

Oregon Board of Forestry – Virtual Public Meeting

Wednesday, January 6, 2021

With the current public gathering restrictions, the Board of Forestry will hold its January meeting virtually to allow interested persons to view the meeting and participate statewide without having to travel or assemble indoors. The Board of Forestry public meeting will be conducted online and streamed live. There will be an opportunity for the public to provide live testimony on the decision item two during the meeting. Written testimony may be submitted for information items, before or up to two weeks after the meeting day to BoardofForestry@oregon.gov with the agenda item number included with the submission.

Link to view Board of Forestry Meeting available at
<https://www.youtube.com/c/OregonDepartmentofForestry>

Prior meetings' audio and this meeting's written material available on the web www.oregon.gov/odf/board. The matters under the Consent Agenda will be considered in one block. Any board member may request removal of any item from the consent agenda. Items removed for separate discussion will be considered after approval of the consent agenda. Public comment will not be taken on consent agenda items.

Consent Agenda

- 9:00 – 9:01 A. **November 4, 2020 Board of Forestry Meeting Minutes** State Forester Peter Daugherty
- 9:00 – 9:01 B. **Trees to Tap – Special Report on Keeping Drinking Water Safe** Thomas Whittington
- 9:00 – 9:01 C. **Regional Forest Practices Committee Appointments and Reappointments** Josh Barnard
- 9:00 – 9:01 D. **Financial Dashboard Report** Bill Herber
- 9:00 – 9:01 E. **2021 Board Governance Performance Self-Evaluation Criteria Review** Sabrina Perez
- 9:00 – 9:01 F. **Carbon in Oregon's Managed Forests** John Tokarczyk

Action and Information

- 9:01 – 9:30 1. **State Forester and Board Member Comments**
- 9:30 – 12:00 2. **2020-2022 Board Work Plans Revision Discussion** Division Chiefs and Program Directors
Board to consider the revisions to the adopted Board work plans developed by Divisions. The Department will seek Board approval on the work plans modifications as presented. This is a decision item.
- 12:00 – 1:00 Lunch
- 1:00 – 1:30 3. **2020 Forest Practices Operator of the Year Awards** Scott Swearingen and John Krause
Department staff will present the Forest Practices Regional Operator of the Year awards for 2020. The program encourages protecting forest resources and values by recognizing operators who have excelled in effort, innovation, cooperation, consistency, and prevention to achieve or surpass the standards of forest resource protection. This is an information item.
- 1:30 – 1:45 4. **Forest Trust Land Advisory Committee Testimony** David Yamamoto or John Sweet
The FTLAC is a statutorily established committee that advises the Board on State Forests policy.
- 1:45 – 2:30 5. **ODF Climate Change Carbon Plan** John Tokarczyk and Danny Norlander
Department staff will present a draft framework of the Oregon Department of Forestry Climate Change Carbon Plan as requested by the Governor's Office per Executive Order 20-04. The plan is additional work, following the reporting previously completed for the Executive Order, and will provide direction for the Board and Department relative to climate change and carbon awareness, as well as outline potential actions for Board consideration. This is an information item.
- 2:30 – 3:00 6. **Board Closing Comments and Meeting Wrap Up** Chair Imeson and Board Members
Board Chair and members to summarize meeting's action items and provide closing comments.

Times listed on the agenda are approximate. At the discretion of the chair, the time and order of agenda items—including addition of an afternoon break—may change to maintain meeting flow. The board will hear public testimony [*excluding marked items] and engage in discussion before proceeding to the next item.* A single asterisk preceding the item number marks a work session, and public testimony/comment will not be accepted.

BOARD WORK PLANS: Board of Forestry (Board) Work Plans result from the board's identification of priority issues. Each item represents commitment of time by the Board of Forestry and Department of Forestry staff that needs to be fully understood and appropriately planned. Board Work Plans form the basis for establishing Board of Forestry meeting agendas. Latest versions of these plans can be found on the Board's website at: <https://www.oregon.gov/odf/Board/Pages/AboutBOF.aspx>

PUBLIC TESTIMONY: The Board of Forestry places great value on information received from the public. The Board will only hold public testimony at the meeting for decision items. The Board accepts written comments on all agenda items except consent agenda and Work Session items [see explanation below]. Those wishing to testify or present information to the Board are encouraged to:

- Provide written summaries of lengthy, detailed information.
- Remember that the value of your comments is in the substance, not length.
- For coordinated comments to the Board, endorse rather than repeat the testimony of others.
- To ensure the Board will have an opportunity to review and consider your testimony before the meeting, please send comments no later than 72 hours prior to the meeting date. If submitted after this window of time the testimony will be entered into the public record but may not be viewed by the Board until after the meeting.
- For in-person meetings, sign in at the information table in the meeting room when you arrive. For virtual meetings, follow the sign up instructions provided in the meeting agenda.

Written comments for public testimony provide a valuable reference and may be submitted before, during, or up to two weeks after the meeting for consideration by the Board. Please submit a copy to BoardofForestry@oregon.gov, and written comments received will be distributed to the Board. Oral or written comments may be summarized, audio-recorded, and filed as record. Audio files and video links of the Board's meetings are posted within one week after the meeting at <https://www.oregon.gov/odf/Board/Pages/BOFMeetings.aspx>

The Board cannot accept comments on consent agenda items or a topic for which a public hearing has been held and the comment period has closed. If you wish to provide oral comments to the Board on decision item two, you must email the Board Administrator at BoardofForestry@oregon.gov; sign up is available only by email, and opens at 6 a.m. and closes at 6 p.m. Monday, January 4, 2021. Instructions for providing public comment virtually will be confirmed by email the day before the meeting.

Three minutes will be allotted for each individual to provide their comments. Those requesting additional time for testimony should contact the Board Support office at 503-945-7210 at least three days prior to the meeting. The maximum amount of time for all public testimony for agenda items with a Board decision will be thirty minutes.

WORK SESSIONS: Certain agenda topics may be marked with an asterisk indicating a "Work Session" item. Work Sessions provide the Board opportunity to receive information and/or make decisions after considering previous public comment and staff recommendations. No new public comment will be taken. However, the Board may choose to ask questions of the audience to clarify issues raised.

- During consideration of contested civil penalty cases, the Board will entertain oral argument only if Board members have questions relating to the information presented.
- Relating to the adoption of Oregon Administrative Rules: Under Oregon's Administrative Procedures Act, the Board can only consider those comments received by the established deadline as listed on the Notice of Rulemaking form. Additional input can only be accepted if the comment period is formally extended (ORS 183.335).

GENERAL INFORMATION: For regularly scheduled meetings, the Board's agenda is posted on the web at www.oregonforestry.gov two weeks prior to the meeting date. During that time, circumstances may dictate a revision to the agenda, either in the sequence of items to be addressed, or in the time of day the item is to be presented. The Board will make every attempt to follow its published schedule, and requests your indulgence when that is not possible.

In order to provide the broadest range of services, lead-time is needed to make the necessary arrangements. If special materials, services, or assistance is required, such as a sign language interpreter, assistive listening device, or large print material, please contact our Public Affairs Office at least three working days prior to the meeting via telephone at 503-945-7200 or fax at 503-945-7212.

Use of all tobacco products in state-owned buildings and on adjacent grounds is prohibited.

DRAFT Board of Forestry Meeting Minutes

November 4, 2020

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Items listed in order heard.

Complete audio recordings from the meeting and attachments listed below are available on the web at www.oregonforestry.gov.

- (1) Presentation, [Fire Season Update](#), Agenda Item 3
- (2) Presentation, [DOJ Memorandum on Statutory Authority relating to Carbon and Climate](#), Agenda Item 4
- (3) Handout, [Written testimony by Wagner for DOJ Memorandum on Statutory Authority relating to Carbon and Climate](#), Agenda Item 4
- (4) Handout, [Written testimony by Anderson for DOJ Memorandum on Statutory Authority relating to Carbon and Climate](#), Agenda Item 4
- (5) Handout, [Oral and Written testimony by Sweet for Forest Trust Land Advisory Committee](#), Agenda Item 5
- (6) Presentation, [Oregon Forest Carbon Accounting Framework](#), Agenda Item 6

- (7) Presentation, [Forest Ecosystem Carbon Report and PNW Forest Carbon Initiative](#), Agenda Item 6a
- (8) Presentation, [Harvested Wood Product Report and Sawmill Energy Report](#), Agenda Item 6b
- (9) Presentation, [Global Carbon Flux and Forest Considerations](#), Agenda Item 6c
- (10) Presentation, [Forest Management Scenarios for Carbon Mitigation](#), Agenda Item 6d
- (11) Presentation, [ODF Urban and Community Forestry Assistance Program - Ramstad](#), Agenda Item 7
- (12) Presentation, [ODF Urban and Community Forestry Assistance Program - Donovan](#), Agenda Item 7
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- (14) Presentation, [Oregon Global Warming Commission EO 20-04 Goal Setting](#), Agenda Item 8
- (15) Handout, [Written testimony by Wagner for Oregon Global Warming Commission EO 20-04 Goal Setting](#), Agenda Item 8

In accordance with the provisions of ORS 526.016, a meeting of the Oregon Board of Forestry was held virtually on November 4, 2020 and hosted at the Oregon Department of Forestry Headquarters on 2600 State Street, Salem, OR 97310.

All Board members joined online by 9:30 a.m. into Zoom webinar. Chair Imeson called the public meeting to order at 10:02 a.m.

Board Members Virtually Present:

Nils Christoffersen
 Cindy Deacon Williams
 Brenda McComb
 Joe Justice
 Jim Kelly
 Mike Rose
 Tom Imeson

Board Members Absent:

None

CONSENT AGENDA:

A. SEPTEMBER 9, 2020 BOARD OF FORESTRY MEETING MINUTES

Approval of Board’s September 9, 2020 Meeting Minutes.

ACTION: The Board approved minutes from the September 9, 2020 Board of Forestry meeting.

B. PERMANENT RULEMAKING FOR SALMON, STEELHEAD, AND BULL TROUT STREAMS IN SISKIYOU GEOGRAPHIC REGION

Oregon Legislature directed the Board of Forestry to adopt rules to make the 2017 board rules regarding salmon, steelhead, and bull trout applicable for the Siskiyou Georegion. These rules shall be effective January 1, 2021. The specific rule would enact stream protections on small and medium fish bearing streams in the Siskiyou Georegion consistent with stream protection rules on salmon, steelhead, and bull trout streams already in effect in the rest of western Oregon. The Board to approve and adopt the proposed final rule language.

ACTION: The Board approved and adopted the Proposed Final Rule Language as submitted with an effective date of January 1, 2021. (Attachment 3).

C. DEQ AND ODF COLLABORATION QUARTERLY UPDATE

Department of Forestry and the Department of Environmental Quality (DEQ) in a collaborative effort are working towards better understanding and alignment of their respective water quality programs. This is an update for the Board and an information item.

INFORMATION ONLY.

D. FINANCIAL DASHBOARD UPDATE

Department provided an executive financial report and summary that will be submitted monthly to the Board. The report to include up-to-date information about the Department's financial condition, the financial and budgetary status, as well as other ancillary topics as appropriate for Board oversight.

INFORMATION ONLY.

E. *PROPOSED FINAL ORDER REVIEW- SISKIYOU CASCADE RESOURCES

The hearing record for contested orders of the state forester (repair orders) involving three forest practices violations by Siskiyou Cascade Resources LLC was considered, and the Board to make a decision on the final order regarding the matter.

ACTION: The Board determined the following:

For ODF Case No. 19-SW002 & 19-SW003

- 1) **FINDS that the exceptions filed by Siskiyou Cascade Resources were not timely, but were considered on their merits in the event that the Board's conclusion as to timeliness is overturned on appeal.**
- 2) **DIRECTS Department to issue a Final Order that incorporates and modifies the ALJ's proposed order with a new time period to comply with the next instream work period.**

For ODF Case No. 19-SW007

- 3) **FINDS that the exceptions filed by Siskiyou Cascade Resources were timely and that it is reasonable to accept an email copy of the exceptions filed by the deadline in light of the current constraints on handling physical documents under the pandemic.**
- 4) **DIRECTS Department to issue a Final Order that adopts the recommendation of the ALJ's proposed order.**

F. OCTOBER 6, 2020 BOARD OF FORESTRY MEETING MINUTES

Approval of Board's October 6, 2020 Meeting Minutes.

ACTION: The Board approved minutes from the October 6, 2020 Board of Forestry meeting.

Mike Rose motioned for approval of the consent agenda items. Nils Christoffersen seconded the motion. Voting in favor of the motion: Nils Christoffersen, Cindy Deacon Williams, Joe Justice, Jim Kelly, Brenda McComb, Mike Rose, and Tom Imeson. Against: none. With Board consensus Items A through F were approved, and the motion carried.

ACTION AND INFORMATION:

1. STATE FORESTER AND BOARD MEMBER COMMENTS [Listen to audio](#) MP3 – (28 minutes and 3 seconds – 12.8 MB)

Chair Imeson commented on:

- Outlined Board proceedings for Board members, presenters, and the public.
- Noted the public meeting will be live streamed, recorded, and posted online.
- Noted written public testimony can be submitted through November 18, 2020, and included with the meeting record.

State Forester Daugherty commented on:

- Discussed diversity, equity, and inclusion as he recognized Native American Heritage month, and the Department's efforts in fostering partnerships with Oregon's tribes. He spoke about the Recreation, Education, and Interpretation program striving to deepen understanding, to engage the public, and create dialogues while exploring diverse topics through social media.
- Described the Labor Day fire event, explaining how the combination of drought conditions, low humidity, and high winds gave way to a historical number of fires and acres burned. He noted the coordinated efforts on all levels that took place statewide to minimize the loss of life, residences, and property. He shared how the Governor has responded to the fire event by standing up a Governor's Disaster Cabinet, a Wildfire Economic Recovery Council, and three taskforces. Listed the three phases of fire recovery, the initial priorities for the state, and coordinated short-term tasks to help inform the recovery process.
- Elaborated on the executive leadership fire recovery coordination and collaboration with natural resource agency directors and federal agency executive partners as they take an all-lands approach to recovery. He shared the leadership's objective, alignment, and recovery priorities to fulfill the economic recovery work.
- Addressed the significant increase to salvage harvest notifications, the gap filled by Oregon Department of Fish and Wildlife and Department of Environmental Quality in supporting the fish habitat and water quality workloads in fire recovery and restoration efforts in the field.
- Noted the intention for the Board meeting being heavily weighted to explore the topic of climate change. Explained status of Department's work in responding to the Governor's letter on Forestry's report in accordance to Executive Order (EO) 20-04. Described the collective feedback received, the prioritization of actions, and the goal to create a Department climate change plan that identifies opportunities and supports leadership actions. He stated a purpose, vision, and set of principles were created to guide the development of the climate change plan, and shared them with the Board. He outlined eight areas of forestry climate actions that the Department will focus on as we produce the next iteration of this report. Closed by providing a rough timeline of drafting and review work, as well as collaboration with the Board before finalization and implementation of the Climate Change Plan.

Board Member Comments:

- Board Member Christoffersen commented about reforestation and afforestation post-fire, inquiring whether stocking rates should be adjusted and tree species propagated, relative to climate change. State Forester Daugherty mentioned the Department is looking as species migration patterns, but has not followed closely the research on stocking rates.
- Board Chair Imeson thanked the State Forester for the work the Department and staff have been doing as part of the fire recovery efforts. He recognized the partnerships, the participation in the disaster cabinet, and extra work everyone has taken on.

Public Testimony: No provision made for public testimony.

INFORMATION ONLY.

2. *HEARINGS BEFORE THE BOARD OF FORESTRY

[Listen to audio](#) MP3 – (10 minutes and 45 seconds – 4.92 MB)

Tim Holschbach, Fire Prevention and Policy Manager, provided an overview of how patrol assessments are determined at the county-level, described the recent assessment and process followed for Tillamook County, and explained how the landowner notifications operate after lands are assessed. He outlined the factors that determines whether a lot can be assessed, the parameters under Chapter 477 requiring forestland protection and described how he reviewed the lot assessed that resulted in the private landowner appealing the County’s determination. Kate Skinner, District Forester for Tillamook District was also present, and had no additional comments.

Bruce Gray, Private Landowner who appealed for a hearing in front of the Board, inquired about the forestland assessment process and how it is applied. He explained his perspective, intentions, and limitations as a landowner. He described what he observed about the assessment process and is striving to find ways to minimize costs as a landowner.

Board members commented on the Hearing before the Board of Forestry Presentation.

- The Board asked Mr. Gray about whether he contacted the Tillamook County classification committee and inquired about why his land was classified as forestland. Mr. Gray described his discussion with a local district representative but explained how he was still unclear about the timing of the assessment and the difference between his land over his neighbor’s. A board member offered an example of how their land was evaluated as part of the classification process and explained how the Board does not have the authority to overturn an assessment made at the county-level but recommended for the landowner to connect with the forestland classification team in Tillamook County.

Public Testimony: No provision made for public testimony.

ACTION: Adopt the proposed final order as written for Mr. Bruce Gray.

Joe Justice motioned for approval of the staff recommendation to adopt the proposed final order as presented for Mr. Bruce Gray. Mike Rose seconded the motion. Voting in favor of the motion: Nils Christoffersen, Cindy Deacon Williams, Joe Justice, Jim

Kelly, Brenda McComb, Mike Rose, and Tom Imeson. Against: none. With Board consensus the motion carried.

3. FIRE SEASON UPDATE

[Listen to audio](#) MP3 - (57 minutes – 26 MB)

Presentation ([attachment 1](#))

Doug Grafe, Fire Protection Division Chief, provided an overview of the presentation. He reviewed the COVID-19 organization, structure, and utility of modules in the fire camps this last fire season. He commented on the drought monitoring across the state and explained how these conditions, along with the weather phenomena on Labor Day, contributed to the fire expansion. He described the various fires that ignited as a result of the Labor Day fire event, summarizing the total acres burned, structures lost, and estimated gross cost to the Department. He listed the fire statistics to date, noting the number of fires, causes of these fires, and the acres burned. He explained that 94% of fires were kept at 10 acres or less to date in 2020 and reviewed the 10-year averages.

Grafe reviewed the gross cost year-to-date of the Department's large fire costs over a 14-year duration and provided an update on the fire protection financial summary as of October 28, 2020. He reviewed the safety statistics for the fiscal year (FY) 2020, including the number of injuries, hours worked related to injuries tracked, and the five-year average of injury claim frequency for the Department. He highlighted the severity's program total program flight hours, aircraft utilization and described scenarios of resource allocation (e.g., infrared detection systems). He commented on the resource availability in Oregon, explained how landowner and Protection Associations contribute to fire suppression and resource coordination efforts. He recognized the Rangeland Fire Protection Associations, operators, and landowners who assisted in the 2020 fire efforts. He noted the trending increase in fire severity for Oregon and how this relates to the Department's century of fire history, explaining how 2020 is the largest year for fire in the 100-year duration.

Grafe commented on the scope of work anticipated for the Fire Protection Division and Department regarding the Governor Wildfire Response Council, response and mitigation, and recovery efforts. He closed by acknowledging the complete and coordinated system Oregon has in place and how Oregon was able to achieve the many successes on the landscape in 2020.

Board members commented on the Fire Season Update presentation.

- Board Chair Imeson shared gratitude towards Division Chief Grafe and the many teams' tremendous work over the fire season. Board members concurred with the Board Chair statement and offered additional recognition.
- Board member asked questions on fire season severity relative to Energy Release Component (ERC) trends to gain a better understanding of the data presented, the elements driving the ERC trend upwards, and if any regional variations exist. Hoped with further understanding, the Board and Department can respond to the ERC trends in a strategic way, beyond suppression efforts. Grafe explained the 30-years of data presented is a culmination of all local district's data relative to the ERC trend. He noted southwest and eastern Oregon areas are driving the trend and described how climate, fuel conditions, as well as live and dead fuel moistures are indicators for how much energy a fire can generate.

- Board member congratulated Division Chief Grafe and his team for their work in responding to COVID-19 and accomplishments relative to the recent fire season. Inquired about whether any language is being developed to distinguish between the Labor Day fire event and other fires on the landscape. Grafe commented on how there have been half a million-acre fires in Oregon's history and the inevitability of fire on the landscape into the future. He referenced the work done through the Governor Wildfire Response Council in areas of fire suppression, mitigation, and community recovery. He noted the Council's balanced approach in coming to terms with fires being a part of the landscape and how Oregon will adapt to this understanding. Grafe remarked on aligning suppression with the reality of increased fire activity across the landscape and think about the policies laid out in the Council's mitigation work, which can help the Department in wildland-urban interface areas and across the entire landscape.
- Board member thanked Division Chief Grafe and his team for their commitment to protecting human life and property during the fire season. Asked if fire ecological benefits within the forest recovery efforts are being considered and whether greenhouse gas emissions are being accounted for in fire efforts. Grafe discussed the mitigation efforts taken by the Department and Board in prescribed burning and how ecological benefits will be assessed as the land is being treated but noted the infancy of this program. State Forester Daugherty noted the Forest Carbon report contains data on 300 plots in the fire footprint and includes many forest pools across Oregon. He commented on the future research opportunities, restoration of tree species diversity, and accounting for fire effects on a landscape scale. He noted that fossil fuel emissions associated with forest protection, suppression, and recovery efforts are being accounted for but are not distinct from the other consumption of fossil fuels.
- Board member commented on the asset of a coordinated system, organized fire communities, and the innate culture of working together that occurs during fire season in Oregon.
- Board member noted the increasing fire severity situation that Oregon is operating under and inquired if forest management techniques implemented prior to Labor Day will be evaluated as effective or ineffective in minimizing fire on the landscape. Grafe described the Division's work relative to fire behavior and how Oregon State University (OSU) is a key partner for this work. He also highlighted the cohesive national strategy and Oregon's leadership engagement across many levels of government to create these strategies. Felt good about Oregon's position and the strategic plan in place. State Forester Daugherty noted that a group is being formed to research and monitor the burned areas, noted how patterns that emerge may not be uniform in terms of fire severity, and cannot speculate how burned areas relate to forest management.

Public Testimony: None

INFORMATION ONLY.

4. DOJ MEMORANDUM ON STATUTORY AUTHORITY RELATING TO CARBON AND CLIMATE

[Listen to audio](#) MP3 - (32 minutes and 40 seconds – 14.9 MB)
Presentation ([attachment 2](#))

John Tokarczyk, Policy and Analysis Unit Lead for the Partnership and Planning Program, introduced the presenters and the scope of the presentation.

Danny Norlander, Forest Carbon, and Forest Health Policy Analyst, provided a brief overview of the topic on statutory authority for the Board, the objectives for the information presented relative to climate change, and future policy work. He explained this topic does not directly correspond to the Governor's Executive Order (EO) 20-04 but may overlap with the work being done by the Department in response to the EO. He referred to the Department of Justice to conduct the main presentation.

Matt DeVore, Assistant Attorney General from the Department of Justice (DOJ), Natural Resources Section, explained what DOJ prepared to share with the Board and public about Board's statutory authority as delegated by the Oregon Legislature. He noted that public release of the memorandum is not intended to waive the attorney-client privilege as to any communications on the subject to the memorandum. He described the approach taken to research, review, and respond to each of the Board questions, as well as explained the intention for pairing each question with a statute citation. He reviewed the best practices in interpreting these statutes, noting that closely related statutes were considered as they can provide context to explain Board authority and listed areas the memorandum does not cover.

DeVore reviewed the eight questions submitted by the Board at the June 3, 2020 meeting. He provided a brief response to each question in sequential order and outlined the Board's authority according to the Oregon Revised Statutes (ORS) listed. He explained the criterion for each response, as the scope of the Board's statutory authority may apply differently to the statutes listed in the [presentation](#), and outlined any scope constraints relative to the subject the Board may want to provide a policy for. He referenced Legislative history to provide context for the Board's ability to set policy or engage in rulemaking, noting that this information is available in the appendix of the DOJ [memorandum](#). He explained how the last question was the amalgamation of the Board's overall authority to address climate change pursuant to Chapters 526 and 527. He described the broad policy statements that can be made under these authorities. He also informed the Board of a typo located on page five of the memorandum in answer number eight that ORS 526.630 should be ORS 527.630.

DeVore closed by mentioning the criterion of ORS 527.714 (5) act as the sideboards that were set by the Legislature and would need to be met before any rules under this category could be enacted and requires scientific evidence and monitoring to be found.

Board commented on DOJ Memorandum on Statutory Authority relating to Carbon and Climate presentation.

- Board had a clarifying question on number seven, response item G, related to pursuing projects on federal lands under the Good Neighbor Authority. If climate change was predicted to harm wildlife habitat or other stewardship values, would policymaking be allowed under the Board's statutory authority related to Good Neighbor Agreements. DeVore believed the Board may have authority under subsection one of ORS 526.274 and can direct the State Forester to facilitate the development of stewardship contracts, which the Board can guide the goals and objectives of these contractual agreements. He added under subsection one (g), the State Forester can engage in stewardship contract agreements

pursuant to the Good Neighbor Authority to perform any activities with the catch-all to perform other activities that can implement the Board's goals and objectives related to climate change.

- Board asked if there is a parallel between the carbon costs of harvest and carbon storage in harvested wood products relative to the Board's statutory authority. DeVore referred to ORS 526.016, which provides broad statutory authority, and allows the Board to regulate all matters of forest policy and management. Board followed up by asking if carbon costs of harvest are under the Board's authority, and DeVore responded with as long as it relates to forest policy and management.
- Board inquired on new regulations and whether the Board would need research to demonstrate harm has occurred as long as the Board already has scientific evidence to indicate a projection of harm in the future. DeVore explained under 527.714(5)(a) that the Board would have to find monitoring and scientific evidence that future degradation is likely, not necessarily if it has occurred, and noted subsection (c) that any proposed rule reflects available scientific information, monitoring, and field evaluation as the basis to support the Board's decision.
- Board inquired about regulatory moves relative to climate change and carbon. Noted if argued, may reduce property values, and could place the Board's effort at risk to Measure 49 claims. DeVore commented the risk is there but he was not prepared to address the question further at this time. Board followed up with a clarifying question, whether that risk could be avoided. DeVore responded that a rule that was required by federal law could be one of the exceptions to an obligation for the state to pay compensation.

Public Testimony:

- Jeffrey Wagner on behalf of WPD Wind Projects Incorporated provided written testimony ([attachment 3](#)) on the Board's work relative to the Forestry Program for Oregon. Urged the Board to consider adding wind energy as a renewable resource to the list of objectives under Goal G, and offered various points to support their request. Wagner referred to answer one granting the Board broad authority on forest policy or management relative to climate change goals.
- Lauren Anderson on behalf of Oregon Wild provided written testimony ([attachment 4](#)) on the Board's broad authorities. Urged the Board to pursue policies that position Oregon as a national leader in climate-smart forest management. Reflected on the biggest steps Oregon can take to confront climate change. Urged the Board to expand the review of statutes and rules to identify barriers for implementing EO 20-04. Looked forward to an open and transparent revision of the climate change goal G. Asked for recommendation to be produced on how current policies can be updated to best address climate change, greenhouse gas mitigation, and climate adaptation. Encouraged the Department to establish a clear timeline for policy adoption that implements the Oregon Climate Action Plan, and offered points to support their requests to the Board.

INFORMATION ONLY.

5. FOREST TRUST LAND ADVISORY COMMITTEE TESTIMONY

[Listen to audio](#) MP3 - (14 minutes and 6 seconds – 6.45 MB)

John Sweet, Vice-Chair of Forest Trust Land Advisory Committee (FTLAC), and Coos County Commissioner provided oral and written testimony ([attachment 5](#)) about the Board's recent action

to enter the Habitat Conservation Plan (HCP) into the National Environmental Policy Act (NEPA) process. He shared his objection to the Board's decision to move forward with the HCP, commented on the recent litigation and judgment between the State and Counties, and how favorable it would be to mitigate future damages. Listed financial considerations and potential repercussions that could come from the implementation of harvest restrictions. He shared his perspective on rural counties, and the impact harvest reductions may have on his community. He reminded the Board of their duty to the trust lands for management of economic, social, and environmental benefits. Sweet closed by asking the Board to abandon the HCP or demand better terms.

Commissioner Testimony: None

Board commented on the Commissioner's testimony.

- Board Chair Imeson expressed respect for the work the County Commissioners undertake. The Board Chair outlined the factors he considered before making the decision to move forward with the HCP and the NEPA process. He commented on the degree of certainty relative to the Endangered Species Act (ESA) compliance, economic efficiency, and long-term agreement for the Department and Board as land managers. Explained the decision was not taken lightly, and more work is expected, and encouraged the counties to be involved with that work. He expressed the value behind the difference of opinions, and appreciated the continuing relationship between the County Commissioners and the Board.
- Board Members concurred with Board Chair's comments. Member McComb described how the NEPA process is a mechanism for stakeholders to express their perspectives or alternatives, and encouraged Commissioner Sweet as well as other commissioners to engage in this process. Member Kelly appreciated Commissioner Sweet sharing an alternative, larger picture view on the state overall. Sweet commented on how timber harvests and revenue impact critical services.

INFORMATION ONLY.

State Forester Daugherty provided recognition for Dr. Andrew Yost's Departmental Technical Achievement Award, for Andrew's outstanding public service, collaboration on research, and ongoing work in the arena of forest carbon, climate change, and accounting for carbon flux in forests and other products. Yost appreciated the award and had no additional comments. Board Chair Imeson shared his gratitude for Dr. Yost's work and contribution to the Board.

6. OREGON FOREST CARBON ACCOUNTING FRAMEWORK
[Listen to audio](#) MP3 - (11 minutes and 2 seconds – 5.05 MB)
Presentation ([attachment 6](#))

Andrew Yost, Forest Ecologist for the Partnership and Planning Program, provided an overview of the framework of information organized to present on the topic of Oregon forest carbon accounting. He reviewed how specific mandates influence and drive this work, noted where these mandates derive, and described the work completed in response to the charges set. He introduced the presenters, offered a brief biography of the presenter's work, and outlined the presentation order. Yost explained how each set of information presented will illustrate a dimension of the carbon accounting framework relative to the monitoring of historical perspectives, current processes, and

future modeling of forest carbon dynamics. He noted the last presentation will cover forest budget modeling and describe a project collaboration with ODF on simulating the carbon consequences of carbon mitigation in forest management scenarios.

6a. FOREST ECOSYSTEM CARBON REPORT AND PNW FOREST CARBON INITIATIVE

[Listen to audio](#) MP3 - (45 minutes and 6 seconds – 20.6 MB)
Presentation ([attachment 7](#))

Glenn Christensen, an Inventory Analyst with the US Forest Service, Pacific Northwest (PNW) Forest Inventory and Analysis (FIA) program, provided an overview of the presentation objectives. He shared the scope, sampling design, and the recent increase in the number of intensified grids in Oregon. Explained that FIA is a national program, how vast the PNW region is, and noted his appreciation for the Department's collaboration on-field efforts for the region. He reviewed the FIA website reporting tools, inventory database, and resources available to the public. Christensen described the range and type of assessments that utilize the FIA national database information.

Christensen discussed how the PNW-FIA forest carbon and harvested wood products (HWP) reporting is taking place in neighboring states, but for a range of interests. He provided base field data and reviewed how each FIA plot was measured. He defined what is included and excluded from the FIA forest carbon pools, outlining how each carbon stock pool was calculated. Christensen covered multiple aspects from the forest ecosystem carbon report, from estimations of carbon stocks per forest carbon pool to carbon stocks per acre and by ownership. He defined forest carbon flux, described how flux is measured and explained how these estimations of change are summarized as a net flux by each forest carbon pool. Christensen reviewed graphs highlighting the annual carbon flux in different pools for forest ecoregions, ownerships, tree growth, and mortality. He offered another perspective on flux based on westside and eastside county groupings, listing the live tree stocks, ownerships, and associated net carbon flux associated. He summarized the number of metric tons of carbon stored in Oregon forests, the amount of carbon sequestered in Oregon per year, and the net CO2 emissions from wildfire accounted for per year.

Christensen commented on the reporting possibilities with this information collected for the western states. He mentioned the Pacific Temperate Forest Carbon Stocks and Flux Report that pulls together neighboring states and provinces data for regional analysis. Christensen reviewed the project phases, funding, and organizations involved with the report collaboration. He described the report's content parameters, the desired outcomes, and the anticipated timeline for report completion. Christensen shared another collaborative effort around the PNW carbon initiative and the outcomes from the forest carbon dynamics workshop, resulting in three initial research objectives. He outlined the next steps for this project with modeling runs and calibrations with various modeling scenarios. Christensen mentioned another study opportunity that derived out of the recent Labor Day fire event, describing how the analysis would be looking at fire effects through modeling and utilizing the FIA plots impacted by fire across ownerships, forest types, and age classes in the westside of the state.

6b. HARVESTED WOOD PRODUCT REPORT AND SAWMILL ENERGY REPORT

[Listen to audio](#) MP3 - (45 minutes and 38 seconds – 20.8 MB)
Presentation ([attachment 8](#))

Todd Morgan, Director of the Bureau of Business and Economic Research at the University of Montana, opened up by acknowledging the many researchers and organizations contributing to the Oregon Harvested Wood Product (HWP) Carbon and Sawmill Energy Use and Emissions reports. He listed the various activities that captured the Oregon Timber Product Outputs (TPO) information and the multiple team efforts that produced these reports. Morgan explained how the HWP report complements the forest ecosystem carbon analysis and reviewed the HWP model framework. He discussed the HWP data sources, data origins, and the additional parameters included with the model. Morgan reviewed Oregon Timber Harvest from 1906 to 2017, along with the timber harvest volume (i.e., TPO) and annual million metric tons of carbon (MMT C) accumulated for that duration. He provided graphs on Oregon's HWP carbon storage, including solid waste disposal sites (SWDS), the products in use (PIU), and ownership.

Morgan reviewed Oregon's HWP carbon change from 1906 to 2017, related the dips to economic recessions, and explained how the harvested wood products pool is net positive across all years. He described the wood product pools accounted for in the report, listed the type of simulations modeled and the confidence interval for the analysis outcomes. Morgan commented on the annual HWP carbon storage and cumulative emissions for each HWP pool, clarifying the types of emissions tracked with and without energy capture. He explained the importance of understanding HWP utilization relative to carbon storage, emissions, and energy captured.

Morgan reported on the 2017 Oregon sawmill energy use and emission study. He described the scope, participants involved, and data sources. Morgan defined the parameters of the energy consumption and emissions studied. He noted the methodology and units of measurement utilized. Shared the survey's response rate and results of the study for on-site energy consumption relative to the unit of lumber output for Oregon. Morgan reviewed national figures and highlighted the Oregon lumber industry (e.g., sawmills) as one of the largest producers of timber with relatively low consumption of energy per million board feet milled. Morgan offered context relative to the forest ecosystem's total carbon stocks, HWP pools, and fluxes. He closed by reviewing key points and listing additional data on carbon emissions from Oregon logging operations.

- 6c. GLOBAL CARBON FLUX AND FOREST CONSIDERATIONS
[Listen to audio](#) MP3 - (34 minutes and 34 seconds – 15.8 MB)
Presentation ([attachment 9](#))

Werner Kurz, a senior research scientist from the Canadian Natural Resources Forest Service, described the presentation's scope and explained how the global warming goal relates to land sector contributions, particularly forestland sectors. Referenced the International Panel on Climate Change (IPCC) report as it identified pathways to achieve the global warming goal through a dramatic and simultaneous reduction in fossil fuel emissions and increase in land sinks. He explained the scale, the variability, and correlation between these two pathways as it relates to the United States territory. He reviewed a 2019 IPCC report on climate change that identified risks, opportunities, and synergies for carbon reduction through land sector actions, highlighting key messages and conclusions from the report.

Kurz presented a global perspective on how forestland carbon sinks contribute to carbon reduction in the atmosphere and how sustainable land management and other non-land actions could enhance reduction. He reviewed the objectives of Canada's National forest carbon monitoring, accounting, and reporting system (NFCMARS). Kurz provided background on the Carbon Budget Model (CBM) of the Canadian Forest Sector (CFS3) and described how a model is a tool to help forest managers assess the impacts or implications of various forest management strategies. He shared the alternative IPCC model Gain-Loss method used by Canada to calculate stock changes and greenhouse gas (GHG) emissions, explaining the difference between the Gain-Loss and Stock Difference methodologies. He discussed Canada's general approach in using the model, described the data and modeling taxonomies included with this approach, and outlined the verification review process. Kurz explained how the framework for all data is integrated, interpreted, and applied over time. He offered an example of British Columbia forestland, demonstrating how this data can track interannual variability associated with the model's drivers, identify trends, and how GHG emissions change over time.

Kurz offered a systems perspective for the Board to consider when developing mitigation strategies for forestland. He noted how understanding forest products and biofuels used by society links to a better understanding of feasible substitutions and the net impact of emissions in the atmosphere. Kurz reflected on the connection between minimizing net emissions to how land is managed as a whole and focusing on GHG balance, not carbon stacking in forest ecosystems. He explored how to increase forest sinks, design mitigation portfolios, and achieve different climate change mitigation options. Kurz explained that a forest is unable to have maximum carbon storage and maximum carbon uptake simultaneously. He reviewed how the model quantifies mitigation portfolio benefits, calculates forested landscape potential to take up additional carbon, assesses tradeoffs, and evaluates risks of regional climate change impacts. He stated that if one designs mitigation portfolios, one must account for the change in GHG balances in forested ecosystems and harvested wood products and the changes achieved through substitution benefits, and one needs to do that analysis relative to a base case. Kurz commented on the innovational use of wood products and the latest Canadian province research on climate change mitigation in the forest sector. He reviewed wildfire risk relative to climate change, how emissions affect the global forest sink, and the future research in climate solutions that can reduce wildfire emissions while enhancing a forest-based bio-economy. He closed by listing a set of conclusions and references for the information discussed.

Board member Cindy Deacon Williams thanked the Department staff for putting together a series of informative presentations for the Board and shared appreciation for working with everyone as she departed the meeting.

- 6d. FOREST MANAGEMENT SCENARIOS FOR CARBON MITIGATION
[Listen to audio](#) MP3 - (32 minutes and 26 seconds – 14.8 MB)
Presentation ([attachment 10](#))

Kendall DeLyser, Senior Manager of Forest and Climate with American Forests, outlined the presentation objectives, offered background on the American Forests organization, and listed the pillars of research the organization pursues. She explained how climate change is the fastest growing pillar of work and research in this area is driven by the relationship between forests, forest management, carbon, and climate. She provided an overview of a collaborative project with the

Department, along with many other partners as they explore the impacts of forest management on carbon sequestration and storage in Oregon. She described the core modeling and research teams organized to help with the projects under this research subject. Explained the US Climate Alliance grant program assistance for these projects and listed other states that signed up for this modeling and research work to inform their forest management and policy or state climate actions. Noted how this project is separate from the Pacific NW Forest Carbon Initiative but hopes that project will help inform the American Forests work.

DeLyser expanded on the Carbon Budget Model (CBM) of the Canadian Forest Sector, how CBM can be applied to the United States Forest Sector, and reviewed the methodology associated with the model. She noted the uses of the Harvested Wood Products framework in the modeling analysis as different forest management scenarios are evaluated. She described the parameters, scope, and limitations for the modeling outcomes as it relates to state-level analyses. Reviewed how the modeling can be used to compare ecosystem carbon results for various forest management and natural disturbance scenarios. She referenced the multiple assumptions used for these alternative management scenarios and described how CBM modeling can draw up scenarios based on the representative information available in Oregon.

DeLyser spoke on the use of CBM as a tool and part of a greater analysis of forest management and natural disturbance scenarios. Offered historical background on the CBM, listed the credentials tying to existing internationally-recognized criteria, and noted the range of applicable uses of the CBM. She commented on how any tool used to assess potential management scenarios should be grounded in science and realistic landscape conditions. She described the baseline of information CBM contains but noted how the project teams strive to fill any knowledge gaps with literature reviews and surveying on-the-ground conditions for a region to ensure a greater degree of scientific certainty in the modeling results.

DeLyser described how the modeling process is operationalized and implemented through a work plan, which will ensure the project's goals can be attained. She listed the four phases of the work plans and described the tiered progression for each phase. Remarked on how the overall process will be informed by stakeholder engagement, outlined the planned approach for this engagement, and highlighted the engagement objectives. She reviewed the approximate timeline for this collaborative project, noted that results will be shared alongside any forest management or policy implications with the Board and stakeholders. DeLyser closed by reflecting on why this work matters, highlighting five areas of understanding this work can help inform and reminding the Board of the intention for this work.

Board commented on the Oregon Forest Carbon Accounting Framework series of presentations.

- Board asked about the degree of detail that forestland management would be assessed in the PNW-FIA study on fire impacts. Christensen listed the range of information and attributes included with the FIA plots. Board explained how this study could inform forest management and help determine whether management actions are successful in building resilience to climate change and future fires.
- Board inquired whether fossil fuel usage associated with managing the forest preceding a harvest operation can be assessed and included with future iterations of the Harvested Wood Product or Sawmill Energy reports. Morgan stated this level of inquiry was not included

with the scope of the studies, but this information could be attained. Board Chair Imeson commented that Oregon adopted legislation that will result in reductions in fossil fuel content for electricity provided in Oregon, but additional actions may be taken as this issue evolves.

- Board Chair Imeson appreciated the information provided and thanked the presenters for their participation, as this work will be relevant and useful to the Board as they continue to work on climate issues. Board members concurred.
- Board commented on the simulation of forest management activities and inquired about the CBM's ability to simulate silviculture practices or whether another model is utilized. DeLyser expressed that CBM has base operations, but the project team plan to assess how Forest Vegetation Simulator (FVS) modeling, as well as other models, can be incorporated with CBM, if not compared to the modeling results.

Public Testimony: None

INFORMATION ONLY.

7. ODF URBAN AND COMMUNITY FORESTRY ASSISTANCE PROGRAM

[Listen to audio](#) MP3 - (57 minutes and 17 seconds – 26.2 MB)

Ramstad Presentation ([attachment 11](#))

Donovan Presentation ([attachment 12](#))

Shandas Presentation ([attachment 13](#))

State Forester Peter Daugherty introduced the main presenter of this multi-faceted topic, provided some background on the Department's Urban and Community Forestry Program, and offered an overview of what will be covered relative to this program.

Kristin Ramstad, Urban and Community Forestry Assistance Program Manager provided an overview of the major themes relative to urban and community forestry that will be presented. She defined the program's mission, how it is funded, and described the scope of the program's assistance. She provided a modern definition of urban forestry and explained the environmental, social, and economic benefits associated with forest canopy and vegetation in urban areas. Ramstad reviewed the Tree City USA program mission, community-building goals and described the ambassadorship it promotes. She noted how resources can be limited in lower-income communities, and how the program assists those communities whether they are a part of Tree City USA or not. Ramstad outlined the contribution made by trees in urban communities from climate change mitigation to green storm water management, and overall public health. She introduced the Tree Plotter Inventory project, listed the program's features and data uses, and noted the potential future updates. She emphasized how trees are demographic indicators and commented on how the following presenters will explore the impacts trees have in urban areas.

Dr. Geoffrey Donovan, Economist for the US Department of Agriculture Forest Service Pacific Northwest Research Station, spoke on the connection between the human quality of life and mortality in association with the prevalence of trees in urban areas. He outlined three studies that he worked on relative to urban tree presence and public health. Donovan listed the parameters of the studies, the plausible outcomes, and the correlations studied. Donovan noted how trees' presence in urban communities correlates with other social drivers beyond public health and described these

drivers. He explored how tree and vegetation pervasiveness, type, and size can be associated with populations' lifespan and immunities built up over time. He closed by encouraging the continued expanse of tree canopy growth in urban communities.

Dr. Vivek Shandas, Portland State University Department of Urban Studies and Planning, explored how inequitable ecologies are relative to past urban planning practices and how landscapes can mitigate people's experiences in an urban environment. He highlighted a study that assessed air temperatures in cities around the nation, described the method of data collection, reviewed how tree shade is related to ambient temperature and heat exposure, and discussed the high correlation between the presences of heat refuges in racially-diverse or elderly communities. Shandas reviewed the history of federal planning decisions and how these decisions tie to the distributional effects of tree inequities observed in urban landscapes. He explained how landscape legacies can be assessed to form tree-planting strategies that would benefit air quality, ambient temperature, and biological diversity in neighborhoods. Shandas reviewed the impacts of red-lining and ecological implications in communities. He spoke on the proportions between invested and disinvested neighborhoods, as well as tree equity ratio and observed trends in urban areas. Shandas closed by relaying the relationship between patterns of housing and privilege to ecosystems and emphasized how the biological effects of residential segregation are being discussed as social justice and climate change issues persist.

Kristin Ramstad shared appreciation for the presenters' work in urban forestry and noted the importance of checking in with residents about identifying essential services or needs for communities. She explained how urban forestry work informs city planners and neighborhood organizers as strategies are built to implement or enhance social, economic, and environmental benefits within their communities. Ramstad noted the challenges to urban forestry funding, but described the various opportunities this work can facilitate across the state relative to mitigating climate change, engaging with communities in the Wildland Urban Interface on wildfire efforts, and promoting tree canopies through tree inventory administration that can inform urban development. Ramstad closed by exploring how the Department's Urban Forestry program could expand into the future, listed the multiple benefits of an urban forest, and thanked the presenters for sharing the urban forestry story.

Board commented on the ODF Urban and Community Forestry Assistance Program presentation.

- Board Chair Imeson appreciated the coordination of these presentations. He reflected on a past Board tour on urban forestry, noting the value of this tour for the Board and public, and recommended revisiting this topic in a tour-setting with future board members as the issues-relative to urban forestry change overtime. He inquired about the pace of funding and the existing mechanisms in place to keep up with the rate of work and assurance of this work into the future. Ramstad described the Department program's current organization to illustrate the need for more funding in order for the program to be sustainable and grow. Board Chair thanked the presenters for sharing this compelling information with the Board, and other Board members agreed.

Public Testimony: None

INFORMATION ONLY.

8. OREGON GLOBAL WARMING COMMISSION EO 20-04 GOAL SETTING
[Listen to audio](#) MP3 - (26 minutes and 50 seconds – 12.2 MB)
Presentation ([attachment 14](#))

Danny Norlander, Forest Carbon and Forest Health Policy Analyst, provided an introduction to the presenter, an overview of the topic to be discussed, and the connection between the Oregon Global Warming Commission (OGWC) and the Department in responding to the Governor’s Executive Order 20-04. Board Chair Imeson added greater context to the breadth of expertise and work history of the main presenter.

Catherine McDonald, Chair of the Oregon Global Warming Commission, appreciated the introduction, the efforts made by the Department in responding to the recent fire disaster in the State, and the Board’s attention to the issue of climate change. She recognized the Department’s current projects and ongoing work towards creating a climate action plan. She mentioned the growing public interest in the Department as a result of their climate change report, as well as in OGWC to work in tandem with the Department on goal proposal for carbon sequestration and storage, as stated in the Executive Order (EO).

McDonald provided background on land sector offsets in the United States, discussed the current mitigation efforts, and described the range of the potential natural climate solutions available, but explained how a change in management of lands would be needed to achieve these potential outcomes. Shared the six steps planned to develop a recommendation for the Governor and noted how robust stakeholder engagement would be sought for each step. Reflected on the US Climate Alliance that Oregon joined in 2017, described the Natural and Working Lands Initiative established in 2018 with this alliance and noted the World Resources Institute as a leader to assist States as they consider land sector greenhouse gas (GHG) mitigation plans.

McDonald explained how Oregon has the Forest Ecosystem Inventory, Harvested Wood Products, Carbon Reduction Potential Evaluation (CaRPE) tool, and Blue Carbon program to anchor into as OGWC and agency partners assess the potential inventory improvements. She referenced a publication that reported on various scenarios of changes in land management practices and how these scenarios could help the State exceed current carbon emission reduction goals. She elaborated on the climate mitigation goal-setting for Oregon’s natural and working lands, listed the outreach efforts for this work, and described the process to engage the wide range of stakeholders as the recommendation(s) are developed for the Governor. McDonald closed by reviewing the mechanisms assembled by the Nature Conservancy and could be pursued to increase sequestration on working lands in the state arena.

Board commented on the Oregon Global Warming Commission EO 20-04 Goal Setting presentation.

- Board asked how the partnered agencies will be reaching out to landowners to fulfill the survey conducted by American Forests. McDonald plans to work with agency partners to pull together lists, share outreach strategies for coordination of direct outreach, and utilize the data from a recent small woodland owner survey.
- Board Chair inquired what to anticipate in the coming months relative to the climate change work plan. State Forester Daugherty stated the Board’s climate change work plan will be

revised and concentrated work on revising Goal G will be pursued, as it ties directly to the Department's Climate Action Plan and the work for OGWC. He also mentioned the work with American Forests will be in play and the Department's goals will need to be aligned with the Board's updated work plan. McDonald added that partner agencies will also be working with OGWC by providing technical support and coordination of policy information over the next few months. McDonald and State Forester Daugherty expressed how capacity is limited across agencies and identified some limitations of the EO work. McDonald was hopeful in attaining a baseline and reliable data sets for forecasting.

- Board Chair Imeson thanked all of the presenters for coming together to present a great series of information to the Board, which will help lay the groundwork for future Board actions.

Public Testimony:

- Jeffrey Wagner on behalf of WPD Wind Projects Incorporated provided written testimony ([attachment 15](#)) on the revision of Goal G from the Forestry Program for Oregon. Urged to include wind energy generation to support compatible land-use noted in the Governor's Executive Order 20-04. Outlined the statutory citations that allow the Board and Department to make policy and rules relative to forest management. Recommended to consider the inclusion of wind energy and leasing on state forest lands.

INFORMATION ONLY.

9. BOARD CLOSING COMMENTS AND MEETING WRAP UP [Listen to audio](#) MP3 - (18 minutes and 56 seconds – 8.66 MB)

Board Chair, Tom Imeson, reviewed the agenda items in sequential order with Board members and Department staff, and welcomed any closing comments or follow-up questions on topic items.

- Board Member Rose commented on the caliber of the presentations presented to the Board and hoped that new board members would be given access to this information. State Forester explained the hope was for new board members to join today's meeting but reminded the Board that all presentations are recorded for future review and how the information laid a foundation for current members moving forward.
- Board Member Kelly inquired about the next steps on the topics presented relative to Board involvement. State Forester Daugherty outlined the next steps for Board engagement anticipated in January 2021, such as seeking Board feedback on the climate change action plan and public engagement framework, as well as discuss the revisions to the Board's work plans like incorporating the Governor's requests and ensuring the Global Warming Commission direction is aligned with the Board of Forestry policymaking direction. He stated the goal is to continue this work as capacity allows. Board inquired if specific policy options are likely to be produced in response to the Governor's Executive Order 20-04. State Forester noted the climate change action plan listing the framework of eight areas of focus as policy goals to pursue and understand Board direction.
- Board Member McComb asked about whether private landowner incentives will be explored to adopt new or alternative practices that may come out of the American Forests project. State Forester stated if a cap and invest bill is adopted by the Oregon Legislature, a portion of the bill would allocate funds to improve mitigation on working lands. State Forester described the different types of incentives, where funding could come from, and the various

positions landowners have expressed. Board would appreciate more information on the nuances of financial incentive development, implications, and limitations for landowners. Board would like to understand how landowners feel about these incentives and openness to alternative land management. State Forester noted that details of the landowners' financial models are unknown, but a dialogue with landowners on these incentives may be possible. State Forester Daugherty offered gratitude for the extended service provided by the Board members and recognized their service to Oregonians. He shared a few words about the Board member's participation, decisions, and accomplishments made over eight years. The Board Chair appreciated the kind words shared, the opportunity to work with the Department, and to balance difficult issues with the values of stakeholders. Board Chair Imeson and Member Rose thanked the State Forester and Department for the awards. Board Member explained how tough this volunteer role can be, but the Department and the great work that everyone does has helped him fulfill his role with professionalism and integrity. Board member Kelly noted how he will continue to carry the torch regarding safety, and the State Forester commented on how safety has become part of the Department's set of values.

INFORMATION ONLY.

Board Chair Imeson adjourned the public meeting at 5:43 p.m.

Respectfully submitted,
/s/ Peter Daugherty



Peter Daugherty, State Forester and
Secretary to the Board

Agenda Item No.:	B
Work Plan:	Private Forests
Topic:	Water Quality Protection
Presentation Title:	Trees to Tap – Special Report on Keeping Drinking Water Safe
Date of Presentation:	January 6, 2021
Contact Information:	Thomas Whittington, Water Quality Specialist, Field Support Unit, Private Forests, 503-945-7399, Thomas.whittington@oregon.gov Erin Isselmann, Executive Director, Oregon Forest Resources Institute, 971-673-2954, isselmann@ofri.org Mike Cloughesy, Director of Forestry, Oregon Forests Resources Institute, 503-329-1014, cloughesy@ofri.org Jon Souder, Assistant Professor, Forest Watershed Extension Specialist, Oregon State University College of Forestry, (541) 737-8561, jon.souder@oregonstate.edu

SUMMARY

This agenda topic provides information regarding the relation of forest management and drinking water quality from the recently updated research and a new science review titled *Trees to Tap*. The report provides the results of a literature review on the effects of active forest management (harvest, forest roads, and reforestation) on drinking water quality and quantity. In addition to the literature review, community water suppliers who rely on surface water as their primary source were surveyed to understand their operations and priorities, and three case studies were conducted.

CONTEXT

The *Forestry Program for Oregon* describes the Board’s mission, values, vision, goals, objectives, and indicators of sustainable forest management. The Board specifies their goals and objectives for water resources in Goal D: *Protect and improve the physical and biological quality of the soil and water resources of Oregon's forests*. The Board states that this goal is important because clean water is critical to our quality of life; more than half of Oregon's population depends on drinking water supplies that originate on or are protected in part by forestlands. Oregonians also depend on high-quality water for fisheries, industry, recreation, and agriculture. The Board recognizes that private forest landowners’ contribution to providing Oregonians with high quality drinking water is achieved through compliance with state water quality standards (Objective D.7) and through voluntary actions by continuing to support and contribute to statewide efforts under the Oregon Plan for Salmon and Watersheds (Objective D.6).

Additionally, the Board’s guiding principles and philosophies includes a commitment to continuous learning, evaluating, and appropriately adjusting forest management policies and programs based upon ongoing monitoring, assessment, and research (Value Statement 11). The

Board values broad-based, informed public participation and consensus-based decision-making whenever possible (Value Statement 10).

BACKGROUND

The Oregon Forest Resources Institute (OFRI) is a state agency established by the Oregon legislature in 1991, funded by a portion of the forest products harvest tax and governed by a 13-member board. The institute's mission is to advance public understanding of forests, forest management and forest products, and encourage sound forestry through landowner education.

In 2001, the Oregon Legislature established the Institute for Natural Resources (INR) to help link the science-based knowledge and expertise of Oregon's universities with natural resource decision making; and, to provide access to integrated information, data, tools, and knowledge to inform natural resource decision making. The institute is headquartered at Oregon State University and offices at Portland State University.

According to the OFRI Forest Values and Belief Survey (presented at the April 2019 Board meeting; available on request) water quality and quantity are of high public concern. Previously in the year 2000, the Oregon Forest Resources Institute (OFRI) commissioned a study on the effects of forest management on water from forested watersheds. Two decades later, the OFRI Board of Directors felt it was time to refresh that work, and provided funds to the Oregon State University (OSU) Institute for Natural Resources to lead a science-based review of the effects of forest management on drinking water.

RESULTS

Drinking water in Oregon is provided by more than 300 public water providers that rely on surface water from rivers, lakes or reservoirs as their main source to supply about 75 percent of Oregonians with their safe drinking water. With over 50% of Oregon forested in a variety of public and private ownership, forested watersheds are an important source of drinking water. As forest management and drinking water quality are of public concern, the Oregon Forest Resources Institute (OFRI) provided a grant to the Oregon State University (OSU) Institute of Natural Resources to lead a science-based review of the effects of forest management on drinking water which has resulted in detailed science review written by OSU faculty, titled - *Trees To Tap (available upon request)*. The full review has been summarized by OFRI in several documents including a special report (attachment 1) and a summary of recommendations and findings (attachment 2).

RECOMMENDATION

This agenda item is informational only. Board comments, questions and suggestions are welcome.

ATTACHMENTS

- (1) Keeping Drinking Water Safe – Summary of the Trees to Tap Science Review Understanding the Effects of Forest Management on Source Water.
- (2) Trees to Tap – Summary of Findings and Recommendations

TREES TO TAP

UNDERSTANDING THE EFFECTS OF FOREST
MANAGEMENT ON SOURCE WATER



Oregon Forest
Resources Institute

A photograph of a forest stream flowing over moss-covered rocks. The water is clear and flows over several large, rounded rocks covered in vibrant green moss. The surrounding forest is lush with moss and ferns, creating a serene and natural setting.

KEEPING DRINKING WATER SAFE

OUR MOST PRECIOUS RESOURCE

Up to 60% of the adult body is water, and without it life ceases. It is our most precious natural resource.



With so many demands on water, keeping supplies safe for drinking is a critical governmental function, one we often take for granted. We simply turn on the tap, and *voilà!*

In Oregon, more than 300 public water providers rely on surface water from rivers, lakes or reservoirs as their main source to supply about 75 percent of Oregonians with their safe drinking water. Because surface water is especially vulnerable to pollutants, it must be treated before it is safe to drink.

Nearly half the state is forested, so much of Oregon's surface water comes from forested

watersheds. Some of these are publicly owned and managed mainly as a water resource. Others are privately owned and managed primarily for timber production.

Because water quality and quantity are top public concerns, the Oregon Forest Resources Institute (OFRI) commissioned a study in 2000 on the effects of forest management on water from forested watersheds. Two decades later, the OFRI Board of Directors felt it was time to refresh that work, and provided grant monies to the Oregon State University (OSU) Institute of Natural Resources to lead a science-based review of the effects of forest management on drinking water.

The updated report, *Trees to Tap*, is written by faculty from the OSU College of Forestry, who were guided by a statewide steering committee. This brief publication highlights key findings from the full report. In addition, we've included a few profiles of the men and women who work every day to keep Oregon's drinking water safe.



MIKE CLOUGHESY
is director of forestry
for the Oregon Forest
Resources Institute.

A handwritten signature in black ink that reads "Mike Cloughesy".

Trees to Tap: two years in the making

The product of two years of work, *Trees to Tap* engaged a diverse team of six OSU scientists, a steering committee of representatives from 11 different organizations, and input from dozens of community water system managers via a statewide survey. The 250-page report will be published in hard copy by OSU Extension in fall 2020. Also available will be a 150-plus-page atlas of water system maps and data; an annotated bibliography comprising



JON SOUDER served as principal investigator for *Trees to Tap*. He holds a doctorate in wildland resources science.

“Oregon’s extensive and diverse forests generally produce very high-quality water and supply most of the state’s community surface water systems. Forest practices designed to minimize impacts to water quality have improved significantly in recent decades.” – *Trees to Tap*

more than 750 scientific articles; and an appendix with the results of the survey.

“This report represents an opportunity to reset people’s perspectives on forest management,” says Jon Souder, the report’s principal investigator. “A lot of the public’s perspective goes back to the 1960s, but there’s been a huge evolution in forestry practices over the past 60 years. There are still things to be concerned about,” he continues, “but they are different and orders of magnitude less impactful on the environment.”

According to Souder, much of the research to date on the effects of forest management has taken place in upper watersheds, typically far removed from raw water intakes. Thus, he says, *Trees to Tap* exercises caution in making direct connections between forest management activities and community water supplies.

Souder, who joined the OSU faculty in 2015 after 15 years as head of the Coos Watershed Association, says he believes *Trees to Tap* will be of value to both managers of community water supplies and landowners who manage forests within a community watershed.

People engaged in policy debates about active forest management and source water quality will also find it useful, he says.

The report’s finding that the highest-quality source water comes from forested watersheds versus other land uses, and that forest practices that minimize impacts to water quality have improved significantly in recent decades, is encouraging, he says. “We’re fortunate that here in Oregon we have a preponderance of source water that comes from forested watersheds.”

The entire *Trees to Tap* report may be found at OregonForests.org/TreesToTap.

***Trees to Tap* science team:**

Jon Souder, Ph.D., Principal Investigator (PI) – OSU assistant professor and extension specialist, forest watersheds

Kevin Bladon, Ph.D., Co-PI – OSU assistant professor, forest hydrology and watershed science

Emily Jane Davis, Ph.D., Co-PI – OSU assistant professor and extension specialist, collaborative natural resource management

Bogdan Strimbu, Ph.D., Co-PI – OSU assistant professor, forest engineering, resources and management

Jeff Behan, M.S. – OSU senior policy research analyst

***Trees to Tap* steering committee representation:**

Geos Institute

National Council for Air and Stream Improvement

Oregon Association of Water Utilities

Oregon Department of Environmental Quality

Oregon Department of Forestry
Oregon Forest Industries Council

Oregon Health Authority

Oregon Stream Protection Coalition

U.S. Environmental Protection Agency

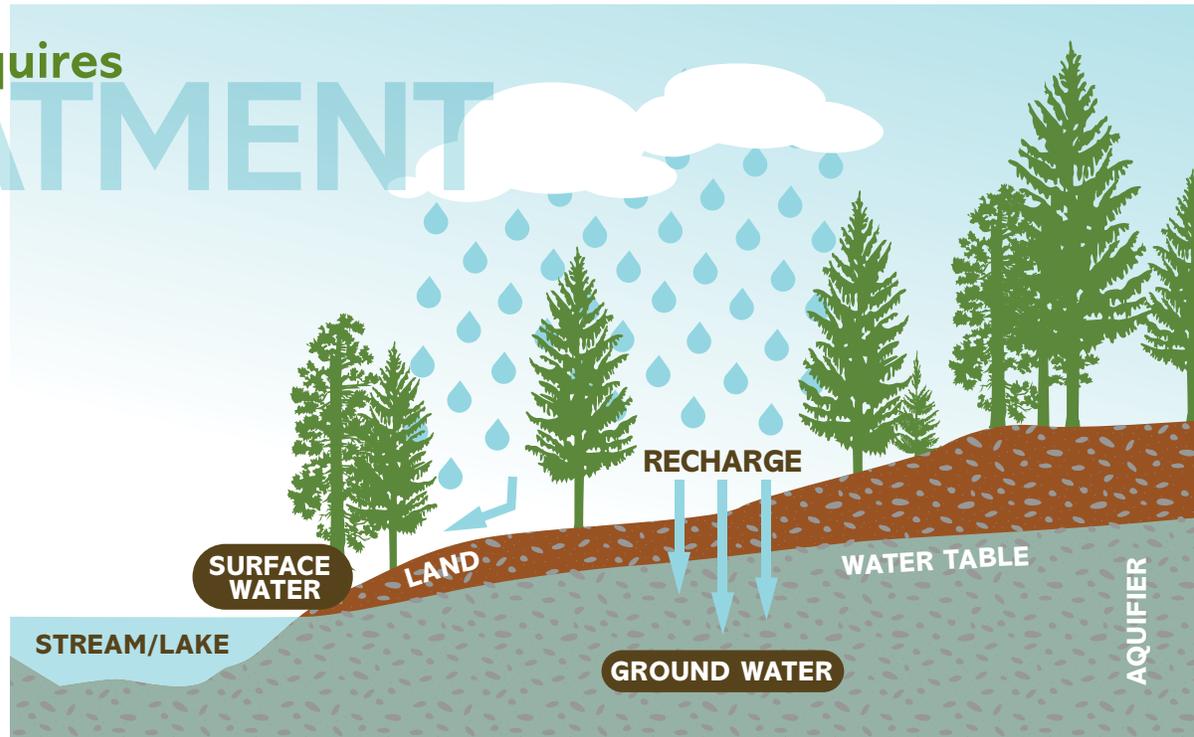
U.S. Forest Service

Oregon Forest Resources Institute
(*ex officio*)

OSU Institute for Natural Resources
(*ex officio*)

Raw water requires

TREATMENT



WHY TREAT WATER?

Treatment removes impurities and kills small organisms that cause disease. Concerns include:

- turbidity and particles
- hardness and total dissolved solids
- color, odor and taste
- dissolved minerals such as manganese and iron
- organisms such as bacteria, algae, protozoan cysts and viruses
- man-made chemicals such as volatile organic compounds, pesticides, endocrine disruptors, nanoparticles, personal care products and pharmaceuticals
- natural organic matter and resulting disinfection byproducts.

The majority of Oregon's 4.2 million residents get their drinking water from large community water systems, many of which rely on forested watersheds for their source water. Many smaller water systems across the state also rely on forested watersheds for clean, easy-to-treat source water.

Two types of water make up our water supply: surface water and groundwater. Surface water flows over the ground or near the ground's surface into streams, rivers, ponds and lakes. This type of water is subject to both airborne pollutants and ground-based contaminants, such as organic matter and eroded soil, human and animal waste, pesticides and other chemicals, and runoff from roads.

As water seeps into the ground, it filters through rocks, roots, soil and organic matter. The water keeps moving deeper into the ground, where it fills the spaces or cracks in the soil, sand or rocks until it gets stopped by a layer of low permeability such as rock or clay. The top of the water is called

the water table, and the water that fills the spaces is called groundwater. Groundwater "recharges" surface water through seeps and springs, contributing to stream and river flows. Groundwater trapped between two confining layers may rise to the surface under pressure, as either a natural spring or a well.

What the report found:

Trees to Tap found that forested watersheds, whether managed or unmanaged, produce higher-quality source water than any other type of surface water source. Forest operations can increase the erosion, transport and deposition of sediment into waterways. Intensive plantation forestry and harvesting change water quantity and quality. Chemical applications result in trace levels in streams. The report found that best management practices, laws, regulations, monitoring and scientific research are all means to protect against these risks and safeguard the quality of source water.

Research is important

As a forest watershed scientist, Ashley Coble understands firsthand the importance of research to address the pressing questions posed by the public about forest management.

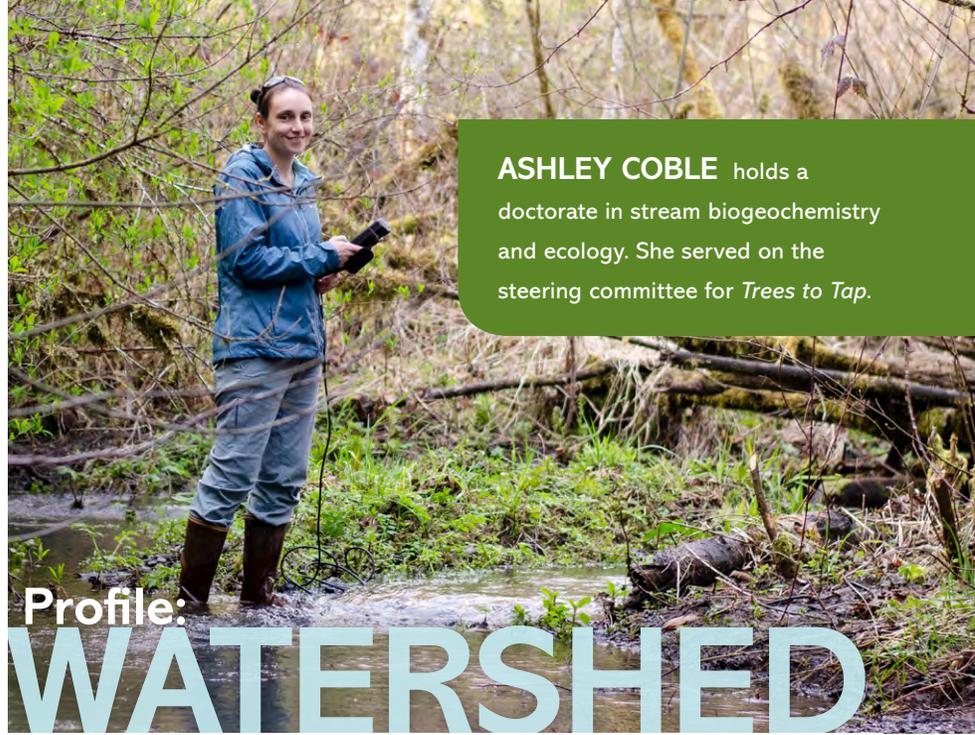
Coble leads the western forest watershed research program for the National Council for Air and Stream Improvement (NCASI). The council is a nonprofit formed more than 75 years ago by pulp and paper companies to lessen the ecological impact of their operations. Today, NCASI's work encompasses the full spectrum of environmental topics that are of interest to the forest products sector.

Based in Corvallis, Coble manages a research program focused on understanding the effects of forestry activities on water quantity and quality. She develops research projects in collaboration with scientists from universities, government agencies and forest sector companies to tackle environmental issues such as understanding stream sediment contributions from natural erosion versus forest management.

Because of her expertise, Coble was invited to serve on the steering committee for *Trees to Tap*. The committee helped the scientific team narrow its scope to four issues at the intersection of forest management and source drinking water: sediment, chemicals, organic matter and water quantity.

"Across all land uses, forestry has a pretty good story to tell, because it has less of an impact on water quality," Coble says.

"We've got a good understanding of what happens in headwater streams," she adds.



ASHLEY COBLE holds a doctorate in stream biogeochemistry and ecology. She served on the steering committee for *Trees to Tap*.

Profile: WATERSHED SCIENTIST

"But to better understand the intersection of forest management with water supply, we need to turn some attention to downstream responses, particularly at scales relevant to drinking water intakes in medium or large watersheds."



NATURE'S FILTER Forests naturally resist erosion that creates sediment. The forest canopy reduces raindrop energy and captures rainfall that evaporates before reaching the ground. Leaves, needles, cones and small branches slow the speed of water reaching the ground. Roots stabilize the forest soil. Trees take up water via transpiration, which reduces soil moisture.



FOREST OPERATIONS

Harvest, roads and chemical use pose water-quality risks

Trees to Tap cautions that timber harvest, roads and chemical use pose risks to source water quality. Safeguarding against this risk requires laws and regulations, constant monitoring and enforcement, management practices based on the best available science and technology, and care taken by skilled loggers and other forest workers. Also, according to the report, increasing effective communication (early, open and often) between forest managers and water utilities offers the best outcomes for both parties.

The potential impact of forest management activities on a particular community water supply is related to the proportion of the watershed affected (both for a single operation and cumulatively), the characteristics of the watershed (slope, geology, rainfall), and how well operations and land management follow required

best management practices. Additional management measures, put in place by skilled foresters, may be needed for sensitive areas or watersheds.

HARVEST. Timber harvest reduces canopy coverage and disturbs soils, which can cause erosion and trigger sediment movement until replanted tree seedlings or vegetation reach sufficient size. The loss of root reinforcement and canopy cover on steep slopes can increase slope instability and the likelihood of landslides.

ROADS. Sediment from forest roads pollutes streams, carries toxic metals and petroleum products, and can clog water intakes. High-risk roads, such as those that cross unstable slopes or that either cross or run adjacent to streams, are more likely to funnel sediment to the stream if not properly built, drained and maintained. So-called “legacy roads,” planned and built a half-century or more ago, are more likely to cause sediment to go into streams than those built and maintained to current standards.

CHEMICALS. The use of chemicals in the forest raises public concerns about their effect on plants and animals, adjacent properties and downstream community water supplies. Herbicides are widely used after timber harvest to slow competing growth in clearcuts until planted trees are established. Other pesticides may be used to control for fungi or insects that attack trees. Nitrogen fertilizers may be applied in timber stands to enhance tree growth.

The following pages delve deeper into the report’s findings as they relate to chemical use, sediment in streams, and the relationship between natural organic material and water treatment products.

Monitoring for compliance

Ashley Lertora drove about 13,000 miles in her state-issued pickup truck in 2019, working for the Oregon Department of Forestry (ODF) in Clatsop County on the Oregon Coast.

As an ODF Stewardship Forester who helps landowners and operators navigate the state's forest practices laws and regulations – and then spot-checks to make sure they comply – Lertora spends 70 percent of her time on the road.

She's one of about 50 ODF foresters statewide charged with providing technical assistance and expert advice to forest landowners and operators about the Oregon Forest Practices Act, as well as monitoring their operations and citing those who fail to meet the law.

With a temperate climate, abundant rain and porous soils, Clatsop County is one of the state's largest timber producers and a center of industrial forest management.



ASHLEY LERTORA

is one of about 50 Oregon Department of Forestry stewardship foresters who provide technical assistance to forest landowners across the state.

Profile:

STEWARDSHIP FORESTER

Seventy percent of the forestland is in private ownership. There are seven major watersheds, including those that serve 10 community water supplies.

Lertora reviews the 300 to 350 notifications of forestry operations filed annually in her region, often visiting each operation in person with the goal of preventing resource damage.

BEST PRACTICES, LAWS AND RULES AIM TO LESSEN FORESTRY IMPACTS

Beginning in the 1970s, Congress and state legislatures took major steps to boost federal and state laws and regulations, as well as best management practices, to better protect drinking water sources.

Best management practices. Oregon's best management practices program is mandated by the Oregon Forest Practices Act (OFPA). Multiple state agencies, including the departments of Forestry; State Lands; Agriculture, Fish and Wildlife; and Environmental Quality, hold some responsibility for best management practice policy development.

State laws. The Legislature passed the OFPA in 1971, and its laws and rules have been modified more than three dozen times since then, in response to new scientific information. Regulations that prescribe how to meet the laws are set by the Oregon Board of Forestry and enforced by the state's Department of Forestry. Most recently, in 2016 and 2017 the OFPA was updated to include 60-foot no-spray buffers for aerial herbicide use around homes and schools; a new salmon-steelhead-bull trout category of stream classification; and wider riparian buffer strips for these streams.

Federal laws. Numerous federal acts and regulations interlace with Oregon

laws to protect drinking water quality. These include:

- Clean Water Act (1972)
- Safe Drinking Water Act (1974)
- Environmental Protection Agency's primary and secondary National Drinking Water Regulations

These regulations set maximum levels on more than 90 drinking water contaminants, as well as non-mandatory water quality standards for aesthetic effects (e.g., taste, color, odor), cosmetic effects (e.g., skin or tooth discoloration) and technical effects (e.g., corrosion, staining, scaling or sedimentation in distribution systems or home plumbing).

CHEMICAL USE

Report studies impact to downstream water sources

Few forestry issues draw more controversy than the use of chemicals, especially aerial herbicide application in forested watersheds that feed community water supplies.

Forest landowners maintain that insecticides, fertilizers and herbicides are important tools in a forester's "toolbox" to protect the landowner's long-term

investment. They believe these tools are necessary for successful reforestation and to increase tree growth and yield, allowing forestlands to remain productive and economically competitive.

Critics raise concerns about chemicals' effect on plants and animals, adjacent properties and downstream community water supplies.



What the report found:

INSECTICIDES. According to *Trees to Tap*, insecticides are rarely used in Oregon's forests. Over a four-year period, 2015 to 2019, the researchers found two instances where foresters applied insecticides on a total of just 161 acres. For that reason, the report focused its attention on fertilizers and herbicides that may affect raw drinking water quality.

FERTILIZERS. Fertilization in Pacific Northwest Douglas-fir plantations usually means applications of nitrogen. If done at all, it generally occurs after commercial thinning to "boost" the growth of remaining trees. Generally, one or two applications is enough. It is typically applied by helicopter and most often delivered as urea pellets, an odorless solid that is soluble in water. Nitrogen runoff can contribute to the growth of algae, which can be problematic in streams and water supplies.

HERBICIDES. Forest landowners use herbicides to aid the re-establishment of tree seedlings following timber harvest. These chemicals are a cost-effective means of reducing competing

vegetation during the reforestation required by Oregon law.

Herbicide treatments can occur prior to timber harvest, after harvest but prior to planting, or after planting. The total number of treatments on a seedling plantation ranges from one to four, depending upon the severity of competing vegetation. Herbicides are also used to control vegetation along roadsides, to maintain visibility and reduce fire risk from vehicles. Herbicide applications can be done by ground or air.

Herbicides target plant life and either kill the targeted plant or suppress its growth. Under federal law and as indicated on forestry herbicide labels, forest landowners are prohibited from applying these chemicals directly to surface water. However, chemicals can still get into water directly by accident, drift during application, volatilization after spraying or through storm water runoff. While glyphosate (the most used chemical) is less mobile in soil, most of the others commonly used (e.g., Imazapyr, MSM, SMM) are moderately to very mobile in soil. Most

“The majority of compounds that present a documented threat to drinking water quality ... are associated with agricultural and urban land-use applications rather than forestry.”

– U.S. Geological Survey

are not volatile, meaning they don't vaporize and become airborne, and most don't accumulate in water and soil.

According to studies reviewed by *Trees to Tap*, traces of herbicides can reach streams via drift during application in the absence of forested buffers, and through leaching or runoff during strong storm events. While herbicide detections downstream were orders of magnitude lower than human health standards, some nearby residents have raised concerns.

In Oregon, authority for development and enforcement of water quality policies related to pesticides such as insecticides and herbicides lies with multiple state agencies. The Water Quality Pesticide Management Team (WQPMT), composed of representatives from these agencies, addresses protecting waters of the state from pesticide contamination. The state's Pesticide Analytical and Response Center (PARC) exists as a unified system of incident reporting.



SAMPLING SHOWS TRACE IMPACTS In addition to reviewing the scientific literature about insecticides, fertilizers and herbicides, *Trees to Tap* identifies six locations where water quality sampling had been conducted. Sampling is done to determine chemical levels likely linked to forest management activities.

The Eugene Water and Electric Board's (EWEB) sampling of the McKenzie River is instructive. Some 88 percent of the McKenzie watershed is forested, with both public and private ownership. Industrial ownership makes up about one-third of the forested portion of the watershed. Sampling over the past decade has found detections of forest chemicals, but at extremely low levels.

According to the EWEB Strategic Plan, quoted in the report, the utility considers forested lands to produce higher-quality water than from any other surface water source. Use of herbicides does constitute a risk, but according to one EWEB report, the utility considers the risk comparatively low (Morgenstern et al., 2017).

The U.S. Geological Survey (USGS) came to a similar conclusion, stating “these results indicate that effects of forestry pesticide use are negligible at these locations in the river system” (Kelly et al., 2012). The USGS continued, “The majority of compounds that present a documented threat to drinking water quality ... are associated with agricultural and urban land-use applications rather than forestry.”

SEDIMENT AND TURBIDITY

How forest operations work to minimize sediment

Nobody wants dirt in their water. Water discolored by fine particles of soil or organic material lacks the clarity we expect. We find it off-putting, plus the material may contain harmful bacteria or chemical pollution. That's why foresters strive to limit sediment delivery to streams from forest operations. And that's why water managers go to great lengths to filter particles from raw water as part of the water treatment process.

Turbidity is a measurement of sediment in water. As a test of water clarity and quality, it is regulated in finished drinking water under the federal Safe Drinking Water Act.

High turbidity levels can challenge the ability of water treatment operators to provide drinking water to communities safely and economically.



KEVIN BLADON is an assistant professor at OSU who holds a doctorate in forest hydrology and wrote the chapter on sediment and turbidity for *Trees to Tap*.

What the report found:

HARVEST. Primary sources of sediment to streams include surface erosion on slopes of the harvest area, roads and trails, stream bed and bank erosion, and landslides.

While contemporary harvesting practices are much less impactful than historic ones, any ground disturbance has the potential to generate sediment. The sediment risk is clearly related to the type of harvest operation, and impacted by geology, soil, topography and rainfall patterns. Sediment

delivery can also occur from past practices, or from operations that are not using best management practices.

In the short run, timber removal can increase stream flows, which can erode stream banks, saturate soils and scour stream beds, remobilizing sediments from past logging and natural disturbances. As stumps decompose, root strength is lost, which can contribute to increased landslide rates. By law and best management practices, forest managers lessen the amount of sediment that gets into water sources by retaining vegetation in buffers on many streams, and creating smaller harvest units.

The report lists a number of factors that contribute to the amount of sediment and turbidity likely to occur at the raw water intake: geology and topography (steepness), proportion of the area harvested, type and size of harvest (clearcut or selective harvest), yarding methods and distance to the water intake. "Distinguishing effects of modern forest practices from those used earlier, and whether increased sediment and turbidity originates primarily from remobilized natural or human-caused sediment within streams, streambank erosion, or sources external to the waterway is difficult and complex," the report states.



LANDSLIDES AND OLD ROADS Haul roads located on steep, unstable terrain, as well as harvest activities, can increase the risk of landslides, which cause sediment delivery to streams. But it's not clear to what extent these landslides affect downstream community water systems. There is extensive knowledge regarding the effects of forest management activities on landslides and sediment delivery to streams. Retention of trees and understory vegetation can mitigate the risk of landslides. However, quantifying direct linkages between upstream sediment inputs from landslides and downstream fluxes in sediment relevant to community drinking water supplies remains limited because of landscape variations and limited research.

Nationwide, state-level monitoring shows generally high levels of compliance with forestry best management practices for roads. However, older roads, also known as “legacy” forest roads, remain. These roads were built without the benefit of current best management practices to minimize their impacts. Often these substandard roads were poorly sited, have unstable fills, were constructed on steep grades or have poorly designed stream crossings. These roads are gradually being either fixed or phased out. From 1997 to 2013, for example, 2,668 miles of logging roads in Oregon public and private forests were closed or decommissioned. According to *Trees to Tap*, the number of such roads exceeds the resources available to fix or decommission them, but remains an issue that needs to be addressed.

ROADS. According to *Trees to Tap*, research consistently indicates that unpaved forest roads are a primary source of sediment entering streams and estuaries in forested watersheds. Any forest road, no matter how carefully constructed, may contribute to soil erosion and potential stream sedimentation.

Over the years, best management practices have evolved for forest road design, placement, construction, maintenance, decommissioning and reclamation. Three examples where significant improvements have been made to reduce the amount of sediment entering streams are:

- actively routing runoff away from streams and toward buffer areas

- improving stream crossings by installing bridges or culverts, to keep road traffic from directly crossing stream channels
- upsizing culvert diameters to increase their flow capacity and reduce the likelihood of failure

Other improvements cited by *Trees to Tap* include locating roads farther away from streams, avoiding impacts to natural drainage patterns, minimizing total area disturbed by decommissioning and sometimes removing unneeded roads, avoiding steep slopes, avoiding wet areas, limiting the number of stream crossings, using more durable surfacing material and improving routine road maintenance.



ORGANIC MATTER

and disinfection byproducts



Treating raw water creates unique issue

Organic matter from plants, animals and other organisms, which serve as food and nutrient sources for aquatic organisms, are important parts of natural ecosystems, but their presence in drinking water requires treatment prior to domestic use. Water system managers use a disinfectant, such as chlorine, to kill harmful bacteria and other organisms. But prolonged contact between chlorine and organic matter can cause chemical reactions that produce what are called “disinfection byproducts,” or DBPs.

Potential health effects of DBPs may include carcinogenicity, adverse reproductive and developmental effects, and immunotoxic and

neurotoxic effects. Federal drinking water rules require treatment systems to disinfect raw water while minimizing creation of DBPs. DBPs are one of the most common causes for exceeding water quality standards in Oregon, affecting 95 systems, large and small, from 2007 to 2017, according to the Oregon Health Authority’s data.

The best way to avoid producing DBPs is to prevent organic matter from entering waterways in the first place. Current forest management practices, such as reducing slash in streams and taking steps to lessen the erosion of organic-matter-rich soil, have decreased the levels of natural organic matter in streams compared to historic practices, but harvest remains a potential source of organic matter in surface water.

What the report found:

Trees to Tap reviewed more than 100 studies regarding natural organic matter, including 30 that are relevant to Oregon. Young forest plantations seem to typically export less organic matter than older stands. Harvest removes a significant source of organic matter, particularly with whole-tree harvesting, a practice where entire trees are cable-yarded to a landing, the branches are removed and the tree is cut into logs. Effectively managing the branch removal can reduce the amount of natural organic matter and nutrients entering waterways.

Only a few papers over the past two decades have studied the relationship between natural organic matter and forest roads. One 2010 study found that the main flush of natural organic matter was triggered by the first major rain event after logging. Natural catastrophic events, such as wildfire and insect outbreaks, and how they might impact natural organic matter concentrations, are a focus of current research, especially with the increasing frequency of these events.

CASES IN POINT

CASE STUDIES HIGHLIGHT RISKS, CONCERNS AND SOLUTIONS Three case studies in *Trees to Tap* illustrate water system types, forest ownership patterns and the partnerships of water systems, landowners and others to address risks and concerns.

CASE STUDY: BAKER CITY



Eastern Oregon city draws water from fire-prone forests

THE WATERSHED. To serve a population of nearly 10,000, Baker City relies on forested watersheds within the 2.3-million-acre Wallowa-Whitman National Forest. Designated a municipal watershed in 1912 and classified as a roadless area, the watershed is closed to the public except for seasonal hunting.

Water treatment occurs in Baker City, though filtration is not required. The department employs five full-time and 20 part-time staff.

The main concern – the forest itself – is a double-edged sword. On the one hand, given the dense, overstocked stands of ponderosa pine and mixed conifers, wildfire is an ever-present risk. Post-fire impacts such as sedimentation and its effects on water treatment infrastructure pose potential issues. However, many slopes in the watershed exceed a gradient of 30 percent, and many are considered “very steep” at over 60 percent, although the well-drained soils reduce the risk of landslides. Thinning forest stands through forest management could lead to increased erosion, turbidity and chemical changes.



Bowen and Bamberger Buildings (Baker City, Oregon) by Visitor7 is licensed under CC BY-SA 3.0

Though Baker City’s population has not changed much over the years, agricultural water use has increased. Allowing enough water for producers is important given the economic significance. Years of drought and reduced snowpack have diminished reservoir supplies. A 2013 outbreak of the microscopic parasite cryptosporidium elevated concerns about straying livestock and wildlife contamination.

ADDRESSING CONCERNS. The Baker City Water Department and the Wallowa-Whitman National Forest are working together to address the many concerns, but such work is not easy given the strictures of forest management within a national forest, especially in a roadless area. Any action is first subject to National Environmental Policy Act analysis, a lengthy process to ensure that forest management activity does not harm the environment, including sensitive wildlife habitat.

SURVEY HIGHLIGHTS WATER MANAGERS’ CONCERNS

In addition to case studies, *Trees to Tap* includes the results of a survey that solicited input from Oregon utility managers regarding the issues they face in managing and protecting their surface water sources.

Among those who responded, the top concerns related to drinking water source management included wildfire, turbidity and suspended sediment, and forest chemicals such as pesticides and fertilizers.



Coastal towns source water from managed forests

THE WATERSHED. The seaside towns of Oceanside and Cape Meares, located on Oregon's north coast, get their drinking water from a two-square-mile forested watershed that drains into small coastal streams west of Tillamook. Raw water is treated and supplied by the Oceanside Water District, which serves a population of 650. The watershed is nearly entirely owned by the private timber companies Stimson Lumber Co. and Green Crow Corp.

The water district operates two treatment plants: one for Cape Meares and the other for Oceanside. The district has one part-time and three full-time employees.

Because of industrial forest ownership, two of the district's biggest concerns are application of forest chemicals and turbidity from forest operations and forest roads. Other concerns include runoff after winter storms and landslides.

ADDRESSING CONCERNS. Landowner Stimson uses an internal checklist to ensure all drinking water suppliers with intakes on its properties are notified about planned chemical applications, in accordance with the Oregon Forest Practices Act. Stimson notifies water managers using a five-step process to help water suppliers take appropriate precautions and prepare reservoir supplies:

1. a minimum of 15 days prior to application
2. on the planned date of the application
3. one day prior to the actual application, if it does not occur on the planned date
4. on the day of application, prior to starting the application
5. when it is completed

Additionally, Stimson foresters work with water district managers and state agencies to develop harvest plans that protect source water quality.

With 94 inches of average annual rainfall, increased turbidity in the two major creeks following seasonal storms is common. Too much sediment can clog the treatment system intake. Slope instability and potential landslides near the intake still pose a concern. Stimson is aware of these concerns and works within the Oregon Forest Practices Act, as well as adding their own additional voluntary measures based on site characteristics, to make sure operations meet the law, protect source water supply and maintain positive relationships with the water district and neighbors.



Forester strives to protect water quality on Oregon coast

Jon Wehage is an engineer, supervisor, contracts manager, husband, father, community volunteer and dog owner. But most of all, he's a farmer — a tree farmer for Stimson Lumber in Tillamook County, where 94 percent of the land is forested.

As a unit forester, Wehage helps oversee operations on some 75,000 acres of Stimson forestland that stretch between the Nehalem and Siletz rivers along the Oregon Coast. Six water systems source their raw water from nine forested watersheds that lie within Stimson's coastal timber holdings. Keeping drinking water safe is a high priority.

"I drink that water. My family drinks that water. All of us who work here in forestry and the mill (more than 100 employees and their families) drink the water that comes off our property, so yes, we want to keep it safe," he says.

In 2019, the company was about to begin harvest in the Short Creek watershed that serves the coastal village of Oceanside. When local citizens voiced concerns about the effects of sediment, landslides and chemicals on their water supply, Wehage met with the water district manager and board members, and later with staff from the Oregon Departments of Forestry and Environmental Quality, to craft a plan to ensure the least impact practicable.

The result was the Short Start logging plan, an 86-acre timber harvest area with the state-required riparian management areas turned into full buffers of unharvested trees



JON WEHAGE is a forester for Stimson Lumber in Tillamook County.

Profile: TREE FARMER

around fish-bearing streams, plus additional buffers around non-fish streams, springs and landslide-prone areas. Wehage will oversee replanting with native tree species. Due to the timing of harvest and reforestation, herbicides will not be required, he says.

The plan prompted this comment from Joshua Seeds, with the Oregon Department of Environmental Quality's Drinking Water Protection Program: "Stimson Lumber's foresters are using leave trees and buffers to protect most of these high-risk features and have done excellent field work, in my opinion."

When dealing with a skeptical public, Wehage's operating principle is basic: show them. "Let's go out into the forest," he says. "And if there's additional protection that would make you as a community water system manager feel more comfortable, then let's talk about it."

CASE STUDY: ASHLAND



City employs unique partnership to protect watershed

THE WATERSHED. The city of Ashland sources its water from a 20-square-mile forested watershed in the Rogue River-Siskiyou National Forest. Access is available to the public.

With 14 full-time staff, the department is one of the larger water agencies in the state.

The watershed faces twin challenges of geology and vegetation. Steep, decomposed granite slopes are prone to erosion and landslides. And forests, because of climate, tree species and hazardous fuels, are prone to wildfire. The issues are many: risk of human-caused wildfire; regional tendency for lightning-caused wildfire; concern about source water contamination from fire

suppression activities such as use of fire retardant; and post-fire impacts, including erosion, sedimentation, loss of tree cover and damage to water treatment infrastructure. Other concerns include the impacts of public use, including driving, hiking and camping.

ADDRESSING CONCERNS. Unique to Ashland's source watershed is the Ashland Forest Resiliency Stewardship Project. This is a multi-partner project that employs forest management to restore historic fire regimes and forest health in the watershed, including reintroducing low-intensity fire to reduce the probability of devastating high-intensity wildfires.

The city of Ashland, led by its fire department, participates in this project, which in 2009 authorized 7,600 acres, or about 60 percent of the watershed, for treatments such as hand and mechanical thinning and prescribed fire. By selectively removing timber, the project can reduce wildfire risk, especially to prevent low-elevation fires from moving to higher elevations. It can also enhance the growth of large trees and protect wildlife habitat. Implementation is done through a 10-year agreement between the city, The Nature Conservancy and the Lomakatsi Restoration Project, a nonprofit organization that develops and implements forest restoration projects. Funding comes from ratepayers through a user fee, as well as the federal government and the Oregon Watershed Enhancement Board.

While the management activity is expensive, sometimes involving costly helicopter logging, the alternative – devastating wildfire damage to the watershed and nearby structures – would be even more costly.

Profile:

CITY WILDFIRE CHIEF

Unique role helps protect Ashland's water source

In a position unique in Oregon, Chris Chambers works as the city of Ashland's wildfire division chief.

Since the city created the position in 2006 and put Chambers in charge, he has helped create Ashland's first-ever Community Wildfire Protection Plan, which set the stage for the city's involvement in the Ashland Forest Resiliency Stewardship Project (see the accompanying case study).

Chambers says one challenge to keeping water supplies safe is leveraging data and using collective scientific and management knowledge to chart a course for the watershed that will soften the impact of climate-driven wildfire risk.

"We know there will be more severe fire," he warns.

Potential solutions include forest thinning, an action Chambers says could increase snowpack and groundwater to streams. Though the watershed rises to 7,500 feet in elevation, snow in treetops evaporates before it can reach the ground and infiltrate soils.

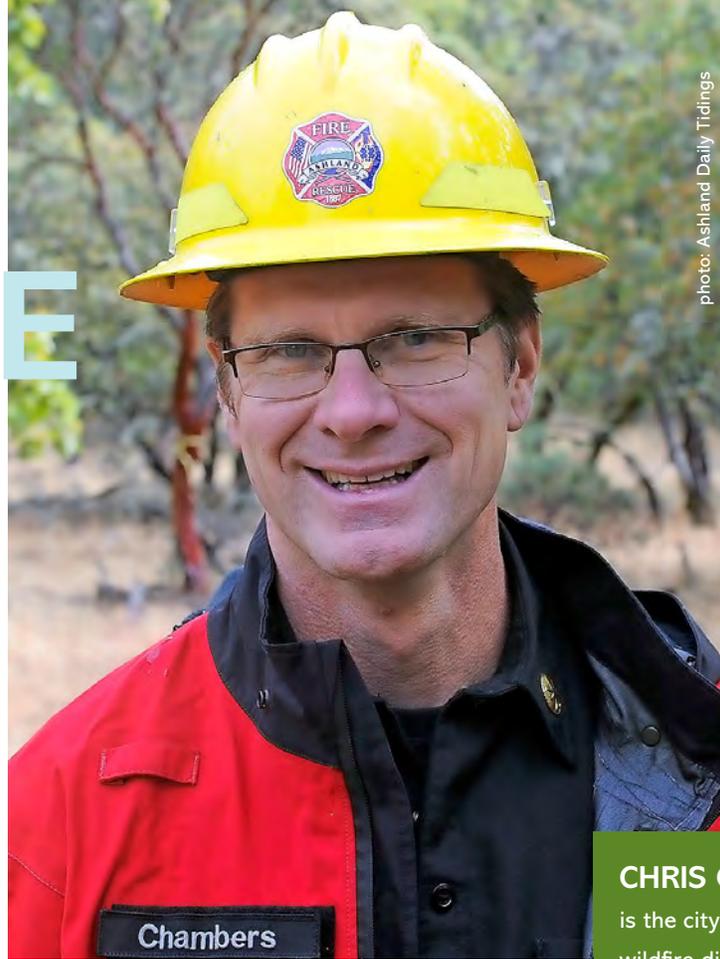


photo: Ashland Daily Tidings

CHRIS CHAMBERS

is the city of Ashland's wildfire division chief.

Managing tree stocking levels could increase water supplies, he says.

A second challenge is re-introducing periodic, low-intensity fire within the federally owned watershed and nearby city and private lands, using prescribed burns. Chambers says southern Oregon's historic fire cycle was every seven to 12 years throughout much of the region's dry forests, a natural cycle that removed excess fuels and diminished the risk of catastrophic fire and the associated negative impacts to water quality.

"We are behind the curve on burn maintenance," Chambers says, also noting that public communication and education are keys to public acceptance of preventive fire.

"We know there will be more severe fire."



WILDFIRE

Fire among the top concerns of water system managers

For three months in fall 2017, the Eagle Creek Fire ravaged the Columbia Gorge east of Portland, spewing hazardous smoke and jeopardizing the city’s Bull Run watershed, the water source for nearly 1 million people.

Prevailing winds pushed the 50,000-acre fire west, away from the watershed. And although wildfire did enter the northern boundary of the Bull Run Management Unit, it did not enter the Bull Run watershed itself or endanger reservoirs and water supply infrastructure. Firefighters contained the blaze, but only with the help of cooler temperatures and autumn rains.

One could say Portland dodged a bullet. Wildfires burn up vegetative cover, including the leaves, needles and branches built up over years. High heat can create hydrophobic soil layers that repel water, reducing the amount that infiltrates the ground. Temperatures of about 200 degrees Fahrenheit cause this effect. The average surface in a forest fire can reach temperatures of more than 1,400 degrees Fahrenheit.

Decreased soil infiltration results in increased overland and stream flow. This can lead to erosion and increased sediment, clogging stream channels and lowering water quality.

What the report found:

While fire effect was not a primary topic for the *Trees to Tap* science review, it does include bibliographic information on the topic. Among the top wildfire concerns identified by community water system managers are increased wildfire risk, wildfire impacts such as erosion contributing to sediment in drinking water sources, and the effects of wildfire suppression, including the addition of chemicals to the watershed from aerial fire suppression.

As part of the *Trees to Tap* project, U.S. Forest Service fire scientists modeled the wildfire risk for all 156 community water systems, to provide information for an atlas in the report as an appendix.

The models showed that rare, large and severe wildfires will continue to occur, especially in the southwest, eastern Cascades and eastern portions of the state. Risk is tied to land ownership. According to those models, public lands will be the leading contributor to burned areas in all but the coastal region, where private industrial lands will be the largest contributor.

The report concluded that a coordinated, collaborative, multi-agency and multi-landowner response is required to reduce the risk of fire exposure to drinking water sources. This can involve thinning out young trees and ladder fuels, and reintroducing fire into fire-dependent forest ecosystems.

Profile: STATE FORESTER

Fire season length, severity influenced by climate change

State Forester Peter Daugherty is unequivocal that climate change is affecting forest conditions in Oregon and elsewhere, but he says it's a change that's difficult to quantify.

But one impact of climate change – increased wildfire – is well-documented, he says.

“We have experienced increased severity and duration of fire seasons in recent years, and the cost of protecting forests from wildfire during those seasons is increasing,” Daugherty says.

Indeed, the threat of wildfire and worries about the state's reaction have grown so large that in January 2019, Governor Kate Brown created the Council on Wildfire Response. In its report issued November 2019, the council underlined the need for “comprehensive change.”

Among its 36 recommendations, the council called for more than 100 new staffing positions at various state agencies, \$20 million in initial investments in non-staffing-related costs, and \$200 million annually to treat 300,000 acres per year to restore and maintain fire-resilient landscapes.



PETER DAUGHERTY heads the Oregon Department of Forestry.

“Planning, collaboration and integrated research will enhance the speed and ease with which we learn.”

Daugherty says the forest sector can take steps now to protect future water quality and fish habitat in the face of climate change.

“If we are serious about understanding the effects of climate impacts on the quality of riparian systems, we must establish and support long-term monitoring and assessments,” he says. “Planning, collaboration and integrated research will enhance the speed and ease with which we learn.”

How the report addresses climate change:

The *Trees to Tap* steering committee did not make climate change one of the four focus topics of the report. Instead, climate change effect was a scientific-literature search topic, and is addressed where it will likely affect those topics. Additionally, the issue was mentioned by some managers in the survey of community water systems. Wildfire is one example of the increased frequency of extreme events expected as a result of a changing climate, and is therefore a concern for water suppliers.

Treatment required before raw water is considered safe to drink

Converting raw source water into safe drinking water entails a series of steps called the “treatment train.” These steps provide an integrated approach, so that if any one step fails there is redundancy to reduce the likelihood of contamination.

Common to treatment processes is the removal of particles and the addition of disinfectants. These can include compounds such as chlorine, ozone or hydrogen peroxide that help control taste and odor, remove particles and disinfect.

Treatment can be any combination of screening, mixing, sedimentation and

filtration. Some systems use ultraviolet (UV) rays to destroy illness-causing microorganisms. UV purification may be used with other forms of filtration such as reverse osmosis systems or carbon block filters.

Three community water systems – Portland, Baker City and Reedsport – do not filter their drinking water, though they do disinfect it. Portland’s system, which serves more than 950,000 metro-area residents, is under federal order to add a filtration plant to remove cryptosporidium, a parasite that can cause respiratory and gastrointestinal illness.

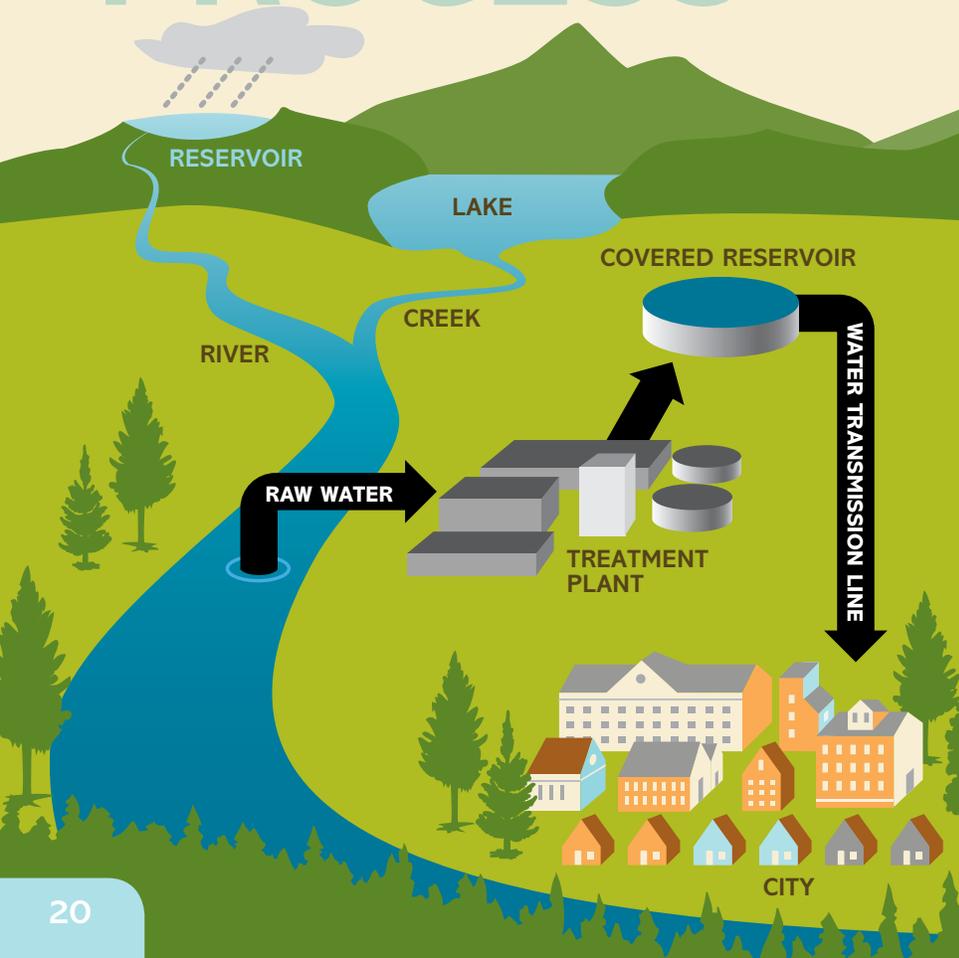
REGULATION OF DRINKING WATER.

The Oregon Health Authority (OHA) regulates the treatment and distribution of drinking water under the Federal Safe Drinking Water Act, while the Oregon Department of Environmental Quality (DEQ) has regulatory authority under the Federal Clean Water Act and state law for point and non-point sources of pollution and attainment of water quality standards. DEQ provides information and assistance to surface water systems, while OHA assists groundwater systems.

Point-source pollution comes from a specific, identifiable source – for example, a manufacturing or sewage treatment operation that discharges treated wastewater into a water body. Non-point source pollution – from forestry, for example – comes from runoff, precipitation, drainage, seepage or changes to waterways.

Since 1972 Oregon has addressed non-point source pollution from forest operations through implementation of the Oregon Forest Practices Act, which regulates logging and other forestry activities to help safeguard drinking water sources.

THE TREATMENT PROCESS



Profile:

CITY WATER MANAGER

Astoria water manager has seen plenty of change

In supplying about 15,000 people with safe drinking water, the city of Astoria has an edge over most other systems: The city owns its own watershed.

During 30-plus years working for the city, Astoria Public Works Department Superintendent Jim Hatcher has seen plenty of changes to how raw water gets transformed into water that's clean, safe and reliable.

Improved filtration, covered reservoirs and dealing with "disinfection byproducts" are all changes that Hatcher and his team of 25 city employees have dealt with over the years. Astoria's water, plus that of five smaller systems, comes from the city-owned Bear Creek watershed, east of town. It's a forested watershed the city manages primarily as a water resource, but also for some timber value.

Hatcher is proud of the city's forest stewardship. Acquired from a private timber company in the mid-1950s, the once cut-over forest is managed carefully to avoid contributing sediment and organic matter to streams that feed the reservoirs. Harvest is selective in the forest, which is managed under standards set by the Forest Stewardship Council (a third-party forest certification program), and consists mainly of thinning and some patch-cuts.



JIM HATCHER

is superintendent of the Astoria Public Works Department.

Heavy gates bar public access to the 3,700-acre watershed. With an average of 72 inches of rain annually but no snow, Hatcher jokes about the region's "rain-pack." Three large reservoirs capture the raw water – more than 350 million gallons – then feed it to four slow-sand-filtration ponds, where natural biological processes filter and clean the water.

Once the water leaves the ponds, it's chlorinated to kill remaining organisms and fluoridated to help prevent tooth decay. The water is then stored in two covered reservoirs before it's ready to be delivered to Astoria residents' taps.

"The city is very, very fortunate to own its own watershed," Hatcher says.

H₂O HELP Community water system managers have a lifeline they can turn to for help and advice: the Oregon Association of Water Utilities.

The Oregon association offers some 400 hours of training annually, hosts five major conferences throughout the year and publishes a quarterly magazine for members. Through its "circuit rider" program, it provides on-site technical assistance to help with distribution, collections, disinfection, treatment and operator certification, among other topics.

Deputy Director Mike Collier says he welcomes active forest management in forested watersheds, provided it's done using best management practices that minimize the delivery of sediment and organic material to waterways.

"Ideally, there should be a strong relationship and good communication between the water system manager and the forestland owner," he says.

What the report found:

A SUMMARY

Forest management's effects require continued study



Trees to Tap includes an extensive chapter on Findings and Recommendations, which can be accessed online at OregonForests.org/TreesToTap. Though it's clear that forested watersheds produce higher-quality raw water than other land uses, concerns still remain, prompting calls for continued study.

SEDIMENT FROM FORESTRY OPERATIONS

The authors found little direct quantitative evidence in the studies reviewed that forestry activities and forest roads impact community drinking water in Oregon. But they point out there is considerable indirect evidence that forestry can have such effects, inferred from the following, among others:

- extensive findings regarding linkages between past and current forest harvest activities, forest roads and landslides in upper watersheds
- cumulative and legacy effects of past harvesting, site preparation, and forest road construction and use when best management practices were not as robust

- “The inherent connectivity of hillslopes, headwaters and larger downstream waterways,” along with the easy movement of fine sediment and turbidity, especially during high flows
- the lack of provisions to protect small, non-fish-bearing and intermittent streams during harvesting

The authors state that the potential for forest operations to affect drinking water quality or quantity is higher for operations in steep, landslide-prone terrain, in areas with relatively more erodible soil and rock types, areas with a significant extent of unbuffered small streams, or where previous operations have left significant amounts of soil or sediment stored in streams.

FOREST CHEMICALS

According to studies reviewed for *Trees to Tap*, traces of herbicides can reach streams during strong storm events, especially the first flush from heavy fall rains.

Most studies on the effects of forest chemicals were conducted on the active ingredient only. In actual use, these chemicals are usually mixed with other ingredients to improve their effectiveness and application. The effects of these mixes are often unknown.

According to *Trees to Tap*, intermittent and non-fish streams can make up a significant portion

of a watershed but may be unprotected by a forested buffer. As noted, foresters may not apply chemicals directly to surface water or protected riparian vegetation. Ten-foot vegetated buffers are required on headwater streams that still contain water in mid-July, but these buffers do not include large trees. Studies show that without larger trees to slow or stop chemical drift, chemicals can drift into protected stream reaches during application, or migrate into streams and flow into lower parts of the watershed, especially during and immediately following post-application storm events.

WATER QUANTITY

Water quantity, also known as “water yield,” following timber harvest is a concern because water system managers need reliable, predictable and sustainable sources of raw water. Variables include geology, soil type, harvest size and harvest proximity to stream channels. According to *Trees to Tap*, study results on this topic vary widely, with some watersheds showing large increases in water yield after harvest and others showing little to none.

Complicating the picture are long-term effects where young, vigorously growing plantations of Douglas-fir yield less water flow during the summer dry season than adjacent old-growth watersheds.

The difficulty of consistently predicting the effects of forest harvest and regeneration on water yield have prompted calls for an expanded research agenda to study the relationship between timber harvest and processes that affect watershed storage.

A TOAST

A quote from *Trees to Tap* bears repeating:

“Oregon’s extensive and diverse forests generally produce very high-quality water and supply most of the state’s community surface water systems. Forest practices designed to minimize impacts to water quality have improved significantly in recent decades.”

Timber has been harvested for well more than a century in Oregon watersheds, historically without best management practices and often with little regard for the consequences. But as in all areas of human endeavor, and as the *Trees to Tap* report demonstrates, we’ve come a long way in our knowledge of human impact and how to live more in harmony with the environment. Moreover, the report suggests ways to continue improving forestry practices and conduct research that can guide management actions in the future.

The men and women who work in the forests drink treated water from those forests. They want safe drinking water, just like everyone else. And as much as anyone, they want to protect source water.

That doesn’t mean the water in our streams is safe to drink without treatment. So, hats off to the 156 community water systems and managers making sure surface water is captured, filtered and treated before it reaches our faucets. They perform an



invaluable service, not only ensuring our water is safe to drink but also that it’s available year-round.

As Oregonians in 2020, this is where we find ourselves: with high-quality water, significantly improved forest practices and the ability to continue improving. And that, I believe, is worth a toast, not only to our forests that supply the raw water, but to those who keep the water safe – from trees to tap.

For the forest,

A handwritten signature in black ink that reads "Erin C. Isselmann".

Erin Isselmann
Executive Director
Oregon Forest Resources Institute



ACKNOWLEDGMENTS

The Oregon Forest Resources Institute is grateful to the people who agreed to be featured here and others who gave their time, expertise, insights and comments during the development of this report: Marganne Allen, Oregon Department of Forestry; Jerry Anderson, Hancock Forest Management; Paul Barnum, past Oregon Forest Resources Institute executive director; Chris Chambers, city of Ashland; Ashley Coble, National Council for Air and Stream Improvement; Mike Collier, Oregon Association of Water Utilities; Peter Daugherty, Oregon Department of Forestry; Jim Gersbach, Oregon Department of Forestry; Jim Hatcher, Astoria Public Works Department; Ashley Lertora, Oregon Department of Forestry; Joshua Seeds, Oregon Department of Environmental Quality; Jon Souder, Oregon State University; and Jon Wehage, Stimson Lumber Co.

ABOUT OFRI

The Oregon Forest Resources Institute (OFRI) was created by the Oregon Legislature in 1991 to advance public understanding of forests, forest management and forest products, and to encourage sound forestry through landowner education. A 13-member board of directors governs OFRI. It is funded by a portion of the forest products harvest tax.



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Resources Institute**

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TREES TO TAP

FINDINGS AND RECOMMENDATIONS



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Trees To Tap: Forest Management and Community Drinking Water Supplies

Final Report to the Oregon Forest Resources Institute

June 15, 2020

Institute for Natural Resources

234 Strand Agriculture Hall

Oregon State University

Corvallis, OR 97331

PREFACE

This report provides the results of a literature review on the effects of active forest management (harvest, forest roads, and reforestation) on drinking water quality. In addition to the literature review, community water suppliers who rely on surface water as their primary source were surveyed to better understand their operations and priorities, and three case studies were conducted.

This Final Report is best characterized as “Working Papers” and will be formally published as a book by OSU’s Extension and Experiment Station Communications after further review and editing. As such, the information provided here is subject to change and revision prior to publication. This report is provided as an interim product to support initiatives of the Oregon Forest Resources Institute (OFRI).

CONTRIBUTORS

Jon A. Souder, Ph.D. Principal Investigator. Assistant Professor in the Forest Engineering, Resources, and Management (FERM) Department; and, Forest Watershed Specialist in the Forestry and Natural Resources Extension Program, and the concluding director of the Watersheds Research Cooperative (WRC). From 2000 until joining OSU, he was Executive Director of the Coos Watershed Association in Charleston, OR, managing their water quality assessment, restoration, and monitoring programs. He has a Ph.D. and M.S. in Wildland Resources Science from the University of California, Berkeley and a B.S. in biology (limnology) from Marlboro College, VT.

Kevin Bladon, Ph.D. Co-Principal Investigator. Assistant Professor of Forest Hydrology in FERM. He is interested in natural (wildfire, pests, pathogens) and human (conventional and salvage harvesting) disturbance effects on water quantity, water quality, and aquatic ecology. Relative to this project, he has previously been involved with transdisciplinary teams, researching the implications of forest disturbance on drinking water treatability. This research examined source water supply and protections strategies to enable both forest and community resiliency to respond to disturbances. He has a Ph.D. in Forest Hydrology from the University of Alberta.

Emily Jane Davis, Ph.D. Co-Principal Investigator. Assistant Professor in the Forest Ecosystems and Society (FES) Department, and Specialist in the Forestry and Natural Resources Extension Program. Her research and technical assistance focuses on natural resource social science, environmental governance, collaboration and partnerships, community development, wildfire response, and science delivery. She has a Ph.D. and M.A. in Human Geography from the University of British Columbia, and a B.A. in History from McGill University, Montreal, Canada.

Bogdan Strimbu, Ph.D. Co-Principal Investigator. Assistant Professor of Forest Management in FERM. His research focuses on strategic forest planning, remote sensing, and biometry. He has conducted research and published on the effects of forest management and petroleum drilling on moose and martin habitat, travel distances for debris flows, structurally complex forest stands, and remote sensing for forest inventories. He has a Ph.D. and a M.Sc. in Forest Management from the University of British Columbia, a M.Sc. in Mathematics/Statistics from Louisiana Technical University, and a B.S. in Forest Operations from Transilvania University, Romania.

Jeff Behan, M.S. Senior Policy Research Analyst, INR. Jeff has over 20 years of experience working with state and federal agencies, universities and native tribes to acquire, synthesize and deliver natural resource science knowledge. Jeff's professional interests include science-based natural resource and water policy, science synthesis and knowledge transfer, sustainability, public land management, river management and outdoor recreation policy and management.

Chapter 8 on Fire Risk was written by **Michelle A. Day**, M.S., Biological Scientist with the U.S. Forest Service, Rocky Mountain Research Station; **Chris Ringo**, M.S., Senior Faculty Research Assistant in the Department of Crop and Soil Science, OSU; and **Alan A. Ager**, Ph.D., Research Forester with the U.S. Forest Service, Rocky Mountain Research Station. In addition to Chapter 8, Ms. Day and Mr. Ringo provided fire risk maps for each of the 156 community water supply watersheds for an accompanying Atlas.

The forest cover change analysis presented in Chapter 1 was conducted by **Robert Kennedy**, Ph.D., Associate Professor in the College of Earth, Ocean, and Atmospheric Sciences, OSU; and **Peter Clary**, Faculty Research Assistant in the College of Earth, Ocean, and Atmospheric Sciences, OSU. In addition to their contributions for Chapter 1, they have created forest cover change maps and data for each of the 156 community water supply watersheds for an accompanying Atlas.

Lisa Gaines, Ph.D. is the Director of the Institute for Natural Resources at OSU and provided convening and facilitation for the Trees To Tap Steering Committee. She has dual B.A. degrees in Economics and International Relations from the University of California, Davis, an M.S. in Agricultural and Resource Economics and a Ph.D. in Environmental Sciences from Oregon State University.

STEERING COMMITTEE

We were fortunate to convene a broadly representative Steering Committee that worked well together. The role of the Steering Committee was to identify priorities for our science review, appraise the community water system survey questions, and review the draft chapters. We did not ask for their approval of the Final Report.

The Steering Committee consisted of:

Marganne Allen was the Forest Health and Monitoring Manager for the Oregon Department of Forestry prior to moving over to the Department of Agriculture towards the end of the project. She is an Oregon State University graduate, with an M.S. in Forest Management/Minor Soil Science and Masters of Forestry in Forest Hydrology.

Seth Barnes is the Director of Forest Policy for the Oregon Forest and Industries Council (OFIC), and prior was the Operations Manager for the Washington Forest Practices Program. He has a B.S. in Forest Management from Oregon State University and attended graduate school for Public Administration and Natural Resource Policy at Washington State University.

Dr. Ashley Coble is a forest watershed scientist with the National Council on Air and Stream Improvement (NCASI). Dr. Coble has a B.A. in Biological Sciences from Mount Holyoke College, an M.S. in Terrestrial Biogeochemistry from Northern Arizona University, and a Ph.D. in Aquatic Biogeochemistry from Michigan Technological University.

Mike Collier is the Deputy Director and Source Water Specialist at Oregon Association of Water Utilities (OAWU), a nonprofit, independent association of 422 water and wastewater utilities that represents water utilities' interests and provides technical assistance. He has an M.S. in Water Resources Engineering from Oregon State University.

Cathy Kellon was the Working Waters Program Director for the Geos Institute during most of this project, moving to be the Columbia Slough Watershed Council's Executive Director in January, 2019. Cathy earned her Master's degree in Geography, with a minor in Interdisciplinary Water Resources Studies, from Oregon State University.

Teresa Kubo was the Environmental Review and Sediment Manager for the Oregon Operations Office, Region 10 of U.S. Environmental Protection Agency, where she worked for last 16 years. She has an M.S. in Forest Resources Management from the University of Idaho, as well as a B.A. in Spanish and International Studies (Emphasis on Natural Resources), also from UI. She was succeeded by **Dan Brown** when she left EPA in July, 2019.

Casey Lyon is the technical services unit manager for Oregon Health Authority Drinking Water Services, currently managing the source water protection team within OHA drinking water services and coordinating drinking water implementation efforts with DEQ partner staff. He has a B.S. in Environmental Studies from the University of Oregon and is a registered Environmental Health Specialist.

Mary Scurlock is Coordinator for the Oregon Stream Protection Coalition (OSPC), representing 20 environmental and conservation organizations in Oregon and Washington. Prior to joining OSPC, Ms. Scurlock was Policy Director for 19 years at the Pacific Rivers Council. She has an A.B. degree from Duke University in Public Policy and History, and a J.D. degree, cum laude, from the Boston University School of Law.

Josh Seeds is a Nonpoint Source Analyst in the Drinking Water Protection program at Oregon DEQ where his work focuses on nonpoint source pollution risks, natural processes, land management, and drinking water provision. He has a B.S in Biochemistry, and an M.S in Environmental Science, from Washington State University.

Brian Staab has been the Regional Hydrologist for the U.S. Forest Service Pacific Northwest Region for the last 11 years, and previously the Regional Hydrologist for the Pacific Southwest Region. Mr. Staab has a B.S. in Civil Engineering from Penn State University, and an M.S. in Hydrology and Water Resources Science from Stanford University.

Mike Cloughesy served in an *ex officio* role as Director of Forestry and project manager for the Oregon Forest Resources Institute. Prior to joining OFRI in 2003, Mike was the director of outreach education at the Oregon State University College of Forestry and the assistant leader of the Forestry Extension Program and Professor of Forest Resources. He has a B.S. in Forestry from Iowa State University and an M.S. in Forest Science from Oregon State University.

CHAPTER 10. FINDINGS AND RECOMMENDATIONS

Jon A. Souder and Jeff Behan

10.1 Introduction, overview, purpose.

Western forests are managed for many diverse purposes, including wood products, recreation, and wildlife habitat. By filtering rain and snowfall and delivering it to streams or aquifers, forests also produce the highest quality and most sustainable sources of fresh water on earth, arguably their most important ecosystem service. The public values water produced from forests very highly, and continues to rank water quality and quantity as primary concerns with forest management. Our extensive and diverse forests generally produce very high quality water and supply the majority of states community water systems. Forest practices designed to minimize impacts to water quality have improved significantly in recent decades. At the same time, demand for all forest ecosystem services continues to rise, against a backdrop of a changing climate and uncertain implications for water derived from forests. Together, these trends point to the importance of maintaining and expanding public awareness of current science knowledge regarding the complex relationships between forest hydrology and forest management.

With support from the Oregon Forest Resources Institute, our group at Oregon State University has spent the last two and a half years evaluating the effects of active forest management on source water quality for community water systems in Oregon. This evaluation included a science review focused on four topic areas: (1) water quantity; (2) sediment and turbidity; (3) forest chemicals; and (4) natural organic matter and disinfection by-products. The 156 community water suppliers in Oregon who rely on surface water as their primary source were surveyed, and three representing different geographic regions (coast, interior valleys, and semi-arid regions) had more in-depth case studies. Additionally, we examined Oregon forest operations notifications for the past four years (about 65,000), paying particular attention to use of forest chemicals, and reviewed incidents regarding chemical applications over the same time period.

In this chapter we pull from the preceding work to summarize our results, and in some cases provide recommendations for policy makers. In the interest of readability, we have chosen not to include citations of research to support each finding. For these citations and details, readers are referred to the chapters specific to each topic and section here.

10.2 Policy-related findings and recommendations

The Oregon Forest Practices Act (FPA) is the state's primary regulatory framework for addressing the environmental impacts of forest operations on state and private forest lands. The FPA sets standards for all commercial activities involving the establishment, management, or harvest of trees in the state. When passed in 1971, the FPA was the first legislation of its kind in the USA. The FPA's first rules were implemented in 1972 and emphasized BMPs, which have since been revised repeatedly in response to emerging environmental concerns and science findings.

The Safe Drinking Water Act (SDWA) was enacted in 1974, and significantly expanded in 1996, specifically to protect drinking water quality. The SDWA focuses on all U.S. surface water or

groundwater sources actually or potentially used for drinking, and requires USEPA to establish and enforce standards to protect tap water. The USEPA National Primary Drinking Water Regulations (NPDWR) are legally enforceable standards, treatment techniques and water-testing schedules that apply to public water systems. The SDWA allows individual states to set and enforce their own drinking water standards if the standards are at a minimum as stringent as USEPA's national standards. The Oregon Health Authority (OHA) regulates the treatment and distribution of potable water under the Federal Safe Drinking Water Act, while the DEQ has regulatory authority under the Federal Clean Water Act (CWA) for point and non-point sources of pollution.

In the past, the CWA and SDWA had mostly separate goals and functions. The CWA focused on environmental protection and maintaining “fishable/swimmable” waters, primarily by identifying and regulating sources of pollution in waterways. In contrast, the SDWA focused on municipal water treatment standards and providing clean drinking water at the tap. Coordination across the CWA and SDWA is motivated by potential synergisms among goals and outcomes of these policies, recognizing that preventing contamination is much more cost effective at providing safe drinking water than removing contaminants or finding alternative water sources after the fact. In 1996, Congress significantly expanded the SDWA to facilitate prevention of contamination through an increased focus on drinking water source protection by requiring states to develop USEPA-approved programs to carry out Source Water Assessments (SWAs) for all public water systems in the state. The DEQ provides reports, general information and technical assistance regarding surface water systems, while the Oregon Health Authority (OHA) supplies these services for groundwater systems. Updated Source Water Assessments (USWAs) with more detailed data, maps, and technical information were completed for roughly 50% of these systems in 2016-2017.

Much of the existing knowledge regarding the effects of active forest management, in particular water and sediment interactions, comes from paired watershed studies conducted from the 1960s-1990s. Funding for long-term, paired watershed studies has declined, so knowledge regarding effects of current practices is more limited. Long-term studies on forestry/sediment/water quality relationships are expensive, time-consuming and thus relatively uncommon. However, major storms and associated peak flows are often a significant or even dominant driver of sediment movement, so whether or not one or more such storms occur during the duration of study can significantly affect results of studies that span only a few years.

- Most studies we reviewed were focused on the effects of forest management on water quality, but few were specific to drinking water quality. We were able to infer effects on source water quality in many cases, but the cause-and-effect linkages were not as direct as we would have preferred.
- Similarly, most of the studies were conducted in the upper parts of watersheds while raw water intakes are located at various and often substantial distances downstream. In addition to forest management, intervening land uses and contaminant sources may also affect water before it reaches an intake. The size of the source watershed, and its mixture of land uses and management actions, often confound the ability to isolate forest management effects.
- Research has identified general patterns for several aspects of forest management effects on water, but findings are often based primarily on a relatively small number of studies and locations. In many

ways, how forestry may affect a particular source watershed represents a unique combination of size, geology, topography, ecology, land use history and also variability in present and future climate.

- Over time, changes related to climate warming are expected to result in significant increases in peak flow frequencies and magnitudes in the Pacific Northwest, especially in snow-dominated watersheds as more winter precipitation falls as rain. This suggests that any effects that forestry activities have on peak flows will intertwine with climate in increasingly complex ways.
- Harmful algal blooms of cyanobacteria (cyanoHABs) are a growing concern because they produce cyanotoxins that can cause sickness and death in humans and are predicted to increase as climate change progresses. Sources of phosphorus and nitrogen that exacerbate cyanoHABs from septic systems, fertilizers, agricultural runoff, and urban and forestry runoff are all likely to come under increasing scrutiny.
- Since 2013, FPA rule compliance monitoring has been conducted by ODF for BMPs related to road construction and maintenance, timber harvesting, some riparian management area measures, measures for small wetlands, and rules for operations near waters of the state. Audits through 2016 indicate generally high compliance rates, e.g. 97% overall compliance for 2016.
- Nonetheless, existing FPA rules are insufficient to protect some water quality attributes. Multiple studies have shown that existing riparian buffers do not meet the “protect cold water” standard. As we’ll see in the Forest Chemicals section, wooded buffer areas on non-fish bearing streams can prevent or reduce pesticide drift. And, as of June 2019, the FPA does not have any water quality-related landslide-prone area rules (although the rules related to landslide hazards to humans and infrastructure provide protection to some areas).

Policy-related recommendations:

1. **Targeted research needed.** Additional research is needed to evaluate the effects of all types of land uses, and particularly forest management, on source water quality. Understanding the connections, and cause-and-effect linkages, between land management activities and source water quality can be improved with targeted studies in the many areas outlined in this report.
2. **Information preservation.** Records retention policies constrained our ability to evaluate longer-term trends for both harvests and pesticide incidents. Most state records (in Oregon and elsewhere) are destroyed after five years. Retention of these records in State Archives would enable researchers to conduct more robust analysis and prediction.
3. **Cooperative planning.** Drinking water protection plans (DWPP) provide a structure and venue for land managers and water utilities to cooperate on maintaining source water quality and quantity in the face of potential changes. The State and other entities (such as NRCS) should continue to provide support and funding for local groups to prepare these plans. Oregon State University can play a supporting role by providing information through its Oregon Explorer web-based service, and expertise in modeling and analysis.

4. **Rules revisions.** The Governor’s 2020 “Oregon Strategy” of state, timber industry, and conservation groups will likely improve water quality to the benefit of community water sources within those areas covered by the agreement. If the Legislature fails to act according to the MOU, the Board of Forestry should entertain rulemaking consistent with the agreement.

10.3 Findings and recommendations related to Community Water Suppliers

In Oregon, 238 source watersheds feed into 157 water treatment plants operated by 156 community water systems (CWSs) that utilize surface water, and shallow wells influenced by surface water, to provide the raw water source for almost 3 million Oregonians. Most (about 75%) of Oregon’s population obtains drinking water from large (serving 10,001 - 100,000 people) or very large CWSs (serving more than 100,000 people), but most (about 80%) of the systems themselves are very small (29% of the 156 total; serving less than 500 people), small (34%; serving 501-3300 people), or medium (17%; serving 3301-10,000 people). Forty-one percent of survey respondents have drinking water primary source watersheds of 10 square miles or less in size. Almost two-thirds of the community water providers dependent on surface water serve small (35% of 156 total) or very small (29%) populations. Their small size limits the human, financial and infrastructure capacity of these providers. Compared to larger CWSs, smaller systems usually face higher costs per unit of finished water delivered, have smaller budgets, and operate with fewer dedicated staff, with some of the smallest systems being staffed by volunteers only. Fifty-eight percent of the Oregon CWSs that responded to our survey operate on a budget of \$500,000 per year or less; 24% operate on a budget of \$100,000 per year or less.

Our survey of CWS showed that the top three general areas of concern among survey respondents were forest harvest and management, stormwater runoff, and ability of the watershed to meet supply demands. Water providers—especially those serving smaller communities—often feel they have little control over activities in their source watersheds that affect the quality of their source water, including: water temperatures, nutrient levels, landslides, riparian buffer blowdown, wildfire risk and effects, forest chemicals, future water quantity, and sediment and turbidity. Large majorities (exceeding 70%) felt they had no control at all over multiple issues. For every issue affecting their source watersheds listed in the survey, respondents’ level of concern over the issue was greater than their perceived control over it, especially wildfire impacts, forest chemicals, floods and sediment, and water temperatures and quantity.

Respondents’ key “lessons learned” via experiences managing source watersheds fell roughly into three categories: the importance of 1) maintaining lines of communication with forest landowners; 2) being proactive and prepared rather than reactive in the face of events and challenges, and 3) actively managing for forest health. Specifically:

- Water provider survey respondents stressed the importance of knowing and communicating regularly with landowners and their agents in source watersheds, including logging crews who were on the ground, to have real-time discussions about forest operations as they occur.
- Respondents stressed the importance of proactively preparing for a range of possible events and situations via regular examination of the source watershed, knowing who to call in the event of

problems, practicing response scenarios, stocking supplies such as filter bags, updating assessments and plans, and having all necessary documentation.

- Some respondents indicated that hands-on, fully-engaged management for forest health, with proactive planning, inventory, monitoring, and activities such as invasive species control and stand improvement, is necessary to maintain source water quality.
- Respondents indicated that their most important partners in managing their drinking water source watershed were private forestland owners (likely because they own many of the drinking water source areas for providers we surveyed) followed by watershed councils and SWCDs.

10.4 Water quantity findings and recommendations

Relationships between forest cover and type, forest management, and the quantity and timing of water produced by forested watersheds have been studied for at least 100 years. Understanding of these relationships has been significantly enhanced by research, especially long-term, paired watershed studies. We reviewed evidence regarding changes in (a) annual flow, (b) changes in peak flows and flooding, (c) changes in low (base) flows, and (d) changes in the timing of water delivery. Throughout, we noted the difficulty in trying to extrapolate from studies that typically took place in higher elevation, small watersheds to effects on downstream drinking water supplies. There is often considerable variability in results, with some studies finding large effects and others none at all. Effects that have been quantified at smaller scales may potentially “scale up” to larger watershed scales, but these larger scale effects are rarely studied and thus remain generally speculative. Lastly, conditions in many watersheds reflect the cumulative effects of actions conducted over the span of many decades of evolving forest management practices.

A substantial body of evidence has nevertheless accumulated, from an increasingly diverse array of research perspectives and methodologies:

- We know with considerable certainty that the percent area of the watershed harvested is the predominant factor affecting changes in stream flow volumes.
- Timber harvesting temporarily increases annual water production, especially in the first few years after harvest, with these increases declining in following years, as vegetation, including planted commercial timber species, establishes and starts growing vigorously.
- By volume, these changes often peak in the fall and early winter. By percentage, the largest changes in low flows often occur in late summer.

Peak flows and floods have implications for community water suppliers in terms of increased sediment transport, turbidity, and mobilization of pollutants, as well as potential damage to water treatment infrastructure. The generally accepted scientific understanding is that:

- Peak flow increases are most prominent for smaller, more frequent peak storm flow events, and these increases tend to decline as peak flow size and basin size increase.
- Snowpack changes related to climate warming are likely to result in large increases in peak flow magnitudes in mountainous areas such as the Cascades and Blue Mountains due to a greater

frequency and magnitude of extreme precipitation events, and a growing proportion of winter precipitation falling as rain instead of snow.

Seasonal low flows are of particular interest because they generally coincide in late summer with the period of greatest demand for drinking and irrigation water:

- Along with rising temperatures, dry years are increasing, low flows are declining and the annual low flow period is lengthening in duration.
- Stands of conifers established after clearcut harvests can, once they are 15 – 20 years old and growing quickly, significantly and persistently reduce summer low flows in comparison to the older stands they replaced.

In summary, the weight of available evidence indicates that forest management can and probably does affect the volume and timing of water delivered from managed watersheds and by extension, community water systems that are hydrologically connected downstream. The limitations on existing knowledge make it difficult to specify these effects for a particular area. However, linkages between water supplies and forest management (e.g., harvesting a significant percentage of the watershed) can be more readily established in smaller systems that are closer to the source watershed than in larger systems that are further away, with more intervening land uses. Finally, climate change and associated shifts in snowpack levels and timing, and in the frequency and severity of extreme weather events, will further complicate an already complex set of factors that influence the amount and timing of raw water provided in actively managed drinking water source watersheds.

10.5 Sediment/turbidity findings and recommendations

Linkages between active forest management and increased sediment loading in streams have been studied extensively and are well-established in broad terms. There is also an expanding body of evidence indicating that modern practices such as improved road building methods and stream buffers have significantly reduced sediment production from forest management activities, and the chances that this sediment will enter waterways. But these effects and findings are highly variable due to the complexity of interactions among factors such as site-specific ecology, geology and geomorphology, management prescriptions and land use histories. The specific sources of mobilized sediment within an actively managed area are also often not clear. Considerable uncertainty remains in predicting precisely how a particular set of forest management actions will affect sediment production in specific cases. Further, there is a paucity of research focused on linkages between sediment inputs related to timber harvesting and associated activities in headwater areas of watersheds and increases in suspended sediment or turbidity in water withdrawn downstream for domestic uses.

A range of potential contributing factors may help explain the lack of research focused on forestry and drinking water linkages. As watershed size and distance from forest management activities increase, it becomes progressively more challenging to isolate and quantify the effects of particular actions. There are usually cumulative effects resulting from forest management in larger watersheds, partly due to variability in forestry activities (e.g. road building and use, harvesting, site preparation) and timing of their impacts on stream sediment, with some actions having immediate effects and others taking years to become apparent. Timber has been harvested for a century or more in many Oregon watersheds,

historically without BMPs in place, with a legacy of sediment production and sediment transfer downstream in many watersheds. Over time, effects accumulate in complex patterns across forestlands managed through multiple harvests and rotations. Distinguishing effects of modern forest practices from those used earlier, and whether increased sediment and turbidity originates primarily from remobilized natural or anthropogenic sediments within streams, streambank erosion, or sources external to the waterway is difficult and complex. Climate variability, the generally episodic nature of sediment movement, and the outsized influence of stochastic events such as infrequent large storms can introduce additional uncertainty into research findings. Finally, in larger watersheds, forest management is often not the only land use or potential source of sediments.

For these reasons, it is difficult to make specific, firm conclusions regarding how, where and the extent to which sediment produced by active forest management in a headwater area affects water quality at a drinking water intake downstream. There is, however, an extensive body of evidence accumulated through forestry and sediment-focused research conducted in upper watersheds that is highly relevant to drinking water quality. Reasoned inferences can be drawn from this evidence base regarding effects on drinking water sources because hillslopes, headwaters, and larger downstream waterways are all elements of fundamentally connected and integrated hydrological systems. Headwater streams comprise about 60-80% of total stream length in a typical river drainage and generate most of the streamflow in downstream areas, and these first and second-order streams cumulatively contribute to, and can profoundly affect water quality downstream.

Headwater streamflow is usually routed efficiently downstream, meaning that management-induced changes in streamflow parameters will accumulate downstream. Because turbidity and fine sediment can be readily transported downstream, changes in headwater inputs of these constituents may be directly linked to downstream conditions. In contrast, linkages between upstream inputs and downstream fluxes for coarse sediment and large woody debris are considerably weaker. It is also important to note the substantial variation in distances between actively managed forests and drinking water intakes across the range of different municipal water suppliers in Oregon. Studies that show forest management activities or forest roads increase sediment production and reduce stream water quality in headwaters can be more reliably extrapolated to drinking water quality effects where intakes are in relatively closer proximity to these management activities and have fewer intervening land uses.

In general, due primarily to the complex interplay of factors outlined above and difficulties in isolating and quantifying the sources and fates of mobilized sediment, we found little direct evidence that forestry activities and forest roads impact community drinking water in Oregon. But there is considerable indirect evidence that forestry can have such effects, and likely continues to have effects in certain cases, inferred from (1) extensive findings regarding linkages between forestry activities and mass wasting in upper watersheds; (2) cumulative and legacy effects of harvesting, site preparation and forest roads dating from periods when BMPs were not as robust; (3) inevitable variability in BMP implementation and effectiveness; (4) the ability of fine sediment to be carried considerable distances, especially during peak flow events; (5) the inherent connectivity of hillslopes, headwaters and larger downstream waterways; and (6) the lack of provisions to protect small, non-fish bearing, ephemeral and intermittent streams during harvesting, and lack of water quality protection provisions for operations in landslide-prone areas.

Key findings are:

- A large body of evidence links forest management activities to increases in sediment production. Most of this evidence comes from research conducted in smaller first- and second-order watersheds, mainly to avoid the confounding effects of other land uses.
- Most available evidence suggests that forest roads, skid trails, log landings and slash burning are more likely to increase sediment mobilization than timber harvesting itself, but considerable knowledge gaps remain regarding the sources of increased sediment loads in streams in specific cases, e.g. roads, general harvest areas, or sources within the stream channel. Soil tracers and sediment “fingerprinting” show promise as research tools to provide insight on the specific sources of sediment associated with forest management.
- In steep terrain, landslides and debris flows have been identified as the primary sources of sediment inputs into streams and have been consistently shown to significantly increase in response to forest harvesting and forest roads in such terrain.

It is generally accepted that modern “best management practices” (BMPs), primarily improvements in road location, construction and use, and riparian management areas (RMAs) with buffers strips of forest vegetation along larger streams, have substantially reduced external sources of sediment into streams resulting from active forest management. However, forestry activities have occurred on a significant scale in Oregon for well over a century, mostly without modern BMPs, leaving a legacy of old forest roads in many watersheds, and unknown but potentially significant amounts of historic “legacy” sediment stored in Oregon waterways.

- Oregon forest practices for activities in landslide-prone terrain and for protection of smaller, non-fish bearing streams have not evolved to the same degree as for activities in other areas; scientific evidence regarding forest management effects on sediment and water quality must be interpreted in this context.
- There is growing recognition of the role and importance of forest harvesting effects on hydrologic regimes as drivers of sediment movement, e.g. the potential for increases in water yields and peak flows after harvesting to remobilize sediment stored in a stream, increasing suspended sediment and turbidity even in the absence of increased sediment inputs from sources external to the stream.
- Variability in research findings across different studies regarding sediment production from active forest management may be explained in some cases or to some degree by differences in geology (soil and rock type) and geomorphology (e.g. slope) and how these factors affect erodibility of sediments.
- The limited evidence available regarding larger, catchment-scale effects of forest operations and roads indicates that suspended sediment increases in the downstream direction as the size of the waterway increases.

In summary, the potential for forest operations to affect sediment mobilization and movement through drinking water source watersheds is higher for operations in steep, landslide-prone terrain, in areas with

relatively more erodible soil and rock types, areas with a significant areal extent of unbuffered small streams, or where previous operations have left significant amounts of bare mineral soil or sediment stored in streams. Linkages between forest management and sediment production will increasingly be complicated (and potentially exacerbated) by predicted shifts in weather patterns associated with anthropogenic climate change, including increases in storm frequency and intensity, and in the proportion of winter precipitation falling as rainfall vs snowfall.

10.6 Forest chemicals findings and recommendations

Chemicals play an integral role in the management of Oregon's forests. Based on an analysis of ODF's FERNS data, there are over 7,400 activities that involve chemical applications on potentially one million acres of Oregon forest land annually, with the vast majority of these being herbicide applications to harvested units. Applications range from herbicide spraying for site preparation prior to replanting, and competing vegetation control afterwards, animal and rodent repellants to protect seedlings, fertilization to increase growth rates after thinning, and for maintenance of rights-of-way for both travel and utility corridors. With the exception of rights-of-way, a defining characteristic of these chemical applications is that they occur infrequently over the 30 – 80 year typical harvest cycle (Figure 6-1). And while the public perceives chemical use in forests as significant, pesticides applied to forest land represent only about from 2.8% (2007) to 4.2% (2008) of those used statewide according to data reported through the Oregon Pesticide Use Reporting System that was defunded in 2009. Accordingly, it's relevant that only 3.5% of pesticide-related incidents from the more recent ODA data involve forestry use of pesticides, and that about half of these are requests for staff to observe applications.

In comparison to other sectors of Oregon's economy that use pesticides, those typically applied in forestry are less toxic to humans, move fairly rapidly through soil and water, and don't accumulate. Most of these are herbicides that are not strongly absorbed (attached) to soil particles, are water soluble, have low volatility (i.e. evaporation and resuspension), and decay rapidly in both water and soil. This means that these herbicides don't tend to build up in the soil or bio-accumulate.

Contemporary best management practices, with a couple of additions, have the potential to protect areas off-site from the pesticide application if followed. Extensive research (and accompanying models) have allowed a better understanding of the importance of droplet size distributions on reducing pesticide drift, as has the development of adjuvants specifically tailored to mitigate drift. Helicopters have precise GPS and nozzle flow data loggers that accurately position the ship both in space and chemical delivery; some models can be preprogrammed to include flight plans that automatically buffer streams and sensitive areas. There is also substantial research from the agriculture community, and one paper reported here from forestry, on the value of wooded buffers to prevent drift into streams. Additions to the Forest Practice Act rules recently proposed through an industry-environmental collaborative process would extend forested buffers along non-fish streams.

The evidence we examined demonstrates that while pesticides are commonly detected in surface waters, in almost all cases they are found in concentrations below levels that can be accurately measured. When quantifiable detections are found, as we've seen from the forestry use studies, they tend to be transient and most likely to occur either during application or in early season storms. In particular, unless live water is directly sprayed (a label violation for herbicides used in forest silviculture),

most herbicide runoff occurs during the first winter storms. In one report this constituted 70% - 90% of the pesticide loadings, a finding that was confirmed by two other studies.

A caveat here, again, is that the impact of forest chemicals on downstream raw source water supplies will depend on the size of the contributing watershed, the proportion annually subject to chemical applications, and other land uses in the basin. There are substantial knowledge gaps regarding the exact timing, locations, areas, amounts and formulations of forestry pesticides applied and also the effectiveness of BMPs for their use. These knowledge gaps can be at least partially addressed via more rigorous monitoring and reporting. If chemicals are to continue to be an acceptable tool in forest management from a public perspective, there is the need for investments in understanding their fates at the watershed/catchment scale. Also, most studies on the effects of silvicultural chemicals to investigate their safety prior to being authorized for public sale and use were conducted on the active ingredient only. In actual use, these chemicals are just about always mixed with other active ingredients and/or adjuvants. The effects of these "tank mixes" are often unknown.

Recommendations related to forest chemicals:

1. ***Pesticide use data needs to be reported.*** It is difficult for the stakeholders and the affected public to understand the impacts, positive and negative, of forest chemicals without good reporting data. This is part of a larger concern over pesticide use relating to air and water quality in Oregon. At present, data on pesticide and chemical use is not routinely reported, even at the aggregate level. While ODF FERNs provides information on where and possibly when forest chemicals will be used, it allows multiple chemicals to be listed over long periods of time, with no subsequent reporting on what was actually applied unless a complaint was filed. In 1999 the Oregon Legislature created the Pesticide Use Reporting System (PURS), but it was never adequately funded and implemented. When its sunset provision was proposed for renewal during the 2019 Legislative Session in HB2980 there was broad support from across the political spectrum (Oregonians for Food and Shelter to the Farmworkers Union) for PURS to be extended and funded. This bill died in the Ways and Means Committee as the Legislature adjourned. A bill more specific to forestry was also introduced, HB4168 that implements the aerial application procedures and reporting requirements identified in the Memorandum of Understanding for the "Oregon Strategy" drafted by the timber industry and the conservation community. This bill, too, died prior to passage in the House with adjournment. The Board of Forestry and ODF could by administrative rule change its notification system to require reporting and disclose chemicals used in management operations.
2. ***Current water quality sampling efforts are insufficient.*** A corollary to the lack of pesticide use information is the relative sparseness of data on potential pesticide loadings in surface waters, particularly at the raw water intakes for public water supplies. Most current sampling at raw water intakes is not correlated with times of likely chemical pulses, i.e., the early winter storms. Moreover, it's clear from the silvicultural herbicide applications studies reviewed that detections and concentrations in receiving waters are highly variable even within a storm event. There is a similar constraint in the grab samples and automatic samplers that are commonly used: they provide detection and concentration information at point(s) of time, but not loads (i.e., the total mass of the substance transported in water over a given period of time) since stream discharge is usually not measured during the sampling. Sampling and analysis techniques developed and applied by the

U.S.G.S., such as POCIS and SPMD have the capability to accurately integrate pesticide concentrations over longer time periods and, in conjunction with streamflow, the ability to estimate loads. These devices could be particularly beneficial at raw water intakes where there is concern over pesticide loadings and the quantity of water flowing into the intake is known.

3. ***Study designs need improvement.*** The majority of studies focused on assessing the impact of pesticides on water quality can be loosely characterized as “reconnaissance” or “case studies” because of their study design and limited replicability. Most of the pesticide/herbicide peer-reviewed studies in the Pacific northwest, and other areas of the U.S. were conducted by industry or industry-supported organizations (NCASI) and tend to be short-term and locally-focused. They have the advantage of knowing exactly when and what was applied, have more site-specific sampling, but are limited because the applicators know that they are being studied which may affect their behavior. In contrast, the PSP and USGS studies sampled over a longer period, but the PSP studies didn’t have exact amounts and timing of application, and may have missed storm events; while the USGS studies using a sampling method that integrated pesticide concentrations over time, but was still limited because of unknown application amounts and timing. Improved study designs would incorporate random, applicator- and landowner-blind sampling of pesticide applications. This approach is critical for developing replicable and reliable scientific results.
4. ***Pesticide fate modeling is a critical need.*** Inference based on downstream measurements includes complex interactions between pesticide and environment, as well as assumptions on their spatial and temporal distribution, which still require significant research. A useful tool to answer many management questions is modeling. Complex hydrological models, such as the Soil and Water Assessment Tool (SWAT) could assist practitioners and regulators to understand the fate of silvicultural forest chemicals. The SWAT has been used for over 50 pesticide fate studies worldwide for agricultural practices, but not for pesticide fates in forest applications. While such process-based models have their limitations, they can provide a structured approach to evaluating herbicide movements at the watershed scale.
5. ***Pesticide Stewardship Partnerships.*** The PSPs are good outreach tools, but don’t produce replicable science. The PSP doesn’t collect pesticide application data and locations in its “partnerships” and its sampling regimes aren’t designed and implemented to catch episodic events (application, early winter storms) generally recognized to be when the highest concentrations are likely to be found. Additionally, the lack of streamflow data in these studies limits their ability to evaluate “loads” versus point concentrations. The benefits of the PSPs by involving landowners, applicators, and agency personnel could be further enhanced by better knowledge of pesticides applied and their timing, and better monitoring procedures as outlined above.
6. ***OSU Research Cooperatives provide a framework to support future studies.*** Creating credible science in an arena as complex as forest chemical use requires long-term and intensive studies across the ownership landscape. One model to achieve this is the research cooperatives in the College of Forestry at Oregon State University. Since 1982 there has been an industry-agency-university cooperative studying forest revegetation that has a substantial record of accomplishments over its almost 40 year history, presently called the Vegetation Management Research Cooperative (<http://vmrc.forestry.oregonstate.edu/>). The VMRC has the partners and and

can bring the expertise needed to successfully conduct the type of herbicide transport and fate studies and modeling described here.

7. **Wooded buffers prevent or reduce spray drift.** Directly spraying into live water is a label violation for most herbicides used in forest management. However, some small streams can be hard to detect and therefore may be inadvertently sprayed during aerial applications, resulting in herbicide detections downstream. Both pesticide fate studies from coastal Oregon demonstrated that non-buffered, small non-fish streams received spray during application. In contrast, another study demonstrated the efficacy of wooded buffers in capturing or deflecting fine spray drift. This finding is consistent with a number of studies on agricultural spray drift. The extension of wooded buffers to Small Non-fish (Type N) streams under the Forest Practice Act and its rules would protect these streams from drift, and reduce potential loadings downstream. Extension of spray exclusion zones along Type N streams is one of the proposals in the “Oregon Strategy” of state, timber industry, and conservation groups (Governor’s Office 2020). It is clear from the science that the effectiveness of these no-spray buffers would be improved if they were wooded.

10.7 Natural organic matter/disinfection byproducts findings and recommendations

The relationship between natural organic matter (NOM) and disinfection byproducts (DPB) is important because two DPBs, total haloacetic acids (HAA5) and total trihalomethanes (TTHM), are regulated by the U.S.E.P.A. under the Safe Drinking Water Act. These DPBs are created when carbon in water comes into contact with the chlorine disinfectant that is required to remain as residual throughout a water utility’s distribution system until the water comes out the tap. The carbon can be from natural sources, can result from human activities, may be added during water treatment, and may be formed through the disinfection process in the treatment plant.

The two regulated DBPs, HAA5 and TTHM, are respectively the fourth- and fifth-most frequent contaminant alerts and exceedances in the Oregon Health Authority’s database. Disinfection byproduct detections in finished drinking water show that in the vast majority of cases the utility relies on surface water as their primary source, and these samples are oftentimes taken at the end of long pipe runs. Most detections are isolated events, but a subset of water utilities (17%) have clusters of detections with absences in intervening years, while a smaller set (5%) have chronic, annual, detections of DBPs in their water systems. Further, most exceedances are within 150% of the maximum contaminant level.

Today, NOM is the raw water constituent that most often influences the design, operation, and performance of water treatment systems. In addition to its role in the formation of DBPs, NOM can overwhelm activated carbon beds used in water treatment and reduce their ability to remove organic micropollutants. NOM also contributes significantly to the fouling of membranes in all membrane technologies used in water treatment, and can promote microbial fouling and regrowth in water distribution systems.

Operationally, NOM is separated in two components: dissolved organic matter (DOM) and particulate organic matter (POM). A significant amount of fresh water DOM is derived from terrestrial soil organic matter (SOM) that underwent specific transformations that increased its affinity for an aqueous environment. The composition of fresh water DOM is believed to depend on the transformation of plant

and decomposed animal compounds into humic-like substances. Freshwater DOM is an aggregation of spontaneous self-associated superstructures formed by plant-derived products of natural decay, such as lipids, amino sugars, sugars, terpene derivatives, aromatic condensed structures, and lignin-derived compounds.

Concentrations of constituents increase as a function of stream discharge, with their export being dominated by short-lived, wintertime high-discharge events. Low flows contain primarily organic detritus from non-vegetation sources (e.g., algal cells) while particles with vegetation and soil-derived POM dominated the high flows.

- Modelling indicates that many decades after harvesting the metabolism of DOM is still being affected. This is because carbon and nitrogen losses from the terrestrial system to waterways and the atmosphere increase due to reduced plant nitrogen uptake, increased SOM decomposition, and high soil moisture.
- During and after harvesting, if slash is removed and/or burned, dissolved organic carbon (DOC) and DOM are reduced due to the diminished amount of coarse woody debris remaining.
- Evidence for the Pacific Northwest area indicates that the main export of NOM and disinfection byproducts (DBP) is triggered by the first major rain event occurring in the fall.
- Wildfires are increasing in frequency and severity in the United States, which is likely altering the chemistry and quantity of NOM and DBP traveling outside forested watersheds. Wildfires consume a large portion of organic matter from the detritus layer, which leads to lower yields of water extractable organic carbon and organic nitrogen. Therefore, wildfires appear to trigger an overall reduction in water extractable terrestrial DBP precursor yield from detritus.
- The last 15 years of bark beetle infestation had a significant impact on water quality as a result of increased organic carbon release and hydrologic shifts induced by the tree dieback. Water quality is impacted nearly one decade after bark beetle infestation, but significant increases in total organic carbon mobilization and DBP precursors are limited to areas that experience massive tree mortality.

10.8 Fire risk findings and recommendations

The cause of recent wildfire catastrophes can be traced to multiple factors including the expanding urban footprint, human ignitions, droughts, and high-wind events. Wildfires remove litter, duff and vegetative cover leading to the creation or enhancement of hydrophobic soil layers, increasing surface runoff and erosion potential. Post-fire changes in water chemistry and sediment transport can increase pollutant loads.

Growing awareness of the expanding scale of wildfire risk to communities and watersheds and water supplies in the US has led to a wide range of research focused on fuel treatments to reduce post-fire impacts to watersheds and drinking water. Researchers are using wildfire simulation models to test hypothetical treatment scenarios and estimate the potential reduction in risk, identified by metrics that quantify adverse impacts including soil erosion and change in water yield.

Existing risk assessment technologies and frameworks do not explicitly examine the cross-boundary problem intrinsic to wildfire risk from large public wildlands. Wildfire risk concerns the estimation of expected loss, calculated as the product of the likelihood of a fire at a given intensity and the consequence(s). By contrast, wildfire exposure concerns the juxtaposition of threatened values in relation to predicted fire occurrence and intensity, without estimating potential loss. Methods used to assess wildfire exposure and transmission were summarized; then a detailed assessment of cross-boundary wildfire exposure in Oregon between major land tenures (private, public, state, and federal) and drinking water source areas was provided. These latter results for each community water supply will be included in an accompanying on-line atlas.

Predicted area burned in 100 years was highest for public water supply areas (PWSA) in the eastern Cascades, southwest Oregon, and eastern Oregon regions. Mean fire size, total annual area burned and the number of simulated fires that exposed PWSAs also varied substantially across the regions, with the largest fires and the highest area burned occurring in southwestern Oregon. There was high variability among the major land tenures and their contribution to PWSA wildfire exposure within and among PWSA regions (Fig. 11). The US Forest Service (Federal-FS) was the leading contributor to area burned in all but the Coastal region where private industrial lands were the largest contributor.

Firesheds were generated for each of the 140 PWSAs that experienced wildfire in our simulations. Firesheds represent the biophysical risk in and around PWSAs and the sources of risk in terms of ownership; and, they represent areas surrounding each PWSA that can ignite and transmit large wildfires that expose an individual PWSA. Fireshed boundaries are often magnitudes larger than the administrative boundary of the PWSA and can represent a mosaic of land tenures.

The juxtaposition of fire prone forests in and around critical municipal watersheds intermixed with a high number of homes and infrastructure, and in close proximity to dense urban areas under a changing climate, creates a complex fuel management problem. Forest management has the potential to reduce fuels and restore ecological resiliency; however, the scale of the risk will require a coordinated, multi-agency, multi land owner collaborative response. This will require coordinated and targeted fuel management and forest restoration activities that minimize the risk of fire exposure to public water supply areas, maximize landscape resilience to wildfire, and allow for beneficial wildfire management.

Translating the findings in this report to prioritize fuel management activities is straightforward. Maps of fire transmission to PWSAs can be used as priorities in scenario planning models to design and sequence project areas and treatment units within them. Including potential treatment costs and revenues associated with harvesting and fuels treatments into planning makes it possible to examine economic costs and benefits associated with forest management to protect water. The Fireshed maps are also useful for identifying the scale of risk to PWSAs and determining the relative contribution from different landowners. Newer initiatives like shared stewardship recognize that the increasing scale of risk requires cross-boundary prioritization and action to treat at the appropriate scale. Assessments of cross-boundary risk can be integrated into this process and used as a management objective to target forest management where wildfires are predicted to spread across federal and state boundaries and expose drinking water or other highly valued resources.

10.9 Findings and recommendations from the community water systems case studies

We conducted three case studies to delve deeper into how managers of forested drinking water supply watersheds identify and address management concerns that have affected/could affect source water. This includes how they collaborate with other landowners and managers to identify, monitor, and respond to these concerns. Water provider survey respondents were stratified by location (Coast, Dryside, or Valley), primary landownerships in source watershed(s), and size of systems. We then purposively chose three case studies, one from each geographic region. Cases were also selected to represent a range of relevant contexts and issues: 1) a public lands context with a proximate wildland-urban interface and extensive collaboration on source watershed management (Ashland); 2) a public lands context with less proximity, collaboration, and public engagement (Baker City); and 3) a private industrial forestland context and a small system (Oceanside). Key takeaways from these studies are presented below.

From the Ashland Case Study:

- A multi-partner effort like the Ashland Forest Restoration (AFR) project is necessary to incorporate the diverse social, economic, and ecological desires that the community of Ashland holds for the management of its watershed. This is particularly essential in the public lands ownership context, where the Forest Service must consider diverse public values in its decisions. Development of scientifically-sound monitoring and robust community plans helps address questions and foster adaptation.
- Activities necessary to reduce hazardous fuels and wildfire risk can be costly in areas with steep slopes and complex forest types. The AFR's strengths and ability to seek multiple authorities and programs to accomplish this work within and adjacent to the watershed is necessary; and expands outcomes beyond what the Forest Service alone could fund or accomplish.
- The City of Ashland has been proactive in articulating its interest in the watershed and using formalized structures and tools (MOU, community alternative, Master Stewardship Agreement, ratepayer fee) to participate in active forest management. Its investment in forestry staff and the fire department provides the human capacity necessary to be part of collaborative efforts.

From the Baker City Case Study:

- Regular, such as quarterly, communication between the Forest Service and a municipality with source watersheds on national forest land assists in maintenance of relationships and proactive capacity for identifying issues and opportunities. Field tours and opportunities to view the watershed and potential management issues together in person help increase mutual understanding of conditions, challenges, and opportunities. This helps keep drinking water source protection issues on the table when both partners are also busy with other responsibilities and projects.
- There can be city and community frustration with the time and other requirements of the NEPA process for management actions on federal land. Increased experience and exposure can help build mutual understanding through the process. Written documentation of agreements and meetings

can assist in the creation of agreements and institutional memory, which is important in a context with the frequent personnel turnover that can occur in both the Forest Service and city management.

- Municipalities and other partners may aid federal partners in managing source watersheds by building political support and obtaining grant funding from sources not accessible to federal agencies.

From the Oceanside Case Study:

- More consistent and proactive communication between the Water District and private industrial timberland owners has enhanced cooperation. Communication has historically been intermittent as it has been solely based around issues with quarry operations or planned forest operations. Opportunities to learn more about each other's goals and processes may have increased mutual understanding. Foresters have toured the Oceanside treatment plant, and Water District commissioners and the watermaster have toured proposed forest operations.
- One industrial timberland owner's use of a process communication checklist is intended to help ensure that the Water District and other water providers are notified beyond what is required by Oregon's Forest Practices Act.
- In small rural landscapes with a limited number of landowners, individuals particularly matter. The interests and actions of the Water District staff and board, and company foresters, have made cooperation possible.

Although the case studies were conducted in three different contexts, there were common lessons learned from each case as well as common themes across cases that may offer broader insights.

1. ***Landownership frames the opportunities and challenges for managing source watersheds.*** The laws and regulations that govern different types of forestland ownerships set the stage for what management activities are permitted, how they are to be conducted, and any public involvement. For example, Oregon's Forest Practices Act provides standards for the establishment, management, and/or harvest of trees on private industrial and nonindustrial forest lands. Public lands managed by federal agencies such as the US Forest Service or the Bureau of Land Management are subject to an array of laws and policies, as well as land use designations and requirements for public participation in management decisions. Drinking water providers who seek to interact and collaborate with their source forestland managers must do so with understanding of these existing frameworks, and the time and effort that it may take to engage.
2. ***Regular communication provides a foundation for relationships.*** Regular communication between drinking water providers and source watershed land managers may assist the maintenance of relationships and proactive capacity for identifying issues and opportunities. This helps keep drinking water source protection issues on the table when both partners are also busy with other responsibilities and projects. Field tours and opportunities to view the watershed and potential management issues together in person may help increase mutual understanding of conditions, challenges, and opportunities. The scope and scale of this communication may necessarily vary by

context. For example, it may be more informal and involve far fewer parties in areas where source watersheds are spatially small and systems serve smaller populations. Regardless, the need for both land managers and drinking water providers to be intentional and proactive about communication with each other remains. Written documentation of agreements and meetings can assist in the creation of agreements and institutional memory, which is important when there is personnel turnover with any organization.

3. ***Specific projects offer opportunity to collaborate.*** Planning forest management activities, a source water protect plan, or a monitoring effort can offer concrete ways for drinking water providers to engage with source watershed managers. Depending on the ownership of the source watershed, providers may be able to provide project design input, develop community plans, or create monitoring protocols. This may involve additional partners such as local nonprofits, government agencies, and community leadership. The opportunity to participate directly may improve understanding of source watershed conditions and needs, particularly through monitoring that could address uncertainties with scientific information. It can also bring leveraged funds from other sources that help support monitoring or management activities.

10.10 Final thoughts

The body of work here, and found in the supporting chapters, represents a substantial contribution towards understanding the effects of active forest management on drinking water source quality. The project's Steering Committee provided important perspectives and clarified priorities during our formative stage; and provided substantive reviews and comments as we crafted this report. Throughout, we have made every effort to be careful and critical in our reviews. We do not realistically expect that this report will resolve the many debates over forest management. However, we do hope that it will provide a common reference on current science and the policy context. If that is the case, then we will be satisfied.

STAFF REPORT

Agenda Item No:	C
Work Plan Title:	Private Forests
Topic:	Annual topic, Regional Forest Practices Committee
Presentation Title:	Regional Forest Practices Committee Appointments and Reappointments
Date of Presentation:	January 6, 2021
Contact Information:	Josh Barnard, Deputy Chief Private Forests Division 503-945-7493 Josh.W.Barnard@oregon.gov

SUMMARY

The purpose of this agenda item is to recommend the appointment of one new member to the Eastern Oregon Regional Forest Practice Committee.

CONTEXT

ORS 527.650 requires the Board to establish a forest practice committee for each forest region. Each such committee shall consist of nine members, a majority of whom must reside in the region. Members of each committee shall be qualified by education or experience in natural resource management and not less than two-thirds of the members of each committee shall be private landowners, private timber owners or authorized representatives of such landowners or timber owners who regularly engage in operations.

ORS 527.660 states “[E]ach forest practice committee shall review proposed forest practice rules in order to assist the Board in developing rules appropriate to the forest conditions within its region.” Regional committees have provided a forum for the public; at each meeting members of the public may participate and offer information and suggestions. The Private Forests Deputy Chief serves as the secretary for all three committees.

BACKGROUND

The last reappointments to the regional committees occurred in September 2020. The regional committees are set with staggered terms so only one-third of committee members come up for reappointment in a given year. This approach ensures continuity of committee work over time. The Eastern Oregon Region currently has two vacant positions. One new committee member nomination was put forth from the Eastern Oregon Area, Brandon Wood (attachment 2). There is still one additional vacancy on the Eastern Oregon Regional Committee and the search is underway for new member nominations.

Attachment 1 shows current and new members and their term expiration dates. The recommended expiration column shows the term expiration date set to maintain the staggered term approach.

RECOMMENDATION

The Department recommends the Board make the following new appointment:

Eastern Oregon Region:
Brandon Wood

term expiring September 2022

ATTACHMENTS

- (1) Current Eastern Oregon Regional Forest Practice Committee Membership
- (2) Biography for Brandon Wood

CURRENT REGIONAL FOREST PRACTICE COMMITTEE MEMBERSHIP
January 2021

EASTERN OREGON REGION

Member Name	Current Term Began	Term Expires	Recommended Expiration
Irene K. Jerome (p)	09/2006	09/2021	
Bob Messinger (Chair)(p)	09/2006	09/2021	
Elwayne Henderson	09/2011	09/2021	
Brandon Wood (New)	01/2021		<u>09/2022</u>
Paul Jones	09/2013	09/2022	
Bobby Douglas	09/2020	09/2022	
Vacant		09/2023	
Patrick Marolla	01/2019	09/2023	
Chris Johnson	09/2014	09/2023	

(p) Denotes public member

Biography for Brandon Wood

I was born and raised in the small town of McCloud California, a small lumber and logging town. My family has always been involved in the timber industry. My dad worked as a faller for Champion and then started his own business, Wood and Son Timber Contracting. At a very young age, I would go in the woods with my dad and watch him log. When I was 18, I spent my summers marking trees, cruising timber for Campbell Timberland management. I attended Shasta College majoring in Natural Resources and then went on to Chico State and finished up at Humboldt State with a degree in Natural Resources. I started first working for Trees Inc as a forester and then Jeld Wen for Dick Went and started the juniper Project at REACH, then went on to become the Timber Manager for the J-Spear Ranch until in 2018 when they sold their forest property to Murphy Company. I am working for Murphy Company in southeast Oregon. I love to hunt and fish with my two boys, Kaden and Tanner.

Agenda Item No:	D
Work Plan:	Administrative
Topic:	Financial Dashboard
Presentation Title:	Department Financial Report for November and December 2020
Date of Presentation:	January 6, 2021
Contact Information:	Bill Herber, Deputy Director for Administration (503) 945-7203, bill.herber@oregon.gov

SUMMARY AND CONTEXT

An executive financial report and summary will be submitted monthly to ensure the Board of Forestry (Board) has up-to-date information for oversight of the Department's financial condition. This report will include the financial and budgetary status of the Department as well as other ancillary topics as appropriate.

BACKGROUND AND ANALYSIS

This consent item is a transparent publishing of the Department's transmittal of monthly financial reports to the Board of Forestry. While executive-level in nature, the financial report provides information on various topics that are either germane, or direct impacts to the financial status of the agency, or other administrative functions of the organization during any given month.

This financial report will continue to evolve over time. As the Department's reporting ability matures and insights into its operational and administrative work improve, this financial report will reflect those improvements. These improvements could include operational or process improvements or the introduction of new systems and technologies that enhance the Department's administrative capabilities. In addition, Board input will be factored in as the report evolves.

NEXT STEPS

The Board will receive the Department's Financial Report the third week of every month, whether a Board meeting is occurring or not. This will allow the Department to report on the previous month while allowing for the fiscal month closing process to conclude.

ATTACHMENTS

- 1) Department of Forestry Financial Report for November 2020
- 2) Department of Forestry Financial Report for December 2020 (available one week before meeting)



Memorandum

Oregon Department of Forestry

Date: November 23, 2020
To: Board of Forestry Members
From: Bill Herber, Deputy Director for Administration
Subject: Department Financial Report

Department Financial Report

As noted in the department's October Financial Report to the Board, the largest financial and administrative burden for the short-term would be the processing and payment of outstanding invoices related to the 2020 fire season. To date, department staff have paid over \$60 million of the estimated \$130 in gross fire costs. These costs represent the majority of our local vendors and other small businesses. Department staff worked hard to keep our small and medium-sized businesses at the forefront of their processing to ensure these partners received their payments first. The department's efforts to streamline accounts payables processes directly contributed to keeping the average days-to-pay on all invoices well below the mandated 45 days, even in the face of the increased workload.

Much of the remaining \$70 million of outstanding fire costs come from our federal counterparts. Our Federal partners generally take a long time to submit invoices for these costs. While the wait-time on these invoices do slow down our ability to finalize and close a fire season, it does provide the department the opportunity to have more control over its cash flow. For example, of the \$70 million of outstanding costs, we expect that only \$20-25 million will show up in the relatively short-term (2 months or so). This delay allows us to receive revenue, manage funds, and triage payments to prepare for those longer-term outstanding balances.

So while the department did get some reprieve from the full brunt of outstanding gross costs, it has still been a significant drain on the financial resources available. The \$55 million in funds received from the State Treasury loan have been fully utilized and the department is starting to once again bear costs out of its direct cash and General Fund resources (Main Cash Account and Fire Protection General Fund Balances, Figure 1).

Revenue collection will be critical over the next few months, both from large fire cost recoveries or through the department's normal revenue sources, such as timber revenues and forest patrol assessments. Fortunately, over 80% of the department's yearly collection of forest patrol assessments

occurs within November and December. These assessments will provide the revenue to closeout most of the short-term large fire accounts payables. In addition, the department has requested over \$30 million from the General Fund (GF) through the December Emergency Board. This amount is for a portion of the State’s GF net cost of \$39 million resulting from the 2020 fire season and will be important to allow the department to operate normally for the remainder of the biennium. In addition, these funds will allow the department to position itself to payback some or all of the outstanding treasury loan balance before the loan matures in June. Absent a complete payment of the debt prior to the maturity date, the department will have to renegotiate terms and conditions with the Oregon State Treasury to extend the payoff window.

Budgetarily, the department continues to track closely to its biennial budget with the exception of Fire Protection (Appendix A).

Main Cash Account and Fire Protection General Fund Balances

The department’s main cash balance has fallen below \$20 million as projected due to the costs of the 2020 fire season and is expected to stay there for some time (Figure 1). The large increase in October is the funds from the State Treasury Loan transferred into the department followed by the sharp decline due to the payment of over \$60 million in large fire costs (This chart denotes end-of-month balances and therefore does not show the transactional movement of \$60 million). Fire Protection’s General Fund balance has likewise been significantly reduced through the payment of large fire costs, with a balance slightly under \$2 million.

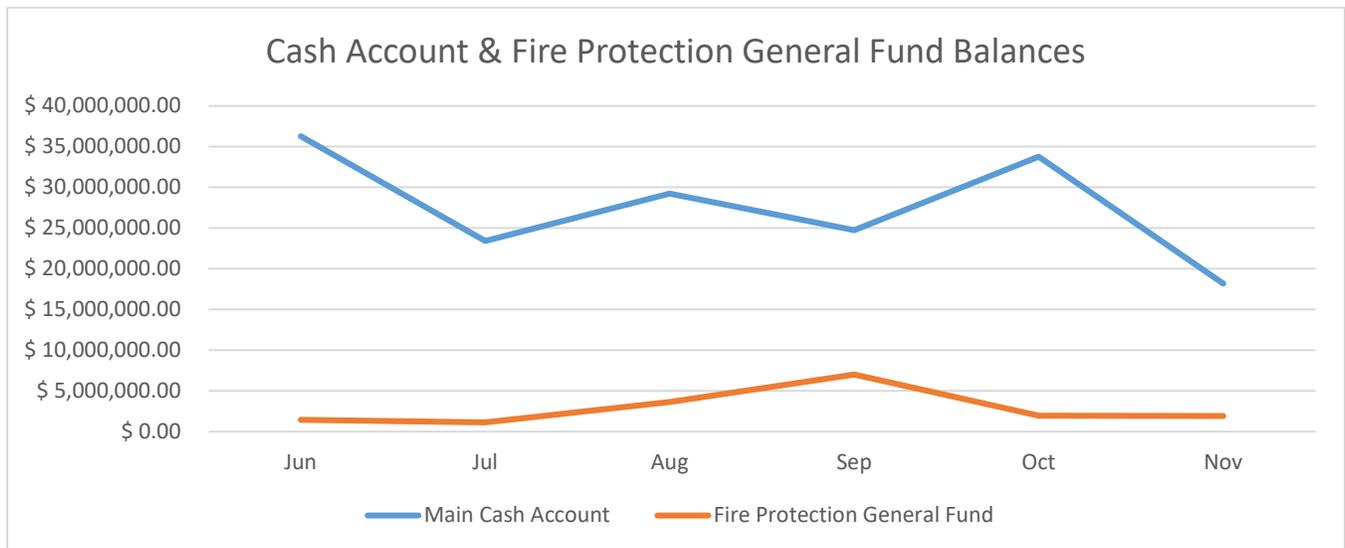


Figure 1, Monthly Balance for Main Cash Account and Fire Protection General Fund, Jun through Nov 15, 2020

Macias, Gini and O’Connell External Review

After nearly a year of effort, the work of Macias, Gini and O’Connell, LLP (MGO) is coming to an end. MGO outlined 32 recommendations across five areas, Budgeting, Financial Resources, Information Technology, Oversight, and Policies and Procedures. The department provided MGO management

responses to these recommendations earlier this month, which should allow them to finalize their work. MGO will work with the Department of Administrative Services to produce several reports and presentations that will assist the department in next steps. In addition, MGO is completing work on a cash projection tool that should augment the department's existing tools for projection of cash flow through fire seasons.

Secretary of State Financial Audit for 2020

The Secretary Of State's Audit Division has completed their 2020 Financial Audit of the department. This annual audit looks at the State of Oregon's financial statements and related note disclosures that are included in the Comprehensive Annual Financial Report (CAFR). The objective of this audit is to express an opinion on whether the department's financial statements are fairly presented in conformity with generally accepted accounting principles (GAAP). The SOS auditors also report on internal control over financial reporting and on compliance with laws, regulations and provisions of contract or grant agreements, noncompliance with which could have a material effect on the financial statements.

This year's audit resulted in no written findings for the department, although the auditors did provide three verbal recommendations. Two were regarding overstatement and understatement of revenues from previous to current years (these accounting adjustments were made and current methodology is in-line with auditor recommendations). The last recommendation was regarding former employees having access to a particular information system within the department. This was a low risk given the employees no longer have access to the department's network, and therefore have no access to that system, however the problem has been addressed and controls are being put in place to prevent future occurrences.

The SOS auditors are finalizing their report and will provide it to the department in the coming weeks.

OREGON DEPARTMENT OF FORESTRY
AGENCY-WIDE EXPENDITURES BY PROGRAM AND APPROPRIATION
2019-2021 BIENNIUM TO DATE THROUGH OCTOBER 2020

Percentage of Biennium Elapsed 67%

Program Title	Fund Type	Legislatively Approved Budget	Actuals as of October 2020	Budget Balance	Percentage of Budget Spent
AGENCY ADMINISTRATION	General Fund	3,957,943	1,589,233	2,368,710	40.15%
	Other Funds	35,424,716	26,789,650	8,635,066	75.62%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	4,599,114	2,795,267	1,803,847	60.78%
	AGENCY ADMINISTRATION TOTAL	43,981,773	31,174,149	12,807,624	70.88%
CAPITAL IMPROVEMENT	General Fund	0	0	0	0.00%
	Other Funds	4,783,787	586,042	4,197,745	12.25%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	CAPITAL IMPROVEMENT TOTAL	4,783,787	586,042	4,197,745	12.25%
DEBT SERVICE	General Fund	16,418,449	10,356,070	6,062,379	63.08%
	Other Funds	603,234	470,009	133,225	77.91%
	Lottery Funds	2,543,451	1,322,577	1,220,874	52.00%
	Federal Funds	0	0	0	0.00%
	DEBT SERVICE TOTAL	19,565,134	12,148,657	7,416,477	62.09%
EQUIPMENT POOL ADMINISTRATION	General Fund	0	0	0	0.00%
	Other Funds	17,723,926	9,330,765	8,393,161	52.65%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	EQUIPMENT POOL ADMINISTRATION TOTAL	17,723,926	9,330,765	8,393,161	52.65%
FAMADA OPERATIONS	General Fund	0	0	0	0.00%
	Other Funds	5,642,619	1,410,449	4,232,170	25.00%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	FAMADA OPERATIONS TOTAL	5,642,619	1,410,449	4,232,170	25.00%
PRIVATE FORESTS	General Fund	19,799,146	12,477,616	7,321,530	63.02%
	Other Funds	13,013,141	6,506,623	6,506,518	50.00%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	14,063,094	7,253,232	6,809,862	51.58%
	PRIVATE FORESTS TOTAL	46,875,381	26,237,471	20,637,910	55.97%
PROTECTION FROM FIRE	General Fund	68,085,794	66,161,781	1,924,013	97.17%
	Other Funds	174,956,633	138,886,031	36,070,602	79.38%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	17,711,687	5,411,979	12,299,708	30.56%
	PROTECTION FROM FIRE TOTAL	260,754,114	210,459,791	50,294,323	80.71%
STATE FOREST LANDS	General Fund	5,000	5,000	0	100.00%
	Other Funds	106,513,000	56,008,796	50,504,204	52.58%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	909,381	503,988	405,393	55.42%
	STATE FOREST LANDS TOTAL	107,427,381	56,517,785	50,909,596	52.61%
AGENCY-WIDE	All General Funds	108,266,332	90,589,700	17,676,632	83.67%
	All Other Funds	358,661,056	239,988,364	118,672,692	66.91%
	All Lottery Funds	2,543,451	1,322,577	1,220,874	52.00%
	All Federal Funds	37,283,276	15,964,467	21,318,809	42.82%
	Total All Fund Types / Programs	506,754,115	347,865,109	158,889,006	68.65%



Memorandum

Oregon Department of Forestry

Date: December 23, 2020
To: Board of Forestry Members
From: Bill Herber, Deputy Director for Administration
Subject: Department Financial Report

Department Financial Report

With higher than anticipated revenues and lower than projected payables, this last month has relieved some of the pressure on the department's short-term cash position (Figure 1). We did anticipate that the Forest Patrol Assessments (FPA) would be a big part of our revenue picture and they did not disappoint. Through November and December, we have received 60% (over \$21 million) of our projected revenue from the FPAs, slightly higher than our average at this time. In addition, we have received nearly \$5 million from the Federal Emergency Management Agency (FEMA) for various past fire season expenditures. While we did expect these revenues eventually, the timing is not always known, so to recover them before the end of the year was an outstanding turn of events.

The lower than projected accounts payables was our biggest driver in our current cash picture. Last month we anticipated seeing approximately \$20-25 million in expenditures for the near-term. Since then we have only seen about \$14 million of these costs and we do not expect that number to climb much higher before the end of the year. Of the \$130 million in gross fire costs for the 2020 season, we have paid out over \$74 million, with an additional \$4 million in co-op costs. The remainder of the fire season's costs will be mid- to long- term payables owed to various state and federal partners. To be clear, these are costs outstanding that the department will pay, but the timing of them can be managed much more effectively to minimize cash flow disruptions.

While most of the department is tracking on pace within the 2019-21 Legislatively Approved Budget, fire costs have pushed Fire Protection to expend nearly 90% of its biennial budget (Appendix A).

Main Cash Account and Fire Protection General Fund Balances

With the increased revenue and the deferment of fire costs into longer-term payables, the department's cash balance was able to recover to pre-season levels quickly. While the Fire Protection's General Fund appropriation continues to decline, the influx of General Fund through legislative action via the

Emergency Board will increase its balance significantly (see the Emergency Board and Special Session update below).

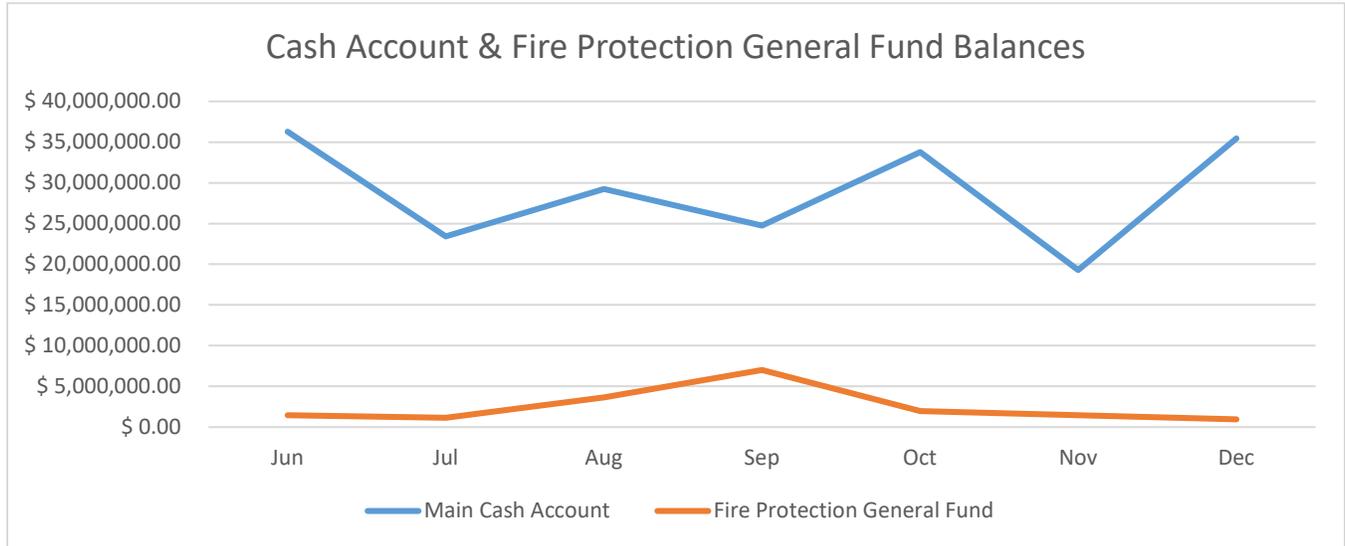


Figure 1, Monthly Balance for Main Cash Account and Fire Protection General Fund, Jun through Dec 23, 2020

2021-23 Governor’s Recommend Budget

On December 1, 2020, Governor Brown released her Governor’s Recommend Budget (GB) and policy agenda for the 2021-23 biennium. This budget focuses on key challenges facing Oregonians: the public health and economic impacts of the COVID-19 pandemic, recovery from the devastating 2020 wildfire season, and taking steps to end systemic racism and address racial disparities in Oregon.

Acknowledgement for the department to assist in the Governor’s focus areas is highlighted by the support of many of our packages from our Agency Request Budget (ARB). Some areas of note:

- Support for fire organizational sustainability and modernization.
- Support for addressing climate change mitigation and adaptation.
- Support for enhancing the department’s efforts in diversity, equity and inclusion (DEI).
- Support for facilities and communication infrastructure improvements and restoration, both due to losses from wildfire and additional investments into fire fighter life safety.

Overall, the GB recommends increasing the department’s General Fund by roughly \$20 million in various investments and increasing its capacity with nearly 50 positions over Current Service Level (CSL). A summary of the department’s 2021-23 Governor’s Budget is attached (Appendix B).

Emergency Board and Special Session

The department requested the following actions through the Emergency Board that met December 11, 2020.

- An increase of \$575,789.00 in General Fund and position authority to hire two limited-duration employees in Administration's Facilities Capital Management Program to provide the capacity necessary to handle the anticipated increase in workload related to the rebuilding of the department's buildings and infrastructure that were damaged or destroyed by the Labor Day 2020 fires.
- Provide a final report on the 2020 fire season, and a preliminary report of losses on private lands of timber, buildings, fencing, livestock and grazing land capacity if the land is expected to be unavailable for two or more grazing seasons.
- \$29,306,763 of General Fund for the state's portion of net large fire costs for the 2020 fire season (approx. 75% of the General Fund's liability of \$39,306,763).
- \$938,587 of General Fund for the state's portion of district deductibles.
- An additional \$33,788,697 of Other Funds Limitation to enable processing of payments and operations from the 2020 fire season.

After consideration of the department's request, the Emergency Board authorized the following:

- Allocation of \$119,690 General Fund from the Emergency Fund and authorization to establish two limited-duration positions (0.50 FTE) for six months for the workload associated with the damaged facilities reconstruction or replacement projects due to the 2020 wildfires.
- Acknowledgement of receipt of the report on the 2020 fire season and the report on losses on private lands of timber, building, fencing, livestock, and grazing land capacity.
- Allocation of \$25.0 million from the Emergency Fund for 2020 fire season costs.
- Increase Other Funds expenditure limitation of the department by \$13,773,119.

Due to statewide pressure on the Emergency Fund, the Emergency Board provided partial payment of the General Fund's portion of 2020 fire costs, with the recognition that the remaining portion will be allocated the next time state funds allowed.

On December 21, 2020, the 80th Legislative Assembly convened its third Special Session. Along with appropriating \$100 million into the state's Emergency Fund, it also established a special purpose General Fund appropriation of \$100.0 million for the state's wildfire recovery, prevention, and preparedness activities. These funds will allow the Emergency Board to allocate funding to various state agencies to address remaining needs from the 2020 wildfire season and to allocate funding to other activities related to wildfire preparedness, including further development of fire adapted communities and resilient landscapes. With the additional funds available to the Emergency Board, we fully expect the remaining balance of the 2020 General Fund fire costs to be allocated at their next meeting.

OREGON DEPARTMENT OF FORESTRY
AGENCY-WIDE EXPENDITURES BY PROGRAM AND APPROPRIATION
2019-2021 BIENNIUM TO DATE THROUGH NOVEMBER 2020

Percentage of Biennium Elapsed 71%

Program Title	Fund Type	Legislatively Approved Budget	Actuals as of November 2020	Budget Balance	Percentage of Budget Spent
AGENCY ADMINISTRATION	General Fund	3,957,943	1,691,619	2,266,324	42.74%
	Other Funds	35,424,716	28,110,171	7,314,545	79.35%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	4,599,114	2,904,647	1,694,467	63.16%
	AGENCY ADMINISTRATION TOTAL	43,981,773	32,706,437	11,275,336	74.36%
CAPITAL IMPROVEMENT	General Fund	0	0	0	0.00%
	Other Funds	4,783,787	591,556	4,192,231	12.37%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	CAPITAL IMPROVEMENT TOTAL	4,783,787	591,556	4,192,231	12.37%
DEBT SERVICE	General Fund	16,418,449	10,356,070	6,062,379	63.08%
	Other Funds	603,234	532,009	71,225	88.19%
	Lottery Funds	2,543,451	1,495,077	1,048,374	58.78%
	Federal Funds	0	0	0	0.00%
	DEBT SERVICE TOTAL	19,565,134	12,383,157	7,181,977	63.29%
EQUIPMENT POOL ADMINISTRATION	General Fund	0	0	0	0.00%
	Other Funds	17,723,926	10,173,569	7,550,357	57.40%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	EQUIPMENT POOL ADMINISTRATION TOTAL	17,723,926	10,173,569	7,550,357	57.40%
FAMADA OPERATIONS	General Fund	0	0	0	0.00%
	Other Funds	5,642,619	1,426,359	4,216,260	25.28%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	0	0	0	0.00%
	FAMADA OPERATIONS TOTAL	5,642,619	1,426,359	4,216,260	25.28%
PRIVATE FORESTS	General Fund	19,799,146	13,068,918	6,730,228	66.01%
	Other Funds	13,013,141	6,878,086	6,135,055	52.85%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	14,063,094	7,474,844	6,588,250	53.15%
	PRIVATE FORESTS TOTAL	46,875,381	27,421,848	19,453,533	58.50%
PROTECTION FROM FIRE	General Fund	68,085,794	66,935,560	1,150,234	98.31%
	Other Funds	174,956,633	161,479,268	13,477,365	92.30%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	17,711,687	5,602,164	12,109,523	31.63%
	PROTECTION FROM FIRE TOTAL	260,754,114	234,016,992	26,737,122	89.75%
STATE FOREST LANDS	General Fund	5,000	5,000	0	100.00%
	Other Funds	106,513,000	60,454,608	46,058,392	56.76%
	Lottery Funds	0	0	0	0.00%
	Federal Funds	909,381	718,342	191,039	78.99%
	STATE FOREST LANDS TOTAL	107,427,381	61,177,950	46,249,431	56.95%
AGENCY-WIDE	All General Funds	108,266,332	92,057,167	16,209,165	85.03%
	All Other Funds	358,661,056	269,645,627	89,015,429	75.18%
	All Lottery Funds	2,543,451	1,495,077	1,048,374	58.78%
	All Federal Funds	37,283,276	16,699,997	20,583,279	44.79%
	Total All Fund Types / Programs	506,754,115	379,897,868	126,856,247	74.97%

Oregon Department of Forestry

2021-23 Governor’s Budget



	2019-21 Legislatively Adopted Budget	2019-21 Legislatively Approved Budget	2021-23 Current Service Level	2021-23 Agency Request Budget	2021-23 Governor’s Budget
General Fund	\$90,604,264	\$108,266,332	\$93,794,837	\$154,609,628	\$113,902,322
Lottery Fund	\$2,543,451	\$2,543,451	\$2,564,210	\$2,564,210	\$2,564,210
Other Funds	\$260,068,337	\$358,430,132	\$281,749,690	\$287,710,802	\$284,531,617
Federal Funds	\$35,483,276	\$37,283,276	\$37,632,564	\$37,326,999	\$37,493,713
Total Funds	\$388,699,328	\$506,523,191	\$415,741,301	\$482,211,639	\$438,491,862
Positions	1,153	1,155	1,149	1,249	1,195
Full-Time Equivalent	848.99	849.83	847.71	948.68	895.18

GB Budget Highlights – Recommended Packages

Continuation of Funding for Fire Severity Resources and Insurance Costs – Package 100

As in previous biennia, establishes a Special Purpose Appropriation in the Emergency Board Fund to pay the state’s share of fire insurance premium costs, and to provide critical, mobile resources—primarily contract air tankers and helicopters—positioned where and when fire danger is the highest.

Fiscal Impact: \$8,000,000 General Fund, 0.00 FTE, 0 Position Counts

Fire Protection: Fire Org Sustainability & Modernization – Package 101

This policy option package enhances Oregon’s complete and coordinated protection system that relies on a broad range of landowner, contractor, and cooperators engagement making this a highly functional model. Strategic workforce planning and development of a comprehensive training program are key elements for success. Additional capacity is necessary to maintain this complete and coordinated system, ensure that ODF’s core business across all divisions are met, and advance ODF’s initial and extended attack strategy to remain effective in the context of growing fire complexity.

Fiscal Impact: \$6,466,865 General Fund and \$232,248 Other Funds, 28.47 FTE, 27 Position Counts

GB Budget Highlights – Recommended Packages

Fire Protection: Next Generation Severity – Package 102

This policy option package proposes wildfire protection system investments including additional “severity” resources that can be staged around the state where fire danger is highest, such as contract hand crews, equipment and overhead resources; rapid transport of firefighters by helicopter; two contracted next-generation air tanker; and additional call when needed detection aircraft. These investments are focused on slowing the increasing size and frequency of large fires across Oregon’s landscape.

Fiscal Impact: \$20,000,000 General Fund, 0.00 FTE, 0 Position Counts

Agency Administration: Forest Climate Change Mitigation & Adaptation – Package 160

The policy option package focuses on Governor’s Brown’s Executive Order 20-04 Directing State Agencies to Take Action to Reduce and Regulate Greenhouse Gas Emissions specifically includes the Oregon Department of Forestry (ODF) and directs ODF to exercise any and all authority and discretion vested in them by law to help facilitate Oregon’s greenhouse gas (GHG) emission reduction goals. EO 20-04 also states that to the full extent allowed by law, ODF shall consider and integrate climate change, climate change impacts, and the state’s GHG reduction goals into our planning, budgets, investments, and policymaking decisions. While carrying out this directive, ODF should prioritize actions that reduce GHG in a cost-effective manner, prioritize actions that will help vulnerable populations and impacted communities adapt to climate change impacts; and consult with the Environmental Justice Task Force. The literature on forest climate mitigation identifies key actions that can improve climate benefits from forestry, afforestation, and improved forest management, improving utilization of harvest and wood processing residuals, and increased use of wood in long-lived products. This policy option package addresses all four of those key actions.

Fiscal Impact: \$3,227,675 General Fund and (\$305,565) Federal Funds, 9.00 FTE, 9 Position Counts

Capital Improvement and Debt Service: Deferred Maintenance – Package 170

During the 2017 Legislative Session, Senate Bill 1067 passed requiring the Agency to include at least 2.0% of the current replacement value of the Agency’s buildings and infrastructure for deferred maintenance in the Agency Request Budget.

Fiscal Impact: \$516,202 General Fund and \$4,885,000 Other Funds, 0.00 FTE, 0 Position Counts

GB Budget Highlights – Recommended Packages

Agency Administration and Equipment Pool: Firefighter Life Safety – Package 171

This policy option package supports the agency’s critical life safety communication and location tracking for firefighters and emergency response efforts through operation and maintenance of wireless communication systems, equipment, resources, and infrastructure. Strategic investments are needed in our life safety communications to ensure business continuity across multiple platforms, align with technological advances in the field, address critical infrastructure deficiencies, and enhance interoperability and standardization across the network.

Fiscal Impact: \$1,098,568 General Fund and \$526,501 Other Funds, 2.00 FTE, 2 Position Counts

Agency Administration: Diversity, Equity & Inclusion – Package 172

This policy option package is multi-faceted in addressing capacity needs that often overlap in furthering agency strategies on diversity, equity and inclusion, environmental justice, enhanced sustainability and Government to Government Leadership. The Department of Forestry requires additional capacity to address statutory requirements in the issues described above and fully integrate strategies and best practices into agency culture and business management.

Fiscal Impact: \$238,738 General Fund and \$452,433 Other Funds, 2.00 FTE, 2 Position Counts

Agency Administration: Facilities Capital Management Capacity – Package 174

This concept addresses the workload capacity needs within the Facilities Capital Management Program. The components of this strategic initiative are integral to the responsive adaptation, recurring maintenance, and investments required to manage this extensive network of facilities in Salem and the field.

Fiscal Impact: \$238,738 General Fund and \$452,433 Other Funds, 2.00 FTE, 2 Position Counts

Capital Construction and Debt Service: Toledo Facility Replacement Expansion – Package 175

Establishes additional funding (bonding) necessary to continue work on the Toledo facility replacement expansion.

Fiscal Impact: \$104,470 General Fund and \$1,825,160 Other Funds, 0.00 FTE, 0 Position Counts

GB Budget Highlights – Recommended Packages

Agency Administration and Fire Protection: MGO Recommendations – Package 200

This package reflects recommendations made by DAS consultants, MGO to review processes related to fire finance activities. These includes shifting nine positions (8.50 FTE) currently reporting to the Fire Protection Division (SCR 010) to the Agency Administration Division (SCR 008) to provide better financial oversight. This package also includes funding to support the addition of four positions (4.00 FTE) in the Agency Administration Division to create three area financial managers, and one position focused on accounts receivable activities for fire finance activities

Fiscal Impact: \$439,322 General Fund and \$1,315,344 Other Funds, 4.00 FTE, 4 Position Counts

GB Budget Highlights – Reductions and Fund Shifts

The Governor's Budget recommends numerous reductions and fund shifts throughout the department, including:

- Reductions due to increases in Department of Administrative Services' assessments and charges
- Reductions due to increases in Attorney General rates
- Reductions due to vacancy savings and decreased inflation on services and supplies
- Shift of administrative costs for base fire protection to a 50 percent General Fund and 50 percent Other Funds split
- Shift to a 50 percent General Fund and 50 percent Other Funds split for the Forest Products Harvest Tax
- Various fund shifts in administrative positions and Federal Forests Restoration program funding

Fiscal Impact: (\$12,223,093) General Fund, (\$8,937,792) Other Funds and \$166,714 and Federal Funds

Agenda Item No.:	E
Work Plan:	Administrative Work Plan
Topic:	Board Governance Performance Self-Evaluation
Presentation Title:	2021 Board Governance Performance Self-Evaluation
Date of Presentation:	January 6, 2021
Contact Information:	Sabrina Perez, Senior Strategy Manager (503) 945-7311 sabrina.perez@oregon.gov

SUMMARY

The Board of Forestry reviewed the results of their 2020 Board Governance Performance Evaluation at their July board meeting. Prior to initiating the next annual evaluation cycle, the Department is soliciting the Board’s interest in proposing any changes to the best practices criteria and tailored descriptions.

CONTEXT

The governance performance measure for state boards and commissions, “percent of total best practices met by the board” was enacted by the Oregon State Legislature and adopted by the Board in 2006. The measure includes fifteen standard best practices criteria tailored to meet the Board’s specific needs and interests.

In 2007, the Board appointed an ad hoc Board Performance Measure Implementation Subcommittee consisting of Chair Steve Hobbs and members Barbara Craig and Larry Giustina to “tailor and fine tune” the Board’s specific approach for the performance measure. The Subcommittee completed their work and the Board adopted a tailored set of best practices criteria that included descriptive text to assist in a shared understanding of the measure, one additional criteria relating to public involvement and communications, and key summary questions to the evaluation. The measure is included in the agency’s annual Key Performance Measures and has been conducted every year since 2008.

To facilitate the Board’s interest in reviewing the evaluation criteria, the Department added an additional milestone in the evaluation cycle to include individual collection of Board member feedback through the month of January. This feedback will then assist in tailoring a discussion with the full Board in March, if necessary. And then allow a final set of evaluation criteria to be presented for Board approval at the April meeting as an initiation to the self-evaluation period that annually occurs in May.

RECOMMENDATION

The Department recommends Board members provide a preliminary review of the best management practices performance measure self-evaluation criteria as tailored by the Board Performance Measure Implementation Subcommittee and adopted by the Board of Forestry in 2007 and submit any proposed changes individually to the Senior Strategy Manager utilizing the attached review form prior to February 1, 2021.

NEXT STEPS

Following receipt of any proposed changes from the Board, staff will analyze the individual board member input to aid in facilitating a discussion with the Board tailored to the proposed changes and allowing a final set of evaluation criteria to be presented for Board approval in April prior to initiating the self-evaluation period in May.

ATTACHMENT

- (1) Oregon Board of Forestry, Governance Performance Measure, Best Management Practices Self-Evaluation Criteria, 2021 Preliminary Review and Proposed Changes Input Form

**Oregon Board of Forestry
Governance Performance Measure
Best Management Practices Self-Evaluation Criteria
2021 Preliminary Review and Proposed Changes Input Form**

Oregon Boards and Commissions Best Management Practices Performance Measure Criteria (2005) (Standard – Not Subject to Change)	Best Practices tailored by the Board Performance Measure Implementation Subcommittee and adopted by the Board of Forestry (2007)	Board of Forestry Preliminary Review and Proposed Changes on tailored Best Practices descriptions (2020)
1. Executive Director’s performance expectations are current.	<i>The Board understands this to mean that the State Forester’s Position Description is current.</i>	
2. Executive Director’s performance has been evaluated in the last year.	<i>The Board understands this to mean that the State Forester’s Position Description is current and that the annual performance appraisal has been completed.</i>	
3. The agency’s mission and high-level goals are current and applicable.	<i>The Board understands this to mean that the Board’s <u>Forestry Program for Oregon</u> and <u>Oregon Forest Practices Act/Rules</u> are current.</i>	
4. The Board reviews the <u>Annual Performance Progress Report</u>.	<i>The Board understands this to mean that the Board reviews the report annually as a meeting agenda item.</i>	
5. The Board is appropriately involved in review of agency’s key communications.	<i>The Board understands this to mean agency and Board communications at a policy level, versus a day-to-day operating level.</i>	
6. The Board is appropriately involved in policy-making activities.	<i>The Board understands this to mean those policy activities that particularly have a statewide perspective, including holding Board meetings at different geographic locations around the state.</i>	
7. The agency’s policy option packages are aligned with their mission and goals.	<i>The Board understands this to mean the packages included in the biennial budget process as part of the Agency Request Budget.</i>	

**Oregon Board of Forestry
Governance Performance Measure
Best Management Practices Self-Evaluation Criteria
2021 Preliminary Review and Proposed Changes Input Form**

Oregon Boards and Commissions Best Management Practices Performance Measure Criteria (2005) (Standard – Not Subject to Change)	Best Practices tailored by the Board Performance Measure Implementation Subcommittee and adopted by the Board of Forestry (2007)	Board of Forestry Preliminary Review and Proposed Changes on tailored Best Practices descriptions (2020)
8. The Board reviews all proposed budgets.	<i>The Board understands this to mean the Department of Forestry's biennial budget at the Agency Request Budget level.</i>	
9. The Board periodically reviews key financial information and audit findings.	<i>The Board understands this to mean significant financial issues and as audits are released.</i>	
10. The Board is appropriately accounting for resources.	<i>The Board understands this to mean critical issues relating to human, financial, material and facilities resources by providing oversight in these areas. This means that the Board receives briefings on such issues as succession management, vacancies, the budget, and financial effects of the fire program.</i>	
11. The agency adheres to accounting rules and other relevant financial controls.	<i>The Board understands this to mean the receipt of the annual statewide audit report from Secretary of State which highlights any variances in accounting rules or significant control weaknesses.</i>	

**Oregon Board of Forestry
Governance Performance Measure
Best Management Practices Self-Evaluation Criteria
2021 Preliminary Review and Proposed Changes Input Form**

Oregon Boards and Commissions Best Management Practices Performance Measure Criteria (2005) (Standard – Not Subject to Change)	Best Practices tailored by the Board Performance Measure Implementation Subcommittee and adopted by the Board of Forestry (2007)	Board of Forestry Preliminary Review and Proposed Changes on tailored Best Practices descriptions (2020)
12. Board members act in accordance with their roles as public representatives.	<i>The Board understands this to mean that they follow public meeting rules, the standard of conduct for Board members, and the public input process. Members received training and information from the Governor’s Office upon appointment.</i>	
13. The Board coordinates with others where responsibilities and interests overlap.	<i>The Board understands this to mean other public agencies and boards with statutory authority connections or overlaps, e.g. the Forest Trust Land Counties, the Oregon Environmental Quality Commission/Department of Environmental Quality; the Oregon Fish and Wildlife Commission/Department of Fish and Wildlife; the State Land Board; local fire districts; the United States Forest Service; the Bureau of Land Management..</i>	
14. The Board members identify and attend appropriate training sessions.	<i>The Board understands this to mean the workshops, symposia, and field tours that accompany some Board meetings, and that the Board receives adequate technical information.</i>	
15. The Board reviews its management practices to ensure best practices are utilized.	<i>The Board understands this to mean carrying out this self-evaluation on an annual basis, conducting the annual Board work plan status check, and by conducting the periodic scan of issues on a biennial basis.</i>	

**Oregon Board of Forestry
Governance Performance Measure
Best Management Practices Self-Evaluation Criteria
2021 Preliminary Review and Proposed Changes Input Form**

Oregon Boards and Commissions Best Management Practices Performance Measure Criteria (2005) (Standard – Not Subject to Change)	Best Practices tailored by the Board Performance Measure Implementation Subcommittee and adopted by the Board of Forestry (2007)	Board of Forestry Preliminary Review and Proposed Changes on tailored Best Practices descriptions (2020)
Listed below is an additional best practice for the Board of Forestry; not included in calculating the percentage adherence to best practices.		
<p>16. The Board values public input and transparency in conducting its work through outreach to and engagement of stakeholders and by using its work plan communication tools. The Board also values input and communications with its standing advisory committees, special ad hoc committees and panels and external committees with board interests. (2007 – Board of Forestry)</p>	<i>n/a</i>	
Board of Forestry Preliminary Review of Best Practices Criteria – New Criteria Proposed for 2021		
17.		
18.		
Summary Questions from Prior Evaluations	Board of Forestry Preliminary Review and Proposed Changes to Summary Questions (2021)	
1. How is the Board doing?		
2. What factors are affecting the Board’s results?		
3. What needs to be done to improve future performance?		
New Summary Questions Proposed for 2021		
4.		
5.		

Agenda Item No.:	F
Work Plan:	Administrative
Topic:	Forest Carbon
Presentation Title:	Carbon in Oregon's Managed Forests
Date of Presentation:	January 6, 2021
Contact Information:	Danny Norlander, Forest Carbon and Forest Health Policy Analyst 503-945-7395, danny.norlander@oregon.gov

SUMMARY

The Oregon Forest Resources Institute (OFRI) has recently completed the [*Carbon in Oregon's Managed Forests*](#) report to synthesize current information on carbon sequestration and storage in Oregon's working forests and the wood products they produce.

CONTEXT

The report references the Oregon Forest Ecosystem Carbon Report which provides an ongoing reporting structure and framework on carbon in Oregon's forests. Development of the Oregon Forest Ecosystem Carbon Report and associated forest carbon accounting framework has been led by Dr. Andrew Yost, Oregon Department of Forestry. Dr. Yost also participated on the OFRI carbon report advisory committee.

RECOMMENDATIONS

This is an information item only.

ATTACHMENTS

- (1) Carbon in Oregon's Managed Forests – Summary Report



CARBON IN OREGON'S MANAGED FORESTS



Carbon and FORESTS

WHAT ARE WORKING FORESTS?

Foresters often use the term “working forests” to refer to forests where the landowners or forest managers carefully balance sustainable timber production with protecting other resources – such as water quality and wildlife habitat. Oregon’s working forests include private, state and certain federal lands.

The vast forests that cover nearly half of Oregon provide an array of social, environmental and economic benefits to the state and its residents. These benefits include providing clean air and water, wildlife habitat, recreation and timber to make wood products. Another important benefit of Oregon’s forests is their ability to capture and store atmospheric carbon in growing trees as well as wood products.

By absorbing carbon dioxide, a greenhouse gas that’s a major contributor to global warming, our forests are a key ally in the fight against climate change. During photosynthesis, trees turn carbon dioxide into solid carbon that’s stored in the wood, and they release oxygen as a byproduct. As a result, Oregon’s forests store significant amounts of carbon, sequestering it from the atmosphere. That carbon remains sequestered even after trees are harvested and made into wood products.

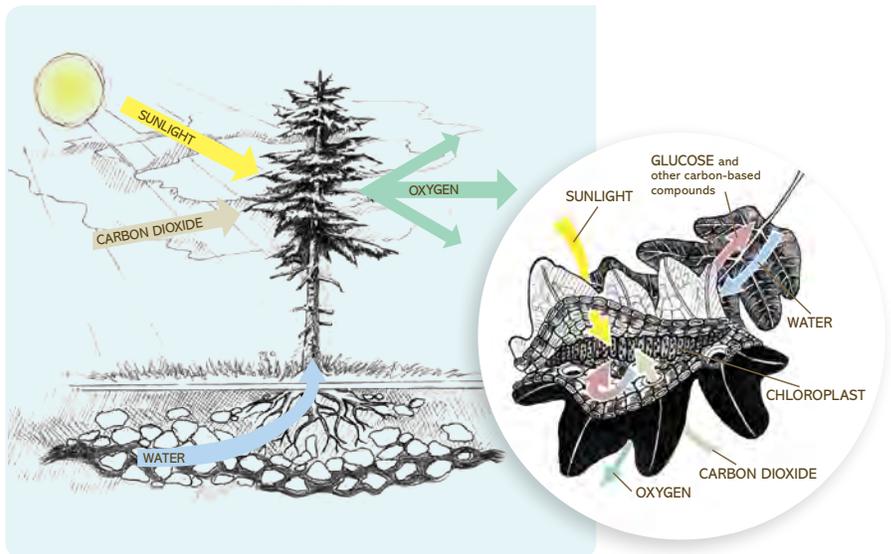
The *Carbon in Oregon’s Managed Forests* report synthesizes the latest science on carbon sequestration and storage in Oregon’s working forests, which are primarily managed for timber production, and the wood products they produce. This summary booklet provides an overview of the report, including highlights from chapters covering:

- the current status of carbon sequestration and storage in Oregon’s forests
- managing forests to increase their carbon storage
- carbon and wood products
- potential carbon markets

The report reveals the major role Oregon’s working forests play in keeping carbon out of the atmosphere, underscoring the importance of using strategies that enhance these forests’ carbon-sequestering superpowers to combat climate change.

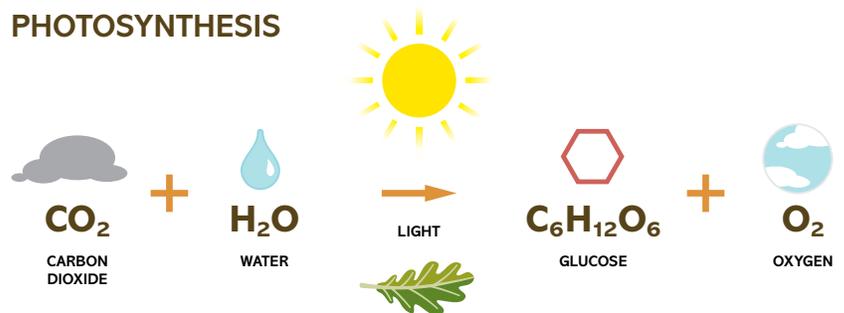
WHY CARBON SEQUESTRATION AND STORAGE IN FORESTS AND FOREST PRODUCTS IS IMPORTANT

- **Climate change is happening.** The hottest years on record have been in the last decade. Unusual weather events such as hurricanes and drought are increasing. Ice caps in Greenland and Antarctica, as well as glaciers, are decreasing in size.
- **Climate change impacts forests.** Extensive research has shown that climate change is affecting forests. Major impacts include increased drought leading to reforestation challenges, longer wildfire seasons, and a long-term shift toward tree species that can tolerate warmer climates.
- **Forests sequester carbon.** Forests are one of the largest terrestrial stores of carbon, and Pacific Northwest forests are among the greatest sequesterers on Earth, due to their fast growth rates and the potential to produce large volumes of timber, some of which can be used to make long-lasting, carbon-storing wood products.
- **Wood products store carbon.** Half the dry weight of wood is carbon removed from the atmosphere by trees as they grow. This can remain locked away for decades in wood products, especially when used in home or other building construction. Wood also requires less energy to produce, and therefore results in fewer carbon dioxide emissions than other building materials.



Forest carbon sequestration starts with photosynthesis, the process plants use to take carbon dioxide out of the atmosphere. Chloroplasts inside leaves and needles use carbon dioxide from the air, water from the soil and energy from sunlight to produce glucose, a simple sugar. Trees use glucose to make wood, storing solid carbon in the process. Oxygen is released into the atmosphere as a byproduct.

PHOTOSYNTHESIS



This simplified chemical equation shows how carbon atoms from the carbon dioxide molecules are moved to glucose molecules through the process of photosynthesis.

ABOUT THE REPORT The *Carbon in Oregon's Managed Forests* report was produced by the Oregon Forest Resources Institute (OFRI) to synthesize the current information on carbon sequestration and storage in Oregon's working forests and wood products. The report updates a similar report commissioned in 2006. Key points from the report are summarized on the following pages. To download the full report, go to OregonForests.org/Carbon.

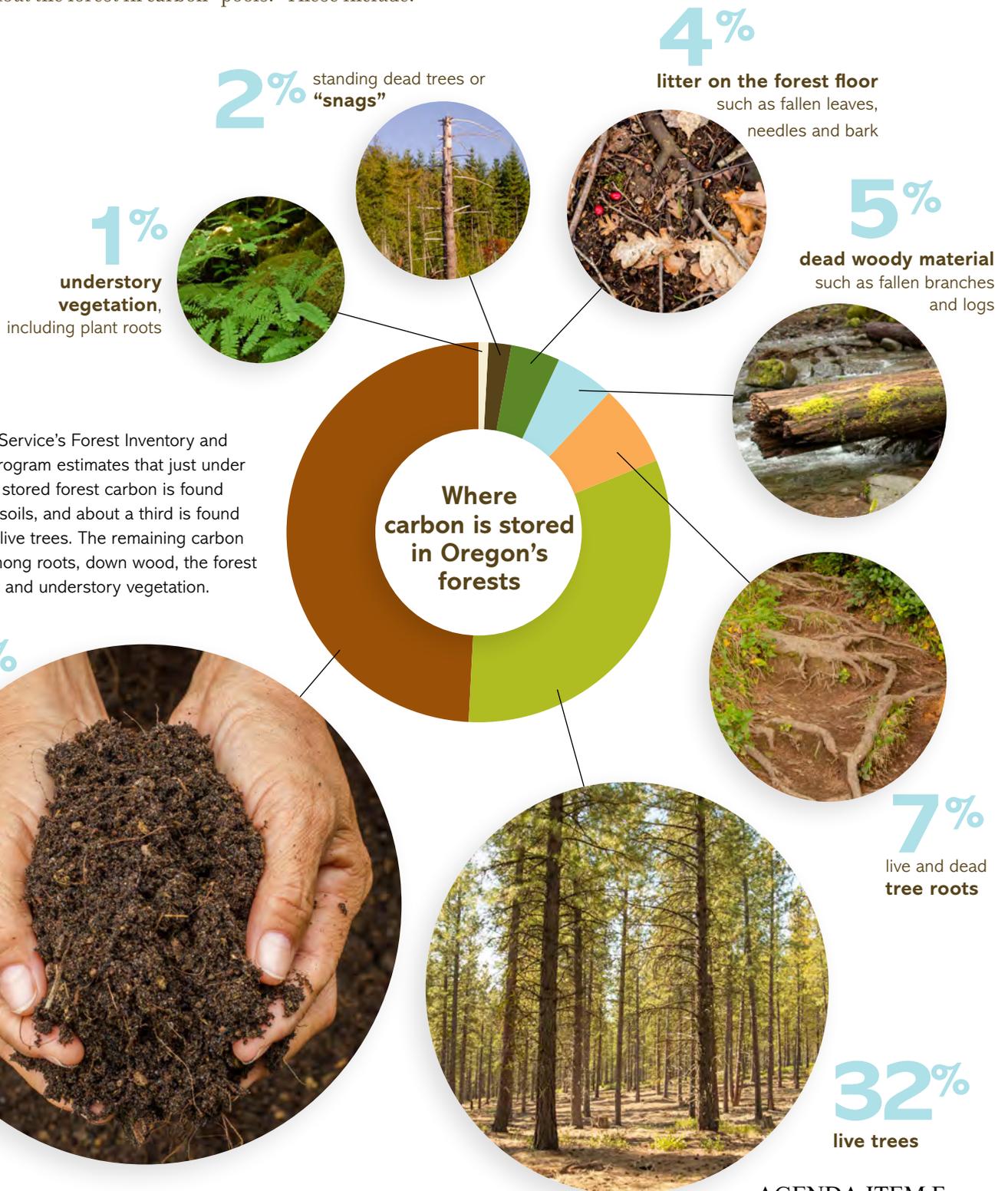
THE AUTHORS *Carbon in Oregon's Managed Forests* was prepared by:

Technical editors: Mike Cloughesy, Oregon Forest Resources Institute, and Edie Sonne Hall, Three Trees Consulting

Other contributors: Glenn Christensen, U.S. Forest Service Pacific Northwest Research Station; David Ford, L & C Carbon; Bruce Lippke, University of Washington (retired); Maureen Puettmann, WoodLife Environmental Consultants, LLC; and Sheldon Zakreski, The Climate Trust.

Carbon in OREGON'S FORESTS

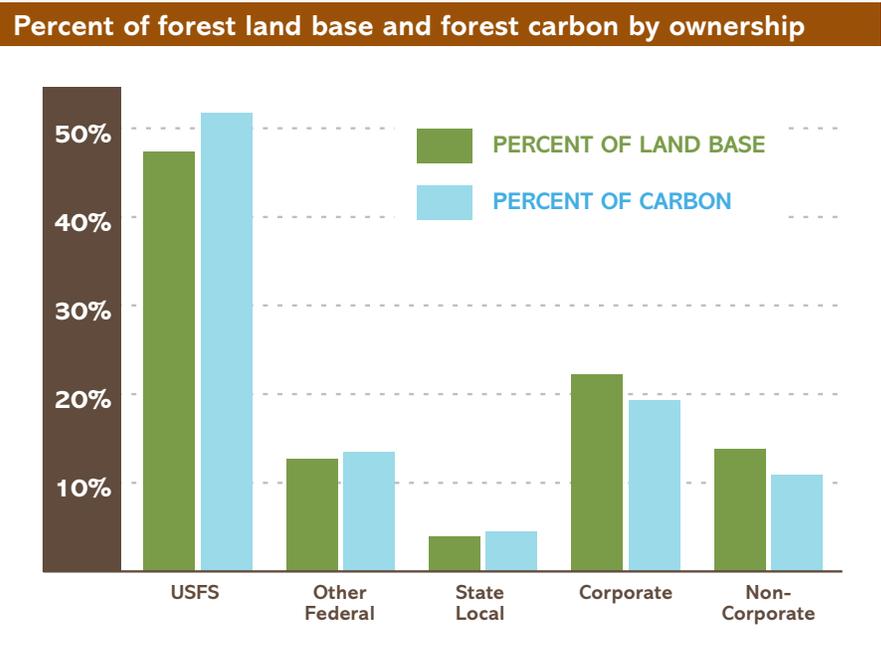
Through the process of photosynthesis, forests naturally sequester carbon dioxide from the atmosphere and store it as solid carbon. Stored carbon is found throughout the forest in carbon “pools.” These include:



The U.S. Forest Service's Forest Inventory and Analysis (FIA) Program estimates that just under half of Oregon's stored forest carbon is found belowground in soils, and about a third is found aboveground in live trees. The remaining carbon is distributed among roots, down wood, the forest floor, dead trees and understory vegetation.

With the help of measurements taken in the field, scientists can estimate the amount of carbon physically present in Oregon's forests by the pool where it's located, such as the amount of carbon stored in live trees. Total forest carbon is the sum of the carbon stored in all of a forest's carbon pools.

Carbon can move between various forest pools and eventually be released back into the atmosphere in a process known as "carbon flux." That means that although forests amass large quantities of carbon as trees grow, they don't store carbon indefinitely. When trees die and start to decay, for instance, they release carbon.



HOW MUCH CARBON IS STORED IN OREGON'S FORESTS?

The most recent comprehensive analysis of how much carbon is stored in Oregon's forests was conducted by the U.S. Forest Service's Forest Inventory and Analysis (FIA) Program at the Pacific Northwest Research Station, in partnership with the Oregon Department of Forestry (ODF). It used field measurements taken between 2001 and 2016.

For the 10-year reporting cycle between 2007 and 2016, FIA estimates there were approximately 3.2 billion metric tons of carbon stored on both public and privately owned Oregon forestland in all carbon pools, including forest floor and soils, as shown in the graphic on the previous page.

HOW MUCH CARBON ARE OREGON'S FORESTS SEQUESTERING?

In addition to measuring the carbon stored in the various forest pools, the FIA-ODF carbon inventory for Oregon also estimated the flux, or change, in each of the pools. Flux in the positive direction is called sequestration, while a negative flux is called emissions. As shown

in the chart (below), the estimated total net flux in Oregon is 30.9 million metric tons of carbon dioxide equivalent per year. This rate of forest carbon sequestration is the highest of the western states, and one of the highest in the country.

CARBON POOL	NET FLUX <i>million metric tons CO₂ equivalent</i>
Aboveground live	31.6
Aboveground dead	-7.0
Belowground live	6.3
Belowground dead	-0.3
VEGETATION NET FLUX	30.5
Forest floor	0.6
Soil organic C	-0.2
TOTAL FOREST NET FLUX	30.9

Scientists estimate carbon sequestration as carbon dioxide equivalents, in order to compare it with carbon dioxide emissions. One ton of carbon equals 3.667 tons of carbon dioxide. The U.S. Energy Information Administration estimates that in 2016 Oregon's carbon dioxide emissions from burning fossil fuels was 37.9 million metric tons. Thus, Oregon's forests sequestered more than 90% of the carbon that was emitted in the state from burning fossil fuels.

There is a close relationship between the proportion of Oregon forestland that falls under each type of ownership and how much carbon is stored there. For instance, the national forests, which are managed by the U.S. Forest Service and account for just under half of Oregon's forests, are storing slightly more than half of the state's forest carbon.

MAXIMIZING forests' carbon-storing POTENTIAL

Photosynthesis enables trees to sequester a significant amount of carbon from the atmosphere, storing between 450 and 650 billion metric tons of carbon in the earth's forests and between 1,500 and 2,500 billion metric tons in soils, respectively.

For this reason, scientists around the world have been studying the role forests can play in mitigating climate change. The Intergovernmental Panel on Climate Change, a United Nations body responsible for assessing international science related

to climate change, has recognized the importance of using sustainable forest management practices that enhance forests' natural abilities to sequester carbon, as well as the increased use of wood products to help reduce carbon dioxide emissions.

Given the capacity of forests to capture and store carbon in the ecosystem and wood products, the timber industry is frequently discussed as a critical component of reducing atmospheric carbon. And Oregon – with its abundant, fast-growing forests and status as the top U.S. producer of softwood lumber and plywood – is well situated to contribute.

Oregon's managed forests already sequester and store significant amounts of carbon, but there are a number of ways they can further contribute to reducing atmospheric

The potential solutions – forest sector carbon cycle

There are many ways Oregon's forest sector, the part of the state economy that's derived from forests, can be part of the solution in the fight against climate change.



carbon. These include preventing the conversion of forestland to other uses, such as housing or other urban development, as well as decreasing the risk of high-severity wildfires and insect or disease outbreaks that can kill large numbers of trees.

Planting trees to create more forests would help take even more carbon dioxide out of the atmosphere. Active forest management aimed at improving a forest's overall health and productivity, as well as resilience to wildfires, can help it capture and store even more atmospheric carbon. Letting trees grow to their peak carbon storage age before harvest can also increase the carbon stored in existing forests and forest products, although there would be financial trade-offs with this strategy for landowners who primarily manage their forests for timber production.

ENHANCING FOREST CLIMATE MITIGATION

The United Nations' Intergovernmental Panel on Climate Change, and its Food and Agriculture Organization, make a number of recommendations based on the latest scientific research regarding ways forests can help us sequester more carbon and reduce carbon dioxide emissions. These include:

- Prevent deforestation by ensuring forests aren't converted to housing or other development.
- Manage forests to store more carbon long-term, by reducing their vulnerability to threats that can cause mass tree mortality and increase forest carbon dioxide emissions, such as drought, insects and wildfire.
- Expand forestland by returning deforested areas to forests.
- Enhance forest carbon sequestration through forest management while producing wood products that can be substituted for materials that require more energy and carbon dioxide emissions to produce, such as concrete and steel.
- Use mill waste and woody debris, also known as biomass, to produce renewable domestic energy.

ATMOSPHERE

REDUCE
EMISSIONS
FROM
FOREST



Reduce deforestation/
degradation from wildfire, etc.

REDUCE
FOSSIL FUEL
EMISSIONS

FOSSIL
FUEL 



Use biomass for energy,
replacing fossil fuel



Use wood products

Half the dry weight of wood is carbon removed from the atmosphere by trees as they grow. That means using wood products in place of materials that don't store carbon and take more energy to produce can help combat climate change.

The role of **WOOD** **PRODUCTS** in carbon storage

In fact, wood products derived from sustainably managed forests, where the amount of timber harvested doesn't exceed growth, can store more carbon in the final product for decades than was released when they were harvested and manufactured. Wood products that store carbon long-term include those used for home and other building construction, such as lumber and plywood, the two most commonly made wood products in Oregon.

In addition to the net 30.9 million metric tons of carbon dioxide equivalent



sequestered in our state's forests each year, the *Carbon in Oregon's Managed Forests* report estimates that the lumber and plywood manufactured in Oregon each year contain an estimated 10.2 million metric tons of carbon dioxide equivalent. Another 8.4 million metric tons of carbon dioxide equivalent is stored each year in products such as particleboard and hardboard, which are made with the wood residuals left over after milling logs into lumber. The total carbon sequestered in Oregon by our forests and the wood products made here is estimated to be 49.5 million metric tons of carbon dioxide equivalent each year.

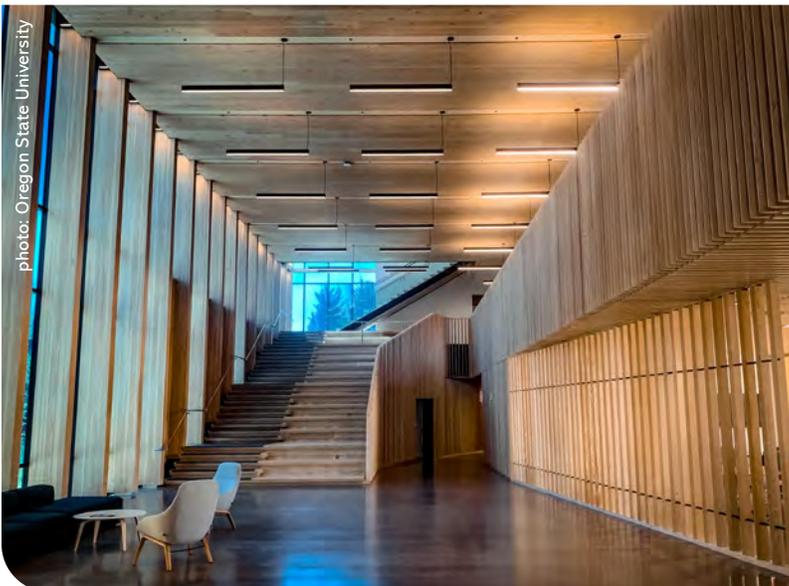


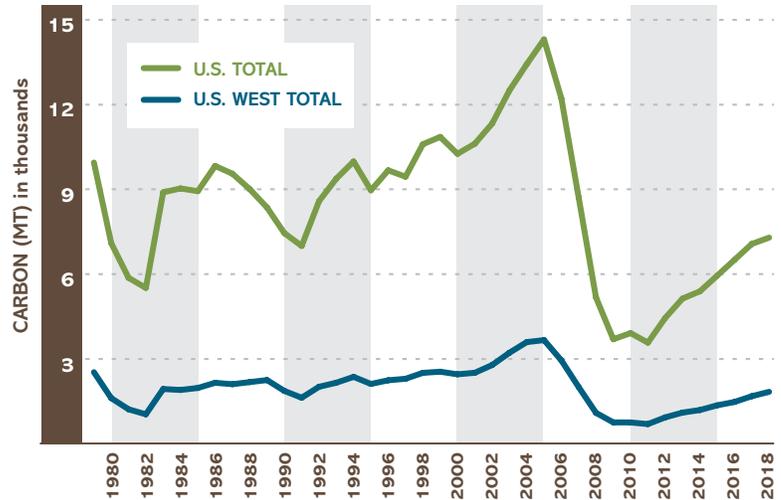
photo: Oregon State University

A SUSTAINABLE BUILDING MATERIAL

Wood performs well in life cycle assessments (LCAs), a method of tracking the overall environmental impact of a product, from the extraction of the raw materials used to make it through to the product's disposal. LCAs have shown that making wood products typically consumes far less water and requires far less energy, and therefore generates fewer carbon emissions, than producing other equivalent construction materials. For that reason, wood is increasingly being recognized as the material of choice for sustainable building projects. This includes constructing larger and taller buildings, such as Oregon State University's Peavy Hall (pictured at left), using engineered wood products in place of or in combination with concrete and steel.



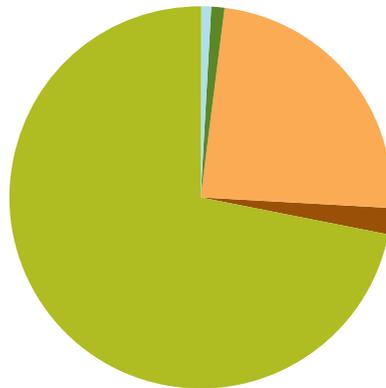
Annual new carbon storage for single-family housing stock



Source: U.S. Census 2019

Most single-family homes in the U.S. are built with wood. That means when housing construction is on the upswing, the total amount of carbon stored in residential structures also increases. The carbon storage associated with total single-family housing starts annually from 1979 to 2018 ranged from 3.6 to 14.6 million metric tons nationally.

Energy sources for softwood lumber production in the Pacific Northwest



72% RENEWABLE, BIOMASS

1% RENEWABLE, WATER

1% RENEWABLE, WIND, SOLAR, GEOTHERMAL

24% NON-RENEWABLE, FOSSIL

2% NON-RENEWABLE, NUCLEAR

photo: LEVER Architecture

Case study:

ALBINA YARD

The Albina Yard commercial office building in Portland is among a growing number of nonresidential structures in Oregon constructed using mass timber products such as cross-laminated timber (CLT). The four-story, 16,000-square-foot building, which was built in 2015 using CLT and glulam beams manufactured in Oregon, stores 80.5 metric tons of carbon, the equivalent of offsetting 295 metric tons of carbon dioxide emissions.

One advantage of wood from a carbon emissions standpoint is that manufacturing wood products requires less energy from cradle to gate than other materials. For Pacific Northwest lumber mills, most of that energy comes from renewable sources, primarily from using wood residuals from the milling process to generate biomass energy.



photo: Stacy McNeil, Green Diamond Resource Company

GREEN DIAMOND RESOURCE COMPANY

forestland near Klamath Falls is being managed for carbon sequestration and storage as part of a registered carbon offset project.

Forests' vital role as a natural mechanism to remove and store carbon from the atmosphere makes them a crucial part of mitigating climate change. U.S. forests and associated wood products currently

Sustainably managing forests has been recognized as a relatively cost-effective strategy for offsetting greenhouse gas emissions. Nature-based solutions can help absorb about a third of the carbon pollution produced in the U.S., according to recent research led by The Nature Conservancy. These solutions include reforestation, practices that improve soil health, and forest carbon management.

MARKETS for forest carbon

capture and store 16% of the country's annual carbon dioxide emissions from burning fossil fuels. Carbon markets that incentivize landowners to take steps through carbon offset projects that increase carbon storage on their forests – while providing a range of social and environmental co-benefits such as wildlife habitat – help take advantage of these forests' climate mitigation abilities.

U.S. forests have the potential to store even more carbon through enhanced forest management practices. America's private, family-owned forestlands offer some of the greatest opportunities to sequester and store more carbon. By managing just 20% of family-forest acres in the U.S. with practices that increase carbon sequestration by 2030, approximately 3.5 trillion metric tons of carbon dioxide could be sequestered by the end of the century.

AGENDA ITEM F
Attachment 1
Page 10 of 12



TYPES OF CARBON MARKETS

There are three types of carbon markets used across the U.S. to mitigate climate change:

Compliance carbon markets are marketplaces where regulated carbon emitters obtain and surrender emissions permits, or allowances, to meet predetermined regulatory greenhouse gas reduction targets. In the case of cap-and-trade programs, participants can trade allowances to make a profit from unused allowances or to meet regulatory requirements. In Oregon, the Confederated Tribes of Warm Springs and Green Diamond Resource Company both operate registered and approved forest carbon offset projects under California's cap-and-trade program.

Voluntary carbon marketplaces involve companies purchasing offsets with the intent to resell them or meet carbon-neutral or other environmental claims, or airlines using them under a United Nations-mandated program to offset carbon emissions from international flights. Voluntary offsets are primarily driven by private corporations seeking to achieve corporate social responsibility objectives. In Oregon, the city of Astoria operates a registered and approved voluntary forest carbon offset project within its watershed.

Incentive programs encourage forest landowners to manage their forests to enhance carbon sequestration and storage. These include programs run by the federal government's Natural Resources Conservation Service and a new program being developed by the American Forest Foundation and The Nature Conservancy. Called the Family Forest Carbon Program, it incentivizes landowners to adopt specific forest management practices that have been scientifically demonstrated to increase carbon sequestration, improve forest health and provide other important ecosystem benefits.

OREGON FOREST CARBON OFFSET PROJECTS

A number of public and private Oregon forest landowners already participate in forest carbon markets. Here are three examples of forest carbon offset projects in the state:

The **city of Astoria** has owned and managed its forested watershed since the 1950s, primarily to provide fresh drinking water to its residents and to generate timber harvest revenue that supports city services. In 2014 the city adopted a revised forest management plan for the watershed that began its commitment to sequester carbon beyond all legal and regulatory requirements, essentially trading off some timber revenue for carbon revenue. That same year, the city initiated a voluntary improved forest management plan under the American Carbon Registry. To date, the project has produced 260,000 carbon offsets that have been purchased by The Climate Trust.

Green Diamond Resource Company registered two California Air Resources Board improved forest management compliance projects in 2015, on about 575,000 acres of

forestland near Klamath Falls that had been heavily logged by the previous owners. These projects represent a long-term commitment to improve forest health, increase productivity, and enhance resiliency to pest outbreaks and wildfires while storing greater amounts of carbon over the next 100 years. To date, nearly 1 million carbon offsets have been generated by these projects.

The **Confederated Tribes of Warm Springs** in central Oregon decided to pursue a forest carbon offset project on 24,000 acres of the 440,000-acre Warm Springs Reservation forest through California's cap-and-trade program in 2015. A small parcel burned during the initial stages of project development, reducing its size to 22,000 acres. To date, 2.7 million carbon offset credits have been issued to this project.



ABOUT THE OREGON FOREST RESOURCES INSTITUTE

The Oregon Legislature created the Oregon Forest Resources Institute (OFRI) in 1991 to advance public understanding of forests, forest management and forest products, and to encourage sound forestry through landowner education. A 13-member board of directors governs OFRI. It is funded by a portion of the forest products harvest tax.



**Oregon Forest
Resources Institute**

OregonForests.org

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AGENDA ITEM F
Attachment 1
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State Forester and Board Member Comments

Agenda Item No.:	2
Work Plan:	Strategic Planning / Work Plan
Topic:	2020-2022 Board Work Plans Review and Revision
Presentation Title:	Division Work Plan Review
Date of Presentation:	January 6, 2021
Contact Information:	John Tokarczyk, Director Planning and Analysis 503-945-7414 John.a.tokarczyk@oregon.gov

SUMMARY

Oregon Department of Forestry (ODF) Division Chiefs will provide updates and suggested revisions to the 2020-2021 work plans for Board consideration. This is an opportunity for the Board to provide comment to the Division Chiefs about items and approve any work plan changes. This item was originally intended to be heard at the October 2020 Board Retreat.

CONTEXT

March 4, 2020 the Board of Forestry (Board) approved the 2020-2021 work plans. The Board work plans are intended to strengthen the Board’s ability to be an effective policy making body, direct the Department’s work, and focus the Board’s and Department’s efforts on the most important issues.

With this item, Division Chiefs will provide work plan mid-course reviews discussing work plan status and changes for 2020-2021 with the Board. Specific elements and status within each work plan will be included for each Division (see attachments). Division Chiefs will provide proposed modifications for review and approval by the Board as each work plan necessitates.

BACKGROUND AND ANALYSIS

The Board and Department’s work plan process is designed to create a systematic way for the Board to identify issues and set priorities that lead to specific decisions and products. The process is also designed to link with the biennial budget cycle where resources are identified and allocated within the Department.

The process of developing work plans provides a number of advantages including:

- Allowing staff to more efficiently allocate time among multiple demands,
- Providing the public with a better idea about when to provide input, and
- Organizing the Board’s work so that it leads to specific decisions.

The steps of the work plan development process include:

September – Staff presents information to help the Board take stock of the current situation surrounding forest issues.

October – Planning Retreat – Board and Department discuss work plan priorities

November –Board sets list of priority issues

January – Department staff provides overview of draft work plans

March – Board approves work plan 2-year work plan

Work plan mid-course review and correction:

Work plan mid-course review and corrections are made to work plans on even years at the October Board retreat, but as this was cancelled the mid-course review will occur at the January 2021 meeting.

RECOMMENDATION

The Department recommends the Board approve work plan modifications as identified.

NEXT STEPS

Implementation of approved work plans where changes have occurred.

ATTACHMENTS

- (1) Private Forests work plan
- (2) Climate change work plan
- (3) Emerging Issues work plan
- (4) State Forests work plan
- (5) Fire Protection work plan
- (6) Administrative work plan

Work Plan:	Private Forests
Primary Contact:	Kyle Abraham, Private Forests Division Chief
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION NARRATIVE

Purpose & Objective

The Oregon Department of Forestry (ODF), Private Forests Division, provides resource protection and landowner assistance on Oregon's 10.3 million acres (34 percent of Oregon's forestland) under private forest ownership. Oregon's privately owned forests are diverse in size and character, including large industrial ownerships, family woodlands of many sizes, and treescapes in cities, suburbs and rural residential areas. To support such diverse ownerships, the Private Forests program provides landowner assistance in the areas of forest and stream health protection and enhancement, urban and community forestry, enforcement of forest practices laws, research and monitoring, tree improvement, and incentive programs. These forests provide values for all Oregonians, including watershed protection, ecosystem services, economic activity, fish and wildlife habitat, and recreation.

Achievements

Siskiyou Streamside Protection Review

ODF completed work for the Siskiyou streamside protection review that included contextual information on climate change from outside experts and the expanded literature review with comments and input from the Siskiyou Advisory Committee. This project consumed significant staff resources over the first half of the work plan. With the passage of Senate Bill 1602 (SB 1602) the planned sufficiency decision for the Board of Forestry at the July meeting was unnecessary as the legislation that was passed directed the Board to develop permanent rules similar to those already in place in western Oregon for salmon, steelhead, and bull trout streams in the Siskiyou geographic region.

Wildlife Food Plots

The Board approved final rule language in July 2020 with rules becoming effective September 1st, 2020. Wildlife food plots originated in the 2015 Oregon Legislative Session and enacted as ORS 527.678 in 2016. As required by the statute, ODF developed rule language for implementation. Input from the Committee for Family Forestlands, Tribal Resources Cluster, Oregon Department of Fish and Wildlife, and the Regional Forest Practices Committees, and interested public was incorporated throughout the rulemaking process.

Current Issues and Focus

Western Oregon Streamside Protections Review

ODF provided an update on the RipStream vegetation and large wood report, plans for a literature review on Desired Future Conditions (DFC) and large wood, and future modeling work or additional field work at the September 2020 Board meeting. These topics were identified as high priority in the Division's 2016 Monitoring Strategy. An update on the combined literature review on DFC (stand structure) and large wood covering western Oregon will be brought to the Board in late 2021/early 2022. This project has been delayed due to the focus of staff resources on the completion of the Siskiyou streamside protection review and post-fire response. The department is tentatively planning to bring the full suite of western Oregon analysis results to the Board for a sufficiency decision at a Board meeting in the middle of 2022.

ODF-Department of Environmental Quality (DEQ) Collaboration

ODF and DEQ have different legal and policy frameworks for assessing the sufficiency of rules in meeting water quality standards, and implementing total maximum daily loads (TMDLs). These differences lead to misunderstandings in completing that work which impedes effective and efficient collaboration between the agencies. The departments are considering revisions of an existing MOU between the agencies to address these differences and seek agreement for testing for rule sufficiency and implementing TMDLs.

The Division and DEQ will continue to bring approximately quarterly updates to the Board, as well as the Environmental Quality Commission (EQC). These updates may be presentations or written reports to these governing bodies.

Specified Resource Sites Rule Analysis: Marbled Murrelet

In June 2016, the Board received a Petition to Initiate Rulemaking under specified resource site rules for the marbled murrelet. In November 2016, the Board directed ODF to initiate a rule analysis for marbled murrelets and as one of the initial steps for this project, to develop a technical report on marbled murrelets as guided by Oregon Administrative Rule (OAR) 629-680-0100.

The draft technical report was presented to the Board in April 2018. Findings from an expert review of the draft technical report were presented to the Board in November 2018 and the final technical report approved by the Board in April 2019. The approved final technical report lays out a range of options for both the definition of resource sites for marbled murrelets as well as a range of protection options the Board may want to consider to protect those resource sites.

In order to inform the Board's future decision-making work, ODF plans to seek input on the range of options from tribal governments and stakeholders. With the help of a facilitator, the meetings are designed to help identify preferred resource site determination and protection strategies. This input from focus groups will be summarized and submitted to the Board when completed.

The department has experienced delays in gathering input from stakeholders due to COVID-19 restrictions. Initial feedback from stakeholder groups indicated they would prefer in-person meetings so ODF chose to temporarily pause the work on gathering further input. With continued in-person meeting restrictions, the department recently reached out to stakeholders to better understand how moving forward with gathering the aforementioned information would be received.

Implementation Study: Reforestation

Annual assessments of implementation of the Forest Practices Act (FPA) is an ongoing core business practice. Over the years, the Private Forests Division has monitored implementation of the FPA on private industrial and non-industrial lands throughout Oregon.

The current study is focused on FPA Division 610 – Reforestation. This Rule Division applies to forest operations that reduce stocking of free to grow forest stands below site-productivity based standards. The purpose of this Division is to assure continuous growing and harvesting of forest tree species. Reforestation was selected as the next focus of implementation monitoring to align with Division workload. Additionally, stakeholders requested we examine it, and the 2016 Monitoring Strategy identifies reforestation as a medium priority.

This work has been delayed due to staff resources focused on the Siskiyou streamside protection review, maintaining vacant positions in the monitoring unit and one-time budget reductions for the 2019-2021 biennium. However, work is continuing on the reforestation implementation pilot study through existing resources.

ADDITIONS TO DIVISION WORK

SB 1602

SB 1602, passed in the June 2020 special session of the Oregon Legislature, put into law components of a memorandum of understanding and changes to the FPA that had been reached by a coalition of environmental groups and forest landowners.

SB 1602 includes several significant changes to protection requirements for non-federal forestlands in Oregon. The bill:

- Increases pesticide spray buffers along certain streams, certain water intakes, and near homes and schools when application is by helicopter.
- Requires applicators to provide announcements the day before a planned operation to nearby residents and water users with certain conditions of water use within certain distances of aerial application of herbicides by helicopter.
- Directs the Board of Forestry to adopt permanent rules in the Siskiyou area of southwest Oregon similar to those already in place in western Oregon for salmon, steelhead, and bull trout streams. These rules will go into effect Jan. 1, 2021.
- Describes mediation sessions for developing an approach to evaluate and jointly recommend substantive and procedural changes to the FPA. ODF expects the Governor's

Office will organize the mediation sessions over the next several months with representatives of the forest industry and environmental interests.

To address this workload, the department has developed a project team to implement the legislation, associated work with other agencies, and education and outreach to internal and external partners. The department is pleased to support this work, but it was unanticipated and there are some significant delays to other projects which will continue to impact our work plan over the next year. In addition, there may be requests of technical staff to participate in some fashion during the mediated sessions.

FIRE RECOVERY

Fires in 2020 impacted over one million acres in Oregon. Within the fire perimeters, approximately 343,000 acres of private (industrial and non-industrial) forest land has been impacted to varying extents. In response, the Private Forests Division has needed to shift priorities in order to focus on fire recovery at a landscape scale. Fire recovery issues that the Division is addressing include:

- State and federal agency coordination. The Division is playing a leadership role in the state recovery response to the 2020 fires. The Division convened the Erosion Threat Assessment Reduction Team, along with the Federal Emergency Management Agency. This multi-agency team conducted flooding, landslides, and other natural resource assessments focused on non-federal land impacted by the fires. These assessments will help guide the work of the Natural and Cultural Resources Task Force, co-convened by ODF that will help determine immediate environmental stabilization needs, as well as longer-term restoration priorities within the fire footprints.
- Post-fire salvage harvesting. The Division has developed guidance to the field to assist in processing salvage harvest notifications that began to be submitted to ODF in September, and are expected to continue for the next 18 months. This guidance assists Stewardship Foresters and operators in processing salvage harvest notifications, particularly with those that require site specific plans for an alternate practice. These plans need to meet or exceed protection of forest resources otherwise found in the FPA, and associated administrative rules. The Division has also brought on additional staff on a short-term basis from the Oregon Departments of Fish and Wildlife and Environmental Quality. Staff will provide additional capacity in reviewing plans for alternate practices, as well as provide resource protection assistance to forest landowners impacted by the fires.
- Reforestation. The 2020 fires are expected to exacerbate issues in Oregon involving access to adequate tree seedlings, as well as nursery and contractor capacity. Division staff is working with stakeholders to address the short-term need to reforest fire-impacted areas as soon as possible, while examining potential longer-term ideas that may help solve future seedling shortage and capacity issues.

Changes to Work Plan

Specified Resource Sites Rule Analysis: Coho Salmon

In April 2019, the Board received a petition to initiate rulemaking under the specified resource site rules for coho salmon. In July 2019, the Board accepted the petition and directed ODF to initiate a rule analysis for coho salmon.

ODF has paused work designed to define the resource sites and work with other natural resource agencies to help establish the inventory of the resource sites. Work on this topic is paused due to intersection directly with potential revisions and consideration of SB 1602 mediated sessions designed to address endangered fish and aquatic species.

Specified Resource Sites Policy Review

After more than a decade since the adoption of special resource site protection policies, Board review of such policies—related statutes and/or rules—is needed in light of changing circumstances for private forests in Oregon and species protection efforts.

Work on this topic is paused due to intersection directly with potential revisions and consideration of SB 1602 mediated sessions designed to address endangered fish and aquatic species and lack of staff capacity that are currently focused on implementing guiding legislation and rulemaking from SB 1602.

Implementation Study: Review

Annual assessments of implementation of the FPA is an ongoing core business practice. Over the years, the Private Forests Division has monitored implementation of the FPA.

ODF presented the 2013, 2014, 2016, and 2017 compliance reports to the Board at the annual Monitoring Unit updates (there was no study in 2015).

Some concerns have been expressed with the level of statistical inference of compliance rates due to landowners who choose not to participate in the study. Also, concerns with statistical analysis and sampling bias with respect to lack of independent sample sites has also been expressed.

At their November 2019 meeting, the Board directed the State Forester to provide for a statistical review of the previous (2013-2017) compliance audit sampling design and analyses. A first phase of the review process was recently completed and presented to the Board in September 2020. Ongoing work includes review of the expected goals and objectives of the implementation study to ensure alignment throughout ODF and the Board, and developing a range of approaches to meet desired outcomes.

ODF is also developing a request for proposal to hire a contractor to complete by the end of the current biennium:

- Review the 2013-2017 compliance audit methods and data, including issues identified in past comments;
- Assess utility of those data relative to Private Forests Division goals;

- Describe alternate approaches to improve both analysis and reporting of those data, and similar future compliance assessments; and,
- Recommend preferred approach for improving these analyses and reporting.

Depending on the outcome of this work product and department budget, we anticipate the contractor implementing one of their alternatives, including re-analysis of the data, and presenting their results to the Board.

Private Forests Division Work Plan	2020					2021						2022		
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Water Quality Topics														
<i>Milestones</i>														
❖ Siskiyou Streamside Protections Review	█	█	ⓓ	█										
❖ Western Oregon Streamside Protections Review				█							i			ⓓ
❖ ODF-DEQ Sufficiency Review Alignment		i	█	i	█		i		i		i			
Issue: Forest Practices Act (FPA) Rule Policy Review														
<i>Milestones</i>														
❖ Specified Resource Sites Rule Analysis: Marbled Murrelet					i									
❖ Specified Resource Sites Rule Analysis: Coho Salmon			█						█					
❖ Specified Resource Sites Policy Review							█							
❖ Implementation Study: Review				█							i			
❖ Implementation Study: Reforestation											█			
❖ Senate Bill 1602 Implementation (as needed)					ⓓ			i						
Issue: Implement Legislative Direction														
<i>Milestones</i>														
❖ HB 3013 Wildlife Food Plots			ⓓ											

Matrix Key:
 TBD – To be determined
 i – Informational item
 d – Preceding Decision item
 ⓓ – Final Decision item

Color Key:
█ – Milestone Completed
█ – Milestone Change
█ – Milestone Tabled or Stopped

Private Forests Division Work Plan	2020					2021						2022		
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Board Updates														
<i>Milestones</i>														
❖ Operator of the Year						i							i	
❖ Committee for Family Forestlands Report and Appointments			D							D				
❖ Forest Practices Agency Meeting Report							i							i
❖ Forest Health Report				i							i			
❖ Forest Practices Monitoring Report				i							i			
❖ Urban and Community Forestry Program Update				i	i						i			
❖ Non-industrial Forest Landowner Program Update				i							i			
❖ Regional Forest Practices Committee Appointments				D		D					D			

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 D – Final Decision item

Color Key:
Green – Milestone Completed
Yellow – Milestone Change
Magenta – Milestone Tabled or Stopped

Work Plan:	Climate Change
Primary Contact:	John Tokarczyk, Policy and Analysis Unit Lead
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION NARRATIVE

Purpose & Objective

The Oregon Board of Forestry (Board) directed the Department to pursue a wide-array of issues relative to climate change and forest carbon. The issue-based work plan is coordinated by the Policy and Analysis Unit (PAU), and milestones outline the goals expressed by the Board.

Achievements

DOJ Carbon and climate Statutory Authority Analysis (2020)

A request to Department of Justice (DOJ) for a legal analysis to inform the board of its statutory authority relative to forest carbon and climate interests, provided awareness and context for the extent to which board climate and carbon policy considerations can be made. This work was initiated in June as identified in the work plan and the memo was made available in November.

Oregon Forest Ecosystem Carbon Report (2019-2020)

The development of a forest carbon accounting framework for Oregon began with the first iteration of the Oregon Forest Ecosystem Carbon Report (FECR) in 2018. This work was developed in collaboration with the USFS Forest Inventory Analysis (FIA), provided estimates of the stocks and flux of carbon in Oregon's forests, and is compatible with California and Washington for regional analyses. This work will be updated regularly with the continuous remeasurement of FIA field plots and provides a mechanism for monitoring the rate of carbon sequestration in Oregon's forests that is fundamental to evaluating forest conditions and trends, effect of current forest practices, and potential policy options for forest carbon mitigation. Given the manner in which this report was developed, the report will be continually improve through ongoing data collection, regional participation, and regular review and updates.

Oregon Harvested Wood Products Carbon and Oregon Sawmill Energy Report (2020-2021)

The analysis in the Oregon Harvested Wood Products Report which is called for in the work plan along with the Sawmill Energy Report, provides the carbon-in-wood-products dimension of Oregon's forest carbon accounting framework. A significant portion of the flux in forest carbon occurs through removal and production of forest products, which can retain carbon for long periods of time. This report provides an evaluation of how much carbon is stored in wood products, in landfills, or has been emitted back to the atmosphere

and will be updated on a regular basis. The Sawmill Energy Report (initiated in 2019) is based on a survey of Oregon's sawmills and provides estimates of the energy use and production at those mills along with the amount of associated emissions. Like the Forest Ecosystem Carbon Report this report will continue iteratively as it was designed to utilize fixed data collection conducted by the USDA every three to four years and will be updated on a four to five year basis to reflect new data and improved methodologies.

Together with the Forest Ecosystem Carbon Report these reports provide

1. A framework for evaluating how Oregon's forests and wood products are contributing to carbon sequestration
2. A foundation of information for understanding the dynamics of the forest carbon, and baseline to compare effect of management practices or potential carbon mitigation policies.

Enhanced forest change awareness, Changes in Forest Composition and model improvement stemming from ongoing work related to the carbon accounting framework (2020-2021)

Stemming from ongoing work related to developing the carbon framework, climate change is predicted to cause changes the current geographic distribution of trees and other forest plants. We are currently collaborating with the USFS Forest Inventory and Analysis and Groom Analytics to use the remeasured FIA plots to evaluate how the distribution of forest species may be affected by changes in climate or other controlling factors. This project will result in a peer reviewed article published in a leading scientific journal and will be the first statistical analysis of the FIA remeasurement data to understand the effect of climate change on forest species geography.

Temperate Forest Climate and Carbon MOU and Regional Collaboration (2019-2020)

Forest Carbon and Climate Change are a shared interest not limited by borders. Neighboring states initiated an evaluation of forest carbon and flux and became aware of complementary interests and needs. States formalized a working and knowledge sharing relationship with the Temperate Forest Climate and Carbon MOU. The MOU and regional collaboration allows broader and more robust coordination and accountability relative to evaluation of forest carbon, flux, accounting, and mitigation interests, opportunities, and challenges.

Current Issues and Focus

Establishment of Climate Change and Forest Carbon Strategic Goals

Commensurate with the work plan item relating to the analysis of statutory authority, the plan entails a review and revision of Goal G in the Forestry Program for Oregon.

Goal G reflects the Board's carbon and climate interests through the Forestry Program for Oregon. Revisiting this goal allows for the integration of new scientific information and contemporary values of the Board to guide the analysis of Departmental policies. This item was scheduled for the September 2020 meeting, which was abbreviated to just the

consent agenda and fire report, due the fire event that started on Labor Day. While staff work has progressed, this work has not occurred within the time frame identified in the plan due to staffing changes, pandemic driven challenges, and wildfire response. Despite the delays, this work will proceed as identified in the revised work plan.

Executive Order 20-04 Directing State Agencies to Take Actions to Reduce and Regulate Greenhouse Gas Emissions

The Governor's Executive order relating to agency actions and opportunities relating to carbon and climate has entailed a significant investment from what is an already limited staff, however the intersection between the Executive Order and the current Carbon and Climate Change work plan are largely consistent with existing work. While the initial work related to Executive Order (EO) is complete, other elements remain, notably support and participation in external work groups and reporting called for in the EO.

ODF Carbon and Climate Change Adaptation and Mitigation Plan.

Beyond the initial work related to reporting called for in EO 20-04, the agency has been directed to "prepare a Climate Change Plan for Board of Forestry review that builds on the agency's executive order implementation report and reflects a broader strategy for establishing Oregon's leadership in climate-smart forestry and greater accountability toward achievement of goals." The development and implementation of this plan will require significant engagement with the Board and Agency Leadership.

Alternative Management and Utilization Strategies and Carbon and Climate Considerations

Beyond carbon accounting, the work plan calls for consideration and review of alternative management scenarios relative to forest carbon and climate impacts. This work is currently underway in coordination with the PNW research station and other partners including American Forests to simulate the effect of different forest management scenarios for carbon mitigation plans relative to current management practices. This study will provide perspective on how different forest approaches can affect alternative carbon outcomes throughout Oregon.

Changes to Work Plan

There are no significant changes to the work plan other than the ability to remain consistent with the initial work plan timelines. The reason for these stems from significant staffing changes, pandemic related challenges, and wildfire response. Nonetheless, all elements of the work plan continue to be addressed and are expected to be fulfilled.

The notable exception is inclusion of the Carbon Climate Change Plan initiated via EO 20-04. Development of the plan will continue to engage existing staff, the Board, and agency leadership. This change represents a substantial addition to what was constituted in the original work plan.

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

Climate Change and Forest Carbon Work Plan	2020					2021						2022		
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Mitigation and Adaptation Efforts														
<i>Milestones</i>														
Harvested Wood Products and Sawmill Energy Report				i	i									
Annual Update on Mitigation and Adaptation Efforts				i	i									
Scenario Planning Model Review								TBD						
Update on Scenario Planning with focus on Management and Utilization Strategies										i				
ODF Climate Change Carbon Plan						i								
To be determined														

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Work Plan:	Overarching Issues
Primary Contact:	John Tokarczyk, Policy Analysis Unit Lead
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION NARRATIVE

Purpose & Objective

The *Overarching Issues work plan* revolves on evaluation and review of elements pertaining to the [Forestry Program for Oregon](#). The Forestry Program for Oregon describes the Board's mission, values, vision, goals, objectives, and indicators of sustainable forest management and is a central element for informing and directing the Board of Forestry's framework for strategic planning.

In terms of strategic planning the Board's mission statement establishes the overall purpose of the Board of Forestry. Values identify the Board's guiding philosophies related to forestry. The vision describes conditions the Board wants to establish, looking at a 20-year horizon. The goals identify what the Board of Forestry wants to achieve over the next eight years. Viewed together, the mission, values, vision, and goals describe the future the Board is striving to achieve. In this context, the Board's objectives are a set of short-term actions upon which it intends to focus its efforts.

The Forestry Program for Oregon is intended to:

- Clearly define and communicate what the Board of Forestry is and what it does;
- Establish the Board's fundamental guiding values and priorities;
- Direct the Department of Forestry in implementation of the Board of Forestry goals and objectives in the Forestry Program for Oregon;
- Focus resources and efforts on the most important issues and priorities that will promote and create the desired future;
- Measure and report performance (both successes and setbacks); and
- Provide an improvement cycle that allows both the Board and the department to make informed changes when necessary.

The *Overarching Issues Work Plan* initiates a Board review of the Forestry Program for Oregon.

Achievements

Dashboard for Strategic Plan – A review of indicators relating to the Board's strategic plan has been completed. Within this review, a number of indicators continue to collect data and remain available for utilization in the reconsideration of dashboard and measure development. Additionally, several other new indicator sources have emerged since initial dashboard and indicator development. Notably forest carbon reporting, Harvested Wood Products and Sawmill

Energy reporting provide additional parameters of data for indicators relative to a revision of Forestry Program for Oregon, Goal G, when that occurs. Beyond these potential indicator opportunities additional other data sources and indicator considerations are underway in anticipation of dashboard and indicator review and development.

Current Issues and Focus

Strategic Plan Values Statements – While the work plan has deviated in terms of timing, there is a current focus on addressing and advancing a revised and current value statement for the Board's Strategic Plan. This effort was to begin at the October retreat in 2020 and continue forward with a consideration of public input. This discussion has been postponed until new Board members join the Board of Forestry.

Ecosystem Services Valuation – An informational session relating to functionality and utilization of ecosystem services valuation was presented to the board in conjunction with academic partners from Oregon State in 2019. Since that session there has been continued dialogue and evaluation of opportunities for utilization of ecosystem services valuation in the policy and evaluative framework. The coordination with university partners has been maintained to further evaluate and advance utilization, however with staffing and pandemic challenges timely progress on this item has been challenged, yet remains an element of ongoing work and focus.

Dashboard for Strategic Plan – The dashboard and indicator development follows with determination of board values and goal revision in order to ensure meaningful and accurate representation of goals reflective of values. As this work progresses, staff will assist the Board in determining what data exists to satisfy corresponding Indicators and/or in developing new metrics.

Changes to Work Plan

There are no structural or content changes to the work plan other than timeliness of items. This change in schedules is a function of staffing and pandemic related challenges as well as Board agenda availability. Regardless, all items in the work plan continue to proceed.

Overarching Issues Work plan	2020					2021						2022		
	Apr	Jun	July	Sep	Nov	Jan	Mar	Apr	Jun	July	Sep	Nov	Jan	Mar
Revise Board’s Strategic Plan -														
<i>Strategic Plan Values Statements</i>														
• Review current Value statements		i					i							
• Determine public input process for revision of Values		d					d							
• Conduct public input														
• Adopt new Values statements for the Board’s strategic plan				i	D					i	D			
<i>Climate Change Goal</i>														
• Revise Goal G relating to climate change	<i>(see Climate Change and Forest Carbon work plan)</i>													
<i>Dashboard for Strategic Plan</i>														
• Review previous indicators and current status				i										
• Develop list of potential dashboard measures						d								
• Review potential sources and time responses of underlying data for potential measures								i						
• Adopt Dashboard										D				
<i>Revise Remainder of Strategic Plan</i>														
• Establish process to complete revision									i			D		
<i>Ecosystem Services Valuation</i>														
• Review potential uses and determine priority policy use of Ecosystem			i		d									

Services (e.g., future 714 Analyses, State Forest Management Plan, etc.)														
• Board review and selection of services to include in future analyses, including assessment of feasibility			i			i			D					
• Methodology Development										TBD when specific policy analysis requires valuation				
• Valuation														

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Work Plan:	State Forests
Primary Contact:	Liz Dent, State Forests Division Chief
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION OVERVIEW

Purpose & Objective

The Oregon Department of Forestry, State Forests Division, manages approximately 730,000 acres of forestlands across Oregon. These state forestlands are actively managed to provide economic, environmental, and social benefits to Oregonians. Timber sales on these forests create jobs and generate revenue that fund counties, local districts, and schools throughout the state. These forests also offer recreation and educational opportunities, and provide essential wildlife habitat and clean water. Management costs associated with managing these public forests are funded primarily through the sale of timber off these lands.

The Division's core businesses include financial accounting and log tracking, timber sale contracting and administration, fish and wildlife surveys and implementation of conservation measures. We collect, manage, and analyze data and report outcomes. Field and Salem staff conduct and coordinate reforestation activities, road construction and maintenance, collaborate with local communities and other organizations on habitat improvement projects, maintain recreation facilities and opportunities, and provide educational programs to schools and the public.

Current Issues and Focus

It has become increasingly difficult to support all priority work and core business. Unanticipated legal actions have further impacted workloads, are costly, and often displace other priority work. We are addressing these issues on multiple fronts. We modernized our organizational structure to more effectively manage Oregon's state forests and deliver greatest permanent value to Oregonians now and into the future. We continue to make significant improvements in our business processes. We are revisiting policies and are seeking to diversify funding streams so we can sustainably manage state forests to provide the full range of social, economic, and environmental benefits. This effort includes potential changes to Forest Management Plans and the development of a Habitat Conservation Plan, both of which are intended to improve financial and conservation outcomes within the context of the Greatest Permanent Value mandate.

The Santiam State Forest was greatly impacted by the Labor Day fires, resulting in over half of the forest suffering some level of damage. Restoration and recovery efforts will be a significant focus for the Division over the next few years.

Achievements

- The Division completed the Draft Western Oregon FMP and submitted it to the Board in April 2020.
- The Division continued with its efforts to have a robust public outreach and engagement process for both the FMP and HCP. This included:
 - A workshop for the Counties and stakeholders to review and provide input on the measureable outcomes proposed in the draft FMP;
 - Presentation and discussion of the draft FMP with the Forest Trust Lands Advisory Committee (FTLAC);
 - Consistent outreach and invitation to FTLAC to engage during development of the HCP;
 - Presentation and discussion of the draft FMP with the State Forests Advisory Committee (SFAC);
 - Presentation and discussion of the draft FMP with the public-at-large at three separate meetings (two in Salem, and one in Astoria at the invite of the Clatsop Board of Commissioners);
 - An open public comment period, paired with an online survey to collect feedback on the FMP and management of State Forest lands;
 - Quarterly HCP meetings for the public-at-large, where draft HCP work products are presented;
 - Individual and focus group (recreation, forest industry, and conservation) meetings between the project team and stakeholders for focused discussion and feedback for the HCP Steering Committee and Scoping Team to consider;
 - Meetings to discuss the modeling done for the HCP with industry and conservation stakeholders;
 - Regular updates on the HCP at SFAC, Conservation Collaboration, and Industry Ad-Hoc meetings;
 - A meeting with the Tribal Council of the Confederated Tribes of the Grand Ronde; and
 - Several meetings with the FTLAC.
- The Division has adapted these outreach and engagement efforts in light of the COVID-19 pandemic to conduct these meetings solely as webinars (a webinar option was always available prior). These webinars have been very successful and have been well-attended by the public and our County partners.
- The Division completed the Draft HCP and presented it to the Board in October 2020. The Draft HCP includes:
 - HCP Mission and Vision;
 - HCP Program Goals;
 - Description of the Permit Area and Plan Area, and Permit Term;
 - A description of the Covered Activities and Covered Species;
 - The Conservation Strategy;
 - The Effects Analysis;

- A description of Monitoring and Adaptive Management associated with the HCP; and
- A description of HCP implementation, including the costs and funding of the HCP.
- The Division also submitted the Comparative Analysis prepared by its consultants in support of the Board's decision on whether to move the HCP into NEPA.

DIVISION TOPICS FOR THE BOARD OF FORESTRY 2020-2022

The Division has been pursuing forest management policy work in parallel processes- Developing a Draft Western Oregon Forest Management Plan (FMP) and a Draft Western Oregon Habitat Conservation Plan (HCP). Following the Board's decision in October of 2020, the Division is proceeding with continued development of the Habitat Conservation Plan for Western Oregon State Forests, including development of the FMP that will be adopted as a companion document to the HCP, using the draft Western Oregon State Forests FMP as a starting point.

ISSUE: Habitat Conservation Plan for Western Oregon State Forestlands

Overview

The Board of Forestry has directed staff to continue exploring options for improving financial and conservation outcomes, including the pursuit of a programmatic Endangered Species Act (ESA) compliance tool, such as a Habitat Conservation Plan.

Purpose

The purpose of this work is to develop a Western Oregon Habitat Conservation Plan (HCP) to achieve programmatic Endangered Species Act (ESA) compliance. The State Forests Division is taking the following 3-phased approach to evaluate the possibility of an HCP to cover state forestland west of the Cascade Mountains:

- ✓ Phase 1: HCP Initiation/Scoping: *Completed*
- ✓ Phase 2: HCP Draft Development (*Completed*): Development of an administrative draft HCP that includes conservation measures and mechanisms to provide operational certainty into the future.
- ✓ Phase 3: National Environmental Protection Act (NEPA) process and Companion FMP development (*Pending*).
 - Submit the draft HCP into the Federal National Environmental Protection Act (NEPA) process.
 - An HCP must be coupled with a companion FMP. Concurrently draft a companion FMP drawing on the Draft Western Oregon FMP (see Issue below).

Board Deliverables with Timelines (see Work Plan Matrix)

- ✓ October 2020: Decision Item
 - Administrative Draft HCP for decision to go into NEPA process.
 - Submit HCP into the NEPA process, which will take approximately 18 months.
 - Begin adapting the Draft Western Oregon FMP into the Companion FMP.
- ✓ June 2021: Informational update
 - Update on Draft HCP and NEPA process
 - Update on the companion FMP
- ✓ November 2021: Discussion Item
 - Present the Draft Companion FMP for review and discussion.
- ✓ March 2022: Decision Item
 - Present the Draft Companion FMP for decision to go into formal rulemaking process. FMP rulemaking: a minimum of 2 months.
- ✓ June 2022: Final Approval of Western Oregon Habitat Conservation Plan and companion Forest Management Plan

Outreach and Public Involvement

Counties within which state forests are managed have a protected and recognizable interest in the management of these lands. The Forest Trust Land Advisory Committee is updated during scheduled meetings. The Department regularly and consistently invited FTLAC and Council of Forest Trust Land Counties to engage during the development of the HCP.

All standing stakeholder groups and committees (State Forests Advisory Committee, Conservation Collaboration, and Forest Industry Ad Hoc) have been invited to participate in the HCP scoping process. The parties have participated to varying degrees.

The Department recognizes the importance and value of reaching out to all Oregon’s federally-recognized Tribes on issues related to managing Oregon’s state forests. We will continue to pursue opportunities to meet with Tribal Chair Council and Tribal staff directors to listen and learn from the Tribes, seek opportunities for input and collaboration, and build relationships.

This work is being conducted collaboratively with our state and federal sister agencies including- National Oceanic and Atmospheric Administration - Fisheries, US Fish and Wildlife Service, Department of State Lands, Oregon Department of Fish and Wildlife, Department of Environmental Quality.

ISSUE: Santiam State Forest Restoration and Recovery

The Santiam State Forest saw extensive damage in the Beachie Creek Fire of 2020. The Beachie Creek Fire was slowly growing in a remote, steep and rugged portion of U.S. Forest Service land in the Opal Creek Wilderness. A historic wind event on September 7, 2020 caused the fire to grow from about 500 acres to over 130,000 acres in a 24-hour span. Communities throughout the Santiam Canyon were evacuated. The fire claimed five lives, destroyed 470 homes as well as numerous businesses, decimated private and public forestland, and altered the Santiam Canyon for decades to come.

Approximately 24,700 acres of the Santiam State Forest were within the fire perimeter, but the fire burned in a mosaic pattern across the landscape with varying intensity. As part of this mission, ODF forests are managed for fire resiliency, including thinning activities that can help slow intensity and spread of fire. Several large ODF-managed tracts within the fire perimeter showed low-intensity burns, and it's possible that this management strategy contributed to reduced impact in these areas. Even so, many areas saw high or extreme fire intensity that killed most trees on the landscape and caused extensive damage to roads, trails and other infrastructure. These include some of the Santiam State Forest's most popular recreation areas, including Shellburg Falls, Rocky Top/Niagara areas, and the Rhody Lake/High Lakes areas. Additionally, the ODF district office in Lyons was destroyed in the fire.

The Division is evaluating the damage and determining what policy considerations may be needed to recover and restore these forest lands. Initially the Division has identified a rulemaking topic to address forest closures. Additional topics could arise as the evaluation of needs continues.

State Forests Division Work Plan	2020						2021					2022			
	Apr	Jun	Jul	Sep	Oct	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Western Oregon Habitat Conservation Plan (including a companion FMP)															
<i>Milestones</i>															
❖ BOF progress updates	i		i							i					
❖ Administrative Draft HCP with Decision to continue into NEPA process					d										
❖ Status of HCP and NEPA										i					
❖ If continuing to pursue an HCP - Begin Companion Western Oregon FMP					d					i					
❖ Rulemaking update on Companion FMP													i		
❖ Rulemaking begins on companion FMP															d
Issue: Santiam State Forest Restoration and Recovery															
<i>Milestones</i>															
Forest closure rulemaking								D							
Santiam State Forest Restoration Update								i							

Matrix Key:

- i – Informational item
- d – Preceding Decision item
- D – Final Decision item

Color Key:

- Green** – Milestone Completed
- Yellow** – Milestone Change
- Magenta** – Milestone Tabled or Stopped

Work Plan:	Protection Division
Primary Contact:	Doug Grafe, Fire Protection Division Chief
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION NARRATIVE

Purpose & Objective

The Protection from Fire Division is the oldest (since 1911) and largest (397 FTE) program of the Department of Forestry. The authorizing statute for the Division is ORS 477.005 stating, “The preservation of the forests and the conservation of the forest resources through the prevention and suppression of forest fires hereby are declared to be the public policy of the State of Oregon.” The program’s mission is to protect Oregon forestlands from fire, through a complete and coordinated system with our cooperators, including fire prevention, suppression, investigation and cost collection. The overarching programmatic goal is to minimize acres burned, the cost of suppression and the value of loss to resources through aggressive wildland fire initial attack, secondary only to the protection of human life.

The Protection division developed a concise summary of achievements from 2020, new issues that have arisen in relation to the work plan and division, and changes to work plans.

Achievements

Preparation of biennial budget request and policy option packages in line with the recommendations of the Governor’s Council on Wildfire Response

Current Issues and Focus

Continued analysis of recommendations from the Governor’s Council on Wildfire Response continue to guide development of policy option packages and budgets presented to the Board.

Changes to Work Plan

No changes are anticipated to the Fire Protection Work Plan beyond the addition of a fire season report in November 2020 and a Smoke Management annual update slated for March each year.

Fire Protection Division Work Plan	2020					2021						2022				
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar		
Issue: Annual and Ongoing Topics																
<i>Milestones</i>																
❖ Approve Forest Protection District and Rangeland Protection Association Annual Budgets		D							D							
❖ Review Letters from FPA's to State Forester		i							i							
❖ Fire Season Reports		i	i	i	i				i	i	i					
❖ Smoke Management Annual Update							i							i		
❖ Appointment for Emergency Fire Cost Committee (As Needed)																
❖ Approve Forest Protection Association Agreements (As Needed)																
❖ Rangeland Protection Association Formation (As Needed)																
Issue: Evolving Topic																
<i>Milestones</i>																
❖ Governor's Council on Wildfire Response																
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Matrix Key: TBD – To be determined i – Informational item d – Preceding Decision item D – Final Decision item </td> <td style="width: 50%; vertical-align: top;"> Color Key: Green – Milestone Completed Yellow – Milestone Change Magenta – Milestone Tabled or Stopped </td> </tr> </table>															Matrix Key: TBD – To be determined i – Informational item d – Preceding Decision item D – Final Decision item	Color Key: Green – Milestone Completed Yellow – Milestone Change Magenta – Milestone Tabled or Stopped
Matrix Key: TBD – To be determined i – Informational item d – Preceding Decision item D – Final Decision item	Color Key: Green – Milestone Completed Yellow – Milestone Change Magenta – Milestone Tabled or Stopped															

Work Plan:	Administrative
Primary Contact:	Bill Herber, Deputy Director for Administration
Date Approved:	March 4, 2020
Date Revised:	January 6, 2021

DIVISION NARRATIVE

Purpose & Objective

Agency Administration provides leadership and management, policy development and assessment, public outreach and communications, and administrative support to the Board of Forestry and the agency's key operating programs.

The administrative issues that regularly require the Board's attention include: securing the Board's input and approval of the Department's legislative concepts and the Agency Request Budget that is submitted to the Governor and the Department of Administrative Services (DAS) every two years; assisting the Board with its governance performance self-evaluation each year; reporting on the agency's annual Key Performance Measures; and periodic reports on the agency's financial status and administrative programs.

Achievements

The Board's Administrative Work Plan is cyclical in nature with several recurring administrative processes. Legislative concepts were submitted for the 2021 Legislative Session and the Agency Request Budget was developed and submitted for the 2021-23 biennium. The Board completed their annual Board Governance Best Practices Self-Evaluation, reviewed the agency Key Performance Measures Report, and received reporting highlights in areas of Facilities Capital Management, Public Information Requests, and Human Resources Management. A revamped Financial Dashboard was brought forward to the Board in July and November. Subsequent reporting intervals are captured in this work plan update.

Current Issues and Focus

With sequencing of the biennial legislative and budgetary development timelines, the odd years of the Administrative Work Plan have fewer scheduled intervals with the Board. The fall and winter months of 2020-2021 include ongoing discussions of best practices in Board governance and will see a heightened frequency in Financial Dashboard updates, then a return in June 2021 with annual programmatic highlights from the administrative programs.

Changes to Work Plan

To better align with the biennial budgetary timelines the annual agency Key Performance Measures report has been moved back to the July meeting instead of September. Our Financial Dashboard did not have subsequent intervals defined upon the original work plan approval but is now captured as a regular consent agenda item for ongoing reporting needs.

Administrative Work Plan	2020					2021						2022		
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Development of Legislative Concepts														
<i>Milestones</i>														
❖ Review proposed guiding principles, list of potential concepts													i	
❖ Approve the legislative concepts for submission to DAS														D
Issue: Agency Budget Development and Request														
<i>Milestones</i>														
❖ Review proposed guiding principles and provide direction														
❖ Review and provide input on draft budget concepts	i													
❖ Review and provide input on final budget concepts		i												
❖ Approve the 2021-23 Agency Request Budget and approve in concept the Board letter of transmittal to the Governor			D											
Issue: Board Governance Best Practices Self-Evaluation														
<i>Milestones</i>														
❖ Review the annual Board governance self-evaluation criteria						i							i	
❖ Review proposed changes to criteria, approve and initiate self-evaluation process	D							D						
❖ Approve summarized evaluation report and metrics of Board governance best practices criteria			D							D				

Administrative Work Plan	2020					2021					2022			
	Apr	Jun	Jul	Sep	Nov	Jan	Mar	Apr	Jun	Jul	Sep	Nov	Jan	Mar
Issue: Key Performance Measures (KPM) Review														
<i>Milestones</i>														
❖ Review the Annual Performance Progress Report summarizing the agency's 14 key performance measures				i						i				
Issue: Financial Dashboard														
<i>Milestones</i>														
❖ Financial Dashboard Projected Design Review			i											
❖ Financial Dashboard Presentations			i			i	i	i	i	i	i	i	i	i
❖ Annual Approval of the State Forester's Financial Transactions							D							D
❖ Fire Finance Update														
Issue: Human Resources Dashboard														
<i>Milestones</i>														
❖ Human Resources Dashboard		i							i					
Issue: Facilities Capital Management Plan														
<i>Milestones</i>														
❖ Facilities Capital Management Plan		i							i					
Issue: Public Information Request Report														
<i>Milestones</i>														
❖ Public Information Request Report		i							i					

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Agenda Item No.:	3
Work Plan:	Private Forests
Topic:	Ceremonial Events and Recognitions
Presentation Title:	2020 Forest Practices Operator of the Year Awards
Date of Presentation:	January 6, 2021
Contact Information:	Greg Wagenblast, Policy Analyst, Private Forests 503-945-7382, Greg.Wagenblast@Oregon.gov Scott Swearingen, Interim Field Support Unit Manager, Private Forests 503-945-7473, Scott.Swearingen@oregon.gov

SUMMARY

The Board of Forestry recognizes Operators of the Year for 2020. This year's award recipients are D & H Logging Co., Darrell Jacobs Trucking, Inc. and C & C Logging, LLC.

BACKGROUND

The *Forestry Program for Oregon* includes the operator recognition program. The program aims to protect, maintain, and enhance forest soil and water resources through voluntary efforts. Forest resources, such as water, wildlife habitat, and soil are important to all Oregonians. The program recognizes operators who voluntarily protect these resources in a conscientious and diligent way. To recognize operators who meet or exceed Forest Practice Act requirements, typically the Board names one Operator of the Year per Region and one or more Merit Award recipients; ODF districts may also issue Letters of Commendation. Program goals are to:

1. Recognize operators who consistently exceed the Oregon Forest Practices Act and voluntarily raise industry standards; and,
2. Improve public understanding of the Forest Practices Act, its administration, and its effectiveness in protecting natural resources.

PROCESS

Anyone may nominate candidates for the Operator of the Year award. Agency staff screens the nominees for minimum requirements. The Regional Forest Practices Committees review the nominations for their region. Each committee chooses a recipient based on innovative techniques, cooperative spirit, consistent performance, and measures taken to protect resources. To make the selection, Regional Forest Practices Committee members tour the sites, review nominations, and watch videos that capture the operator's work. The 2020 Operators of the Year are:

For the Eastern Oregon Region –

Darrell Jacobs Trucking, Inc. of Klamath Falls, Oregon earned the award for working with multiple landowners on a landscape forest health and fuels-reduction project in the Copperfield Draw area of Klamath County. While conducting the operation to improve forest health, the operator protected sensitive and riparian areas, was thoughtful in the operational layout for soils, reduced smoke emissions through biomass utilization, enhanced mule deer habitat through forage manipulation, and provided a service to small landowners that is challenging to conduct on that scale. Darrell Jacobs Trucking, Inc. focused on successfully dealing with the complexity of eastside Oregon issues while delivering a quality product to these landowners. The award also recognizes Darrell Jacobs Trucking, Inc. for decades of consistently applying best management practices to safeguard forest resources, even under challenging circumstances.

Northwest Oregon Region –

C & C Logging, LLC of Kelso, Washington earned the award for their continual innovation in developing and bringing new technology to the logging industry, making logging safer, more efficient and productive, all while protecting forest resources. They are involved with developing new technology and applying it to logging. This has allowed them to efficiently log on a wide variety of difficult ground, all while protecting forest resources. The award also recognizes C & C Logging, LLC for decades of consistently applying best management practices to safeguard forest resources, and doing this while achieving an exemplary degree of worker safety.

Southwest Oregon Region–

D & H Logging Co. of Coos Bay, Oregon earned the award for its diligent planning and harvesting. While doing forestry work, D & H Logging protected a number of resources including: streams, stream buffers, fish habitat, soils, marbled murrelet, northern spotted owl, osprey, wetlands and freshwater emergent wetlands. They also provided for the traveling public's safety with flaggers regulating traffic daily through the operation areas. The award also recognizes D & H Logging Co. for a history of consistently applying best management practices to safeguard forest resources, even under challenging circumstances.

PUBLICITY

The department recognizes the operators through news releases, social media postings, and at annual statewide industry events, including the Associated Oregon Loggers Convention, the Oregon Logging Conference, and the Oregon Small Woodland Association Conference.

All nominees met or exceeded Forest Practices laws and improved Oregon's forests in multiple ways, from enhancing fish and wildlife habitat to improving fire safety and safeguarding water quality and soil.

Merit Award and Letter of Commendation recipients will be recognized at local functions. The Merit Award recipients for 2020 are:

- Greg Johnson Logging of Blodget, OR - NW Oregon Region Merit Award
- Greenup Enterprises, Inc. of Estacada, OR – NW Oregon Region Merit Award
- J.M. Browning Logging, Inc. of Astoria, OR – NW Oregon Region Merit Award
- Wayne Stone Logging, Inc. of Sandy, OR – NW Oregon Region Merit Award
- Weber Logging and Construction, Inc. of Roseburg, OR – SW Oregon Region Merit Award
- Rocky Wardle of Rogue River, OR – SW Oregon Region Merit Award
- Hart Custom Cutting, LLC of Brownsville, OR – Letter of Commendation

Staff will give a brief presentation, including videos, and operator recognition. Operator of the Year videos for Darrell Jacobs Trucking, Inc., C & C Logging, LLC and D & H Logging Co. can be viewed at: <https://www.oregon.gov/odf/Working/Pages/default.aspx>

RECOMMENDATION

The Department recommends the Board of Forestry recognize each operator for their excellent forestry work and selection as Operator of the Year for their region.

STAFF REPORT

Agenda Item No.:	4
Topic:	Forest Trust Land Advisory Committee
Presentation Title:	FTLAC Testimony to the Board of Forestry
Date of Presentation:	January 6, 2021
Contact Information:	David Yamamoto, Tillamook County Commissioner

On behalf of the Forest Trust Land Advisory Committee (FTLAC), comments and additional information provided on State Forest Lands business.

Agenda Item No:	5
Work Plan:	Climate Change and Forest Carbon
Topic	Department Climate Change and Carbon Plan
Presentation Title:	Department Climate Change and Carbon Plan
Date of Presentation:	January 6, 2021
Contact Information:	John Tokarczyk, Manager, Policy Analysis Unit (PAU) 503-945-7414 John.A.TOKARCZYK@oregon.gov Danny Norlander, Forest Carbon and Forest Health Policy Analyst, PAU, 503-945-7395 Danny.NORLANDER@oregon.gov

SUMMARY AND CONTEXT

Planning and Analysis Unit staff will provide an update to the Board on further work and response to Executive Order 20-04. This update will include work that has taken place and anticipated progress on an agency climate change plan for Board review at a later date. Development of the climate change and carbon plan has been on going and presented material will include a draft plan framework, public engagement considerations and an overview of how the plan relates to other Departmental work.

BACKGROUND

Beginning in 2019, the Board reviewed prior Board work dating back to 2015 on climate policy, including how departmental Divisions incorporated climate change into operations.

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

At the June 2020 meeting, the Board identified questions to pose to the Department of Justice (DOJ) around their statutory authority and climate change. The DOJ provided a memo to the Department and the Board at the November 2020 meeting that provided an analysis of the Board’s statutory authority relating to carbon and climate change. The memo and related documents are available in the November 2020 materials.

Governor Brown signed Executive Order 20-04 on climate change in March 2020. The order directed the Department to complete several tasks. These tasks include providing a report to the Governor’s office, participating in a work group focused on climate-impacted communities, and engaging with the Oregon Global Warming Commission on goal setting in natural working lands. These tasks have been addressed.

The Department’s EO 20-04 report garnered the most public comments among the agency reports submitted to the Governor’s office. Subsequently, the Governor’s office sent a letter to the State Forester providing guidance to ensure the agency’s plans align with the Governor’s expectations.

The letter highlights that climate change is significantly impacting Oregon's forest resources and that Oregon's forests play a significant role in mitigating climate change, by sequestering and storing carbon. As such, the Governor has directed the Oregon Department of Forestry to become a regional leader in climate-smart forestry to ensure the health of our climate and the long-term vitality of our forest products industry. Accordingly, the Department should prioritize the goal of improving carbon sequestration and storage and reducing greenhouse gas emissions. This goal should be prominent in the agency's vision, culture, and presentation, and specific actions should be identified to more fully and ambitiously integrate climate change considerations into the agency's management plans and actions.

The Governor envisions that the Department will lead on climate-smart forestry both through its own work and in bringing leadership opportunities to the Board. The department should identify specific goals, develop systems for tracking and reporting outcomes, and incentivize climate-smart forestry practices and new markets for climate-smart wood products. Greater energy efficiency and efforts to decarbonize the forestry sector can also yield additional benefits.

The Governor requested that the agency prepare a Climate Change Plan for the Board's review that builds on the agency's executive order implementation report and reflects a broader strategy for establishing Oregon's leadership in climate-smart forestry and greater accountability toward achievement of goals.

NEXT STEPS

1. Staff will continue the work identified in the letter from the Governor's office related to Executive Order 20-04 and the overall climate change carbon plan.
2. With the Board and Department leadership, staff will determine the public input process for the climate change and carbon plan.

ATTACHMENTS

1. Draft purpose, vision, principles, and agency goals (available one week before meeting)

The Oregon Department of Forestry Climate Change and Carbon Plan

Purpose:

Make Oregon forestry a leader in climate change mitigation and adaptation. The department 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:

The Oregon Board and Department of Forestry provide national leadership in climate-smart and socially equitable forest policies that promote climate health, resilient forests, 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 alter catastrophic impacts. We must be innovative, creative, and proactive in working towards solutions, not reactionary to the results of climate change.
- Black, indigenous, and people of color (BIPOC) communities 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 and actions prioritize to benefit historically and currently underserved communities..
- Oregon's forest sector offers opportunities for significant sequestration and storage both in the woods and in harvested wood products.

Forestry Climate Action Goals

Climate-Informed Silviculture

Encourage the just and equitable transition to climate-informed silviculture 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.

Fire Management, Response and Fire / Smoke Adapted Communities

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

State Forests Management

Lead by example and demonstrate climate-informed forest management on State Forests to achieve Greatest Permanent Value.

Federal Forest Restoration

Accelerate the pace, scale, and quality of Federal Forest Restoration to increase the resilience to increased wildfire severity and incidence. Support implementation of the recommendations of the Governor's Council on Wildfire Response.

Urban and Community Forests

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

Reforestation and Afforestation

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

Maintain and Conserve Forests

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

Research and Monitoring

Maintain a research and monitoring program to inform policy and measure accomplishment of goals.

Board Closing Comments and Meeting Wrap Up