

Oregon Board of Forestry – Hybrid Public Meeting

Oregon Department of Forestry -
2600 State Street, Salem OR, 97310

Wednesday, September 7, 2022

The Board of Forestry will hold its September meeting in a hybrid format, allowing interested persons to view the meeting and participate online while having seating for in-person public attendance. The meeting will be streamed live on the department's YouTube channel. There will be an opportunity for the public to provide live testimony during the meeting. Written testimony may be submitted for information items, before or up to two weeks after the meeting day to boardofforestry@odf.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 are 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 the 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 the consent agenda or work session (*) asterisked items.

Consent Agenda

9:00 – 9:01	A.	<u>Financial Dashboard Report – July and August 2022</u>	Bill Herber
9:00 – 9:01	B.	<u>Central Oregon District Boundary Change</u>	Levi Hopkins
9:00 – 9:01	C.	<u>Regional Forests Practices Committee Appointments and Reappointments</u>	Mike Kroon
9:00 – 9:01	D.	<u>Emergency Fire Cost Committee Appointments and Reappointments</u>	Nancy Hirsch

Action and Information

9:01 – 9:45	1.	<u>State Forester and Board Member Comments</u> A. Public Comments [for information items on agenda and topics not on agenda-see page 3]....	Register online
9:45 – 10:15	2.	<u>Fire Season Update</u>	Mike Shaw <i>The Department will provide an update to the Board on the 2022 fire season. This is an information item.</i>
10:15 – 11:00	3.	<u>Emerald Ash Borer Discovery</u>	Wyatt Williams, Christine Buhl, and Scott Altenhoff <i>Emerald ash borer (EAB), one of the most damaging exotic forest pests in the U.S. was found on June 30, 2022, in Forest Grove, Oregon. Department staff will provide an update on the response to the EAB discovery in Oregon. This is an information item.</i>
11:00 – 11:15 a.m.			Morning break
11:15 – 12:00	4.	<u>October Board Retreat Discussion</u>	Ryan Gordon <i>Department staff will lead a discussion with the Board about key topics for the October retreat, including proposed changes to work plans and agenda development, Board governance, and revision of the Forestry Program for Oregon (FPFO). This is an information item.</i>
12:00 – 1:00 p.m.			Lunch
1:00 – 1:30	5.	<u>*Executive Session</u>	Chair Kelly <i>The Board will meet in executive session for the purpose of reviewing the State Forester's Annual Performance, pursuant to ORS 192.660(2)(i).</i>
1:30 – 1:45	6.	<u>Forest Trust Land Advisory Committee Testimony</u>	David Yamamoto or John Sweet <i>The FTLAC is a statutorily established committee that advises the Board on State Forests policy. This is an informational item.</i>
1:45 – 2:15	7.	<u>State Forests Carbon and Inventory</u>	Tyson Wepprich and Mike Wilson <i>State Forests Division will present forest inventory and carbon storage estimates for western Oregon State Forest lands. This is an information item.</i>
2:15 – 2:45	8.	<u>Western Oregon State Forests HCP Update</u>	Mike Wilson and Cindy Kolomechuk <i>State Forests Division will present the summary of public comments received through the federal NEPA process on the draft Western Oregon State Forests Habitat Conservation Plan. This is an informational item.</i>
2:45 – 3:00 p.m.			Afternoon break

- 3:00 – 4:15 **9. Forest Carbon Implementation and Policy Discussion** Ryan Gordon
Department to host a conversation about forest carbon policy modernization and implementation. Discussion space will be available for the Board and presenters. This is an informational item.
- 4:15 – 4:30 **10. Board Closing Comments and Meeting Wrap-Up** Chair Kelly and Board Members
Board Chair and members to summarize the meeting’s action items and provide closing comments.

The times listed on the agenda are approximate. At the discretion of the chair, the time and order of agenda items—including the 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 the 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. The 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 signup 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@odf.oregon.gov, and written comments received will be distributed to the Board. Oral or written comments may be summarized, audio-recorded, and filed as a 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, you must email the Board Administrator to sign up for live testimony, contact, Hilary.Olivos-Rood@odf.oregon.gov, by 5 p.m. Friday, September 2, 2022. Instructions for providing public comment virtually will be confirmed by email and the link provided 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 before 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 comments 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.

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 before 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.

Agenda Item No:	A
Work Plan:	Administrative
Topic:	Financial Dashboard
Presentation Title:	Department Financial Report for July and August 2022
Date of Presentation:	September 7, 2022
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 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 July 2022
- 2) Department of Forestry Financial Report for August 2022



August 1, 2022

Sen. Elizabeth Steiner Hayward, Co-Chair
Rep. Tawna Sanchez, Co-Chair
Joint Committee on Ways and Means
900 Court St. NE, H-178
Salem, OR 97301

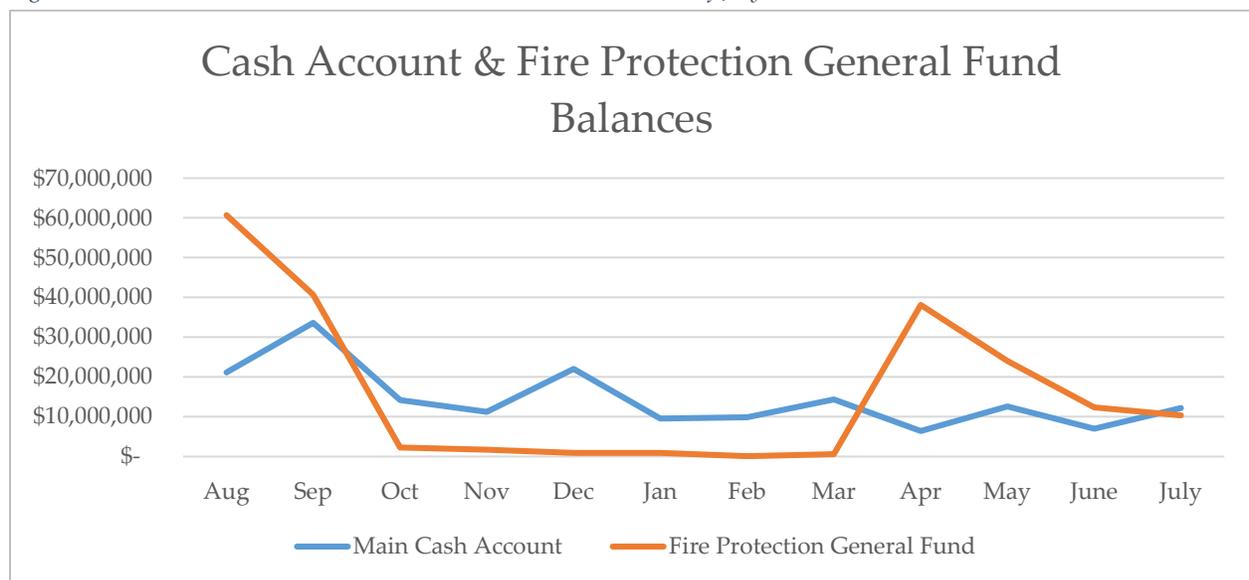
Re: Oregon Department of Forestry (ODF)—Monthly financial condition report

Dear Co-Chairs,

Cash and General Fund Balances

Between June and July, the department's main cash account balance increased \$5.2 million. The department has been making a concerted effort since April to reimburse programs for funds previously used to mitigate cash flow challenges due to fire-related debts the agency continues to carry. As a result, when cash balances allow, we continue to reclassify expenditures between General Fund and the appropriate Other Funds. The slight decrease in the Fire Protection General Fund balance reflects the net impact between actual expenditures and the reduction of prior period expenditures moved to the appropriate Other Funds appropriations (Figure 1).

Figure 1 - Cash Account and Fire Protection General Fund Balances as of July 18, 2022



The General Fund appropriation increases authorized during the June 2022 meeting of the State Emergency Board are not reflected in the balances as of July 18 (Figure 1). Those amounts were not yet recorded in the Statewide Financial Management System but will be reflected in the next reporting period.

Financial Projections

Timber sales, large fire reimbursements, and federal grant reimbursements continue to be the primary revenue sources contributing to the variance between projected and actual revenue activity (Table 1). Actual timber sales totaled \$9 million, large fire reimbursements totaled \$8.4 million, and federal grant reimbursements totaled \$1.2 million.

The variance between actual and projected revenue activity totaled \$37.9 million, a large portion of which was attributable to reimbursements due from federal partners. Some of these federal revenues are difficult to accurately project since the department does not have control over when amounts will be obligated or distributed.

Overall, total actual expenditures were \$1.8 million greater than amounts projected. Services and supplies expenditures were 56% less than anticipated due to the late start of the 2022 fire season. However, this was offset by the \$9.6 million variance between actual and projected special payment expenditures due in part to recording a portion of the administrative prorate to the Fire Protection General Fund.

Table 1 - Financial Projections through July 18, 2022

	22-Jun		22-Jul	22-Aug
	Projection	Actual	Projection	Projection
Total Revenue	\$59,445,911.24	\$21,516,191.19	\$24,201,251.60	\$39,650,893.73
Total Expenditures	(\$25,074,548.13)	(\$26,893,860.96)	(\$25,143,592.33)	(\$24,560,170.19)
Net Total Exp/Rev	\$34,371,363.11	(\$5,377,669.77)	(\$942,340.73)	\$15,090,723.54
Beginning Cash Balance	\$28,961,616.02	\$28,961,616.02	\$24,879,349.34	\$23,937,008.61
End of Month Cash Balance*	\$63,332,979.13	\$24,879,349.34	\$23,937,008.61	\$39,027,732.15
Less: Dedicated Funds	(\$16,732,928.60)	(\$17,810,260.33)	(\$18,105,083.95)	(\$7,768,533.01)
End of Month Main Cash Balance	\$46,600,050.53	\$7,069,089.01	\$5,831,924.66	\$31,259,199.14
Available GF Appr	\$57,309,119.83	\$81,558,884.73	\$114,262,311.00	\$113,420,282.73
Available Resources	\$103,909,170.36	\$88,627,973.74	\$120,094,235.66	\$144,679,481.87

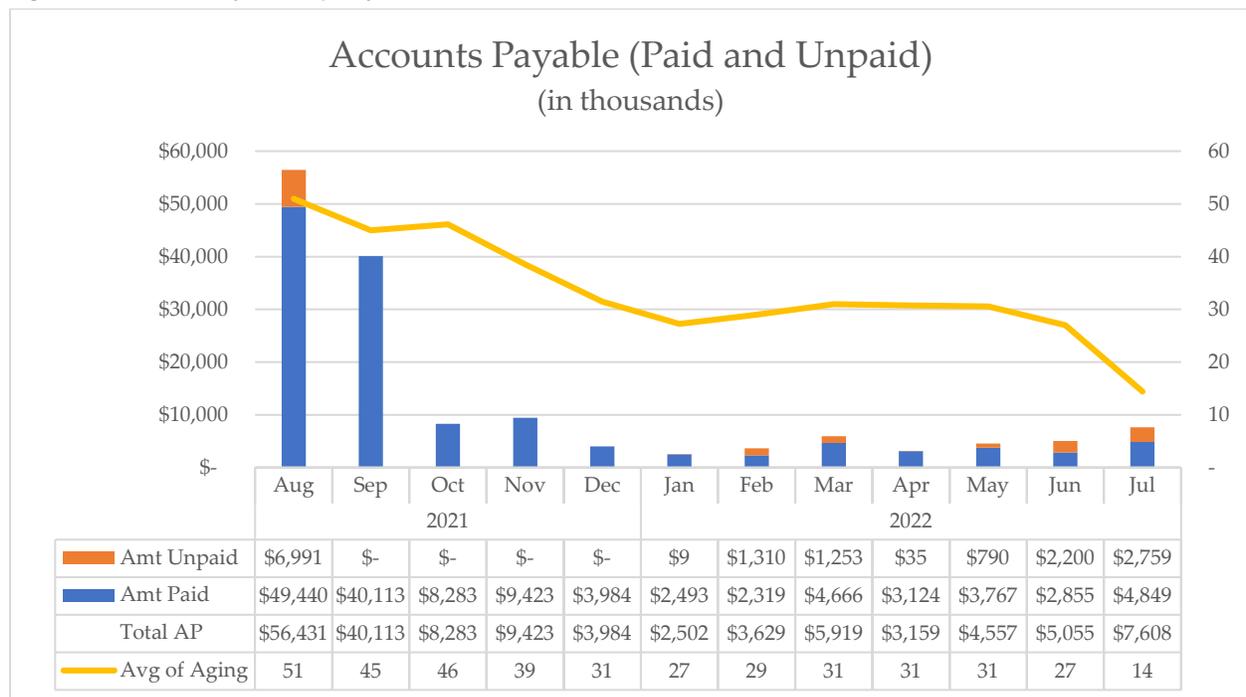
*Includes reconciliation for non-cash revenue and expenditure transactions.

Accounts Payable

Accounts payable expenditures processed through OregonBuys increased between June and July, primarily due to the processing of annual General Fund distributions to the operating forest protection associations (Figure 2). The average aging of accounts payable decreased from 27 days to 14 days due to the agency prioritizing payments of all fiscal year 2022 expenditures as part of the annual financial reporting process.

Many of the unpaid accounts are payments due to the U.S. Forest Service. Due to cash flow concerns, the department continues to hold those payments until reimbursements owed to ODF from other federal entities are received.

Figure 2 - Accounts Payable as of July 22, 2022



Accounts Receivable

The total balance of outstanding accounts receivable increased \$3 million (2.8%) between June 20 and July 18, primarily due to changes in large fire receivables billed to federal and local partners and increases in timber tax revenue billed to private partners (Figures 3 & 4). Accounts receivable balances over 120 days are primarily owed by federal partners, most notably FEMA, for reimbursement of large fire costs (Figure 3).

Since the last reporting period, all eligible liquidated and delinquent accounts receivable were assigned to the Department of Revenue, as required by ORS 293.231, for subsequent collection activities.

Figure 3 - Accounts Receivables Aging as of July 18, 2022

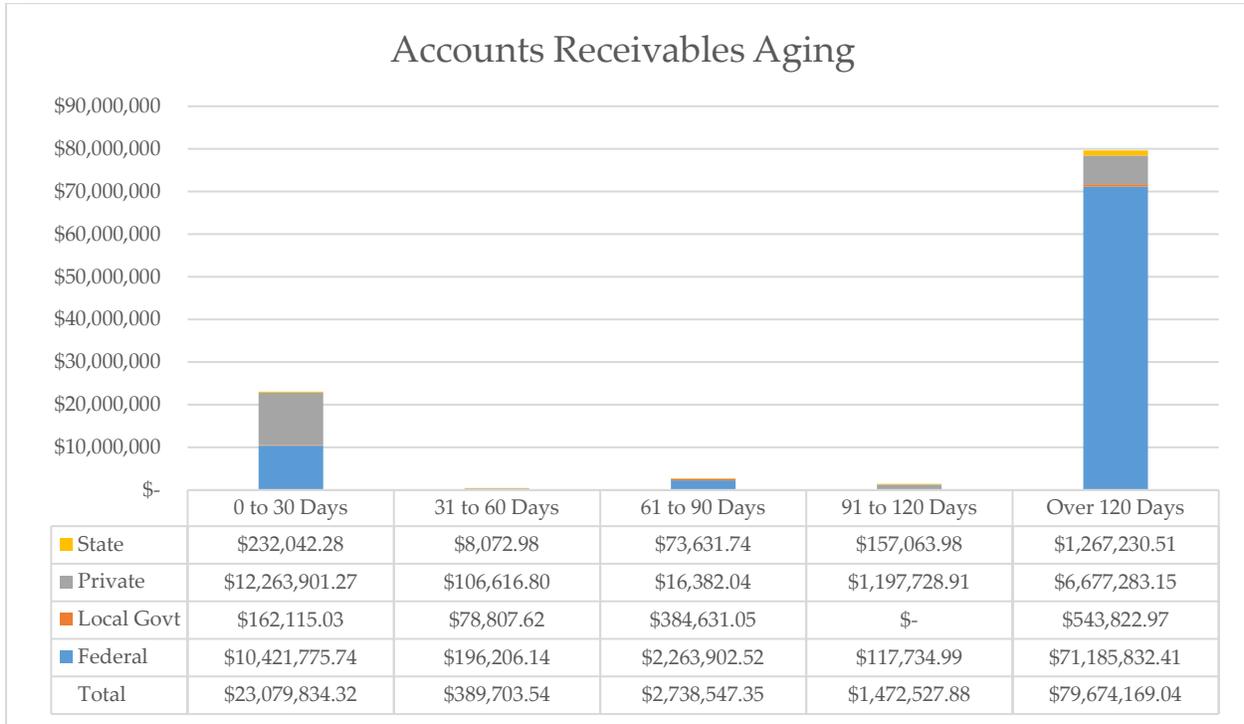
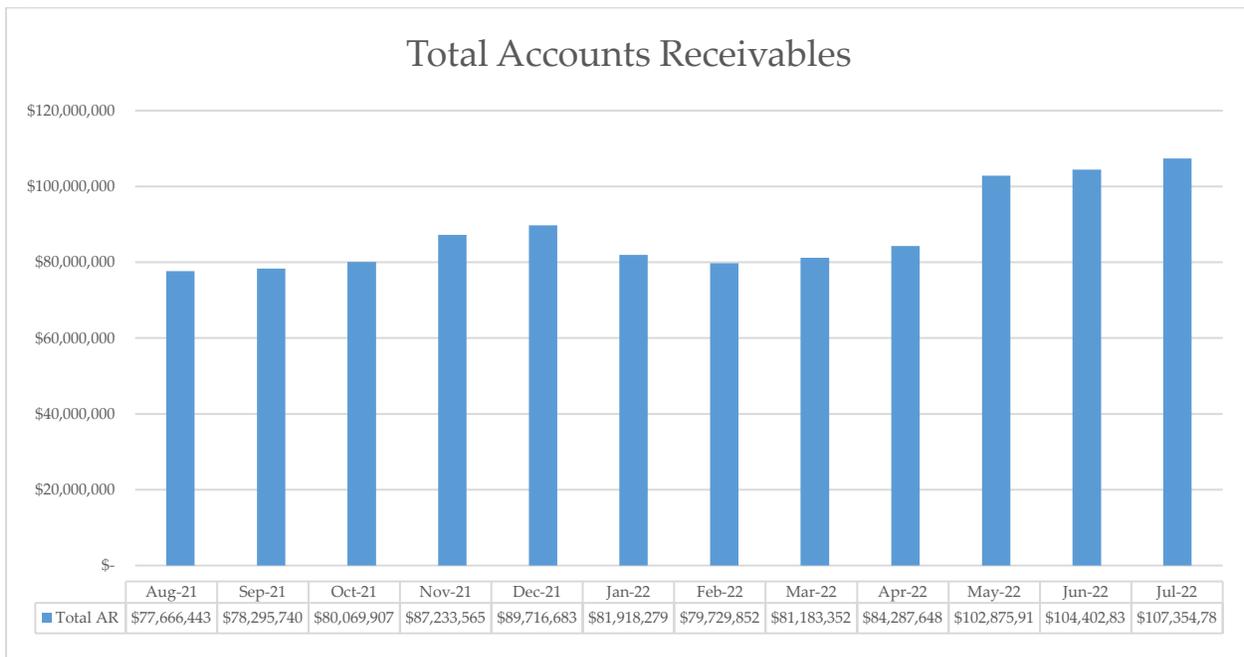


Figure 4 - Total Accounts Receivables as of July 18, 2022



Large Fire Costs

Over the last month, the department dedicated resources to prepare a preliminary FEMA-Federal Management Assistance Grant (FMAG) application for reimbursement of the 2021 Bootleg fire. The preliminary application will reflect approximately 60% of actual expenditures; the remaining expenditures are affiliated with cost share agreements. Additionally, resources were assigned to aggregate supporting documentation for the remaining costs (personal services net of cost share settlements) associated with 13 fires from the 2020 fire season. Since applications made under the FEMA-Public Assistance (PA) grant require additional documentation, this process takes longer. We estimate at least another month before final applications for the 2020 fires will be submitted under the FEMA-PA grant.

The preliminary 2020 PA grant applications are at various stages of FEMA’s review process. Currently, there are no outstanding information requests to the department from FEMA and the applications are with either the Environmental and Historic Preservation (EHP) reviewers, the Consolidated Resource Center (CRC) reviewers, U.S. Congress, or Oregon Department of Emergency Management (OEM). The PA grants account for most of the currently invoiced amounts from the 2020 fire season (Table 2).

As of July 18, 2022, the status of FEMA grant applications are as follows:

- FEMA - Five grants (\$11.5 million) are pending CRC review; projects have been expedited with additional FEMA staff.
- FEMA - Fifteen grants (\$27.3 million) are pending EHP review; FEMA is unable to provide a timeline for review.
- U.S. Congress - One grant \$2.1 million) is in the Large Project queue; the approval timeline is estimated at 3-6 weeks.
- OEM - Sixteen grants (\$1.15 million) have been obligated; projects are in various stages of review and distribution status.

Table 2 – Gross Large Fire Cost Summary (red indicates estimates – in millions) as of July 18, 2022

Fire Protection Large Fire Cost Summary								
Fire Season	2015	2016	2017	2018	2019	2020	2021	Total
Fire Costs	76.48	20.74	61.35	108.09	33.79	139.95	144.72	585.12
Currently Invoiced	(0.14)	(0.07)	(0.17)	(1.39)	(0.23)	(66.82)	(12.51)	(81.33)
Outstanding to Invoice	-	-	(0.09)	(0.46)	(0.46)	(8.47)	(69.17)	(78.65)

MGO Update

The Board of Forestry received an update of the department's work to date at its July 20, 2022, meeting. MGO presented its second [formal assessment of the department's progress](#) towards implementation of the recommendations building upon the [first presented in April](#). Outcomes of the assessment were once again positive, showing successful mitigation and lowering of risk across multiple recommendations. There was also recognition of areas where continued monitoring will assure implementation of noted deliverables. Subsequent reviews will be performed by MGO through mid-2023 with continued reporting to the Board of Forestry at the next meeting in November 2022.

ODF has now completed implementation of eight of the recommendations and has made significant progress on nine additional recommendations. Internally, work continues on priority deliverables from the [department's Implementation Management Plan v4](#).

Sincerely,



Cal Mukumoto
Oregon State Forester

c:
Legislative Fiscal Office
Chief Financial Office
Oregon State Treasury
Board of Forestry
Governor's Office



Oregon

Kate Brown, Governor

Department of Forestry
State Forester's Office
2600 State Street
Salem, OR 97310
503-945-7200
www.oregon.gov/ODF

September 1, 2022

Sen. Elizabeth Steiner Hayward, Co-Chair
Rep. Tawna Sanchez, Co-Chair
Joint Committee on Ways and Means
900 Court St. NE, H-178
Salem, OR 97301

Re: Oregon Department of Forestry (ODF)—Monthly financial condition report

Dear Co-Chairs,

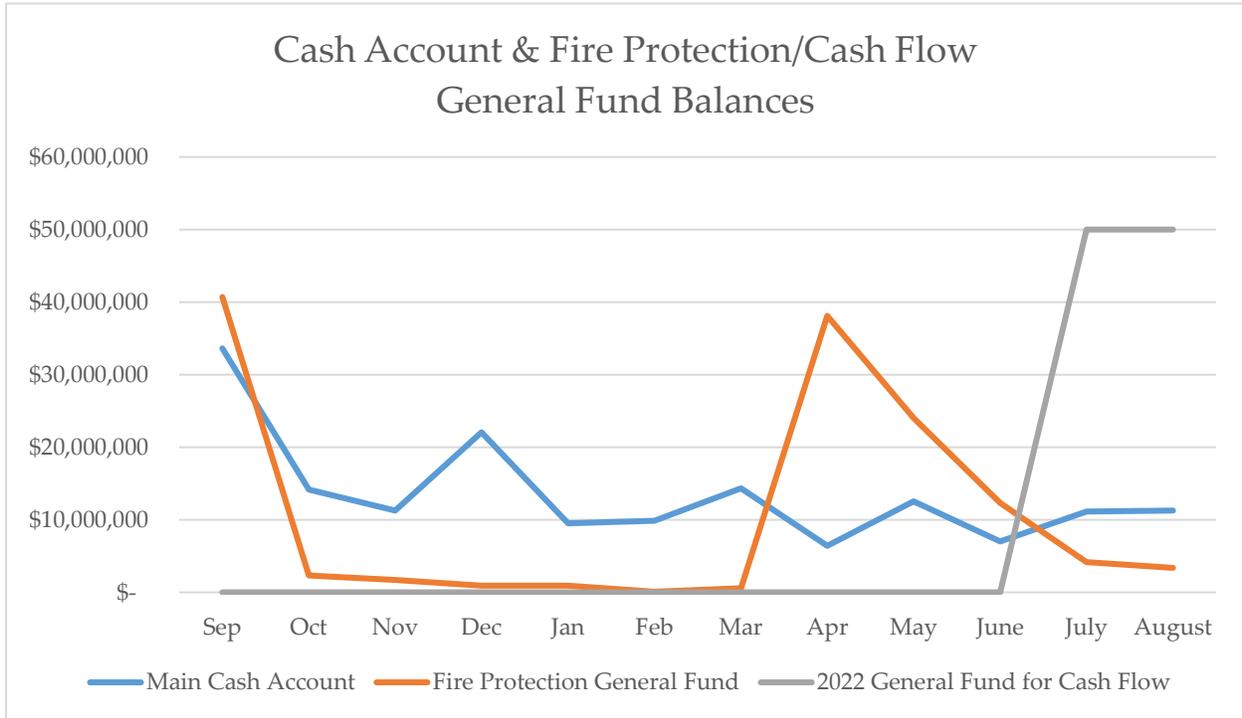
Cash and General Fund Balances

In June 2022, the Legislature appropriated \$50 million General Fund to ODF to assist the department with cash flow needs during the 2022 fire season. These moneys were officially allocated to the department in early July (Figure 1) and are now available for department use. Fortunately, this fire season's expenditures have been moderate, with gross emergency fire costs totaling slightly less than \$8 million. This has allowed the department to manage its cash needs with other internal resources and, thus, has yet to draw from the additional \$50 million.

The department's main cash account balance increased from \$11.1 million to \$11.3 million between July and August (Figure 1). Over the next few months, the department anticipates receiving up to \$6.7 million for recently obligated 2020 FEMA Public Assistance (PA) grants, with an additional \$19.8 million anticipated to be received by the end of the calendar year, barring any unforeseen delays at the federal level. These amounts will be used, in part, to process outstanding cost-share invoices payable to the U. S. Forest Service. This will aid in future FEMA reimbursement processing, which require settlement of all obligations before cash is disbursed.

The Fire Protection General Fund balance decreased slightly between July and August, resulting in a balance of \$3.4 million as of August 22 (Figure 1). As fire season 2022 progresses and the payment of related costs occur, the department will continue to closely monitor the Fire Protection General Fund balance and draw from other resources, as necessary, to ensure the Fire Protection Division is funded for the remainder of the biennium.

Figure 1 - Cash Account and Fire Protection General Fund Balances as of August 22, 2022



Financial Projections

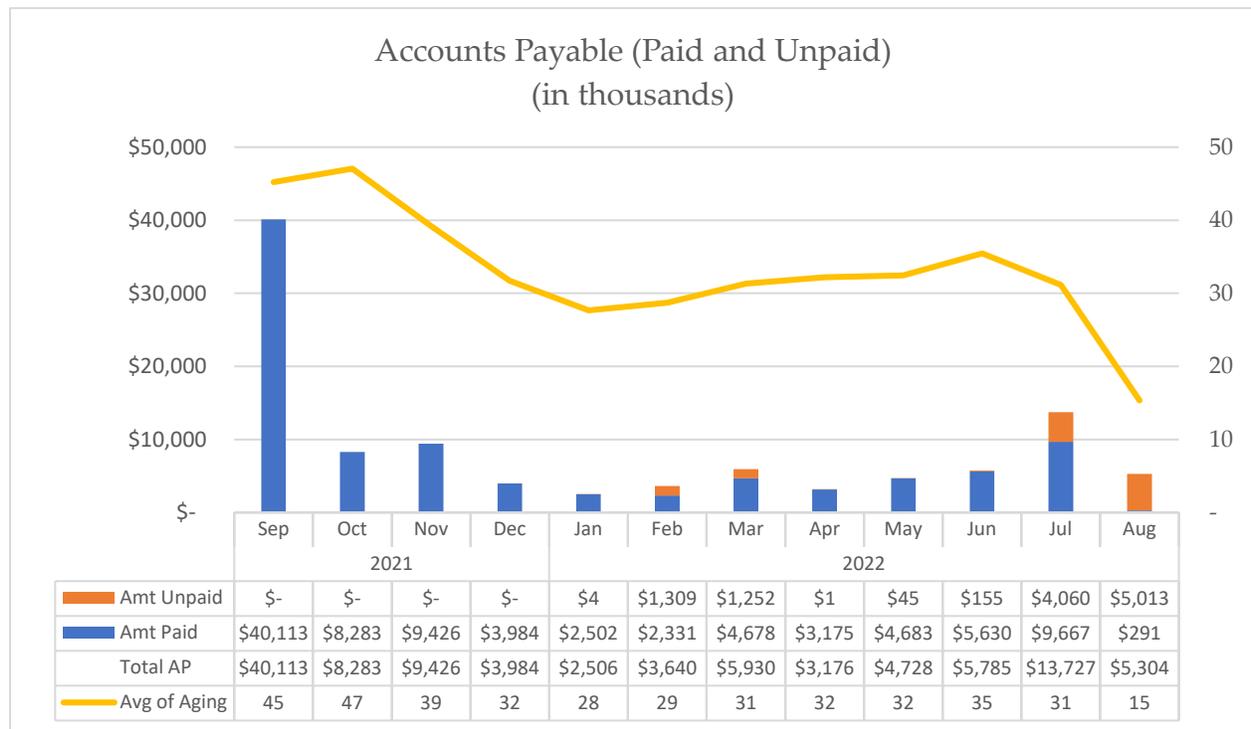
Each of the previous monthly financial condition reports included financial projections compared to actuals associated with the last fiscal month close. Unfortunately, due to fiscal year end processes, July fiscal month close data is not yet available.

During fiscal year end, an extra reporting period is added to the calendar to allow accounting professionals to record year end entries for financial reporting (e.g., financial statement accruals, journal entries for debt, etc.). This extra reporting period is referred to as “Month 13.” To accommodate Month 13, the July fiscal month will close on September 2. As a result, the next monthly financial condition report will include financial projections compared to actuals for the fiscal months of July and August and highlights from each reporting period.

Accounts Payable

The OregonBuys accounts payable activity indicates that most August invoices are unpaid; however, this is the direct result of prioritizing the payment of fiscal year 2022 invoices received between June and August to facilitate the fiscal year closeout (Figure 2). Now that fiscal-year-end reporting is complete, the department’s Disbursements Unit will be working to get caught up on processing the fiscal year 2023 invoices received to date.

Figure 2 - Accounts Payable as of August 22, 2022



Accounts Receivable

Total accounts receivable increased \$7.9 million (7.3%) over the past month (Figures 3 & 4). The most notable activity included increases associated with 2021 FEMA Fire Management Assistance Grant (FMAG) applications.

The fiscal year 2021 Secretary of State’s financial audit report identified the need to strengthen controls to ensure appropriate receivable balances. In response, the department’s Revenue Unit dedicated a significant amount of time over the past month reviewing and verifying that cash receipts were properly applied to affiliated accounts receivable balances. Processes continue to be refined to ensure timely reconciliation of deposits and corresponding adjustments to related accounts receivable balances.

Of the \$115.2 million balance of outstanding accounts receivable, amounts due from FEMA represent \$83.8 million. The department continues to work closely with FEMA Region 10 representatives to expedite the reimbursement process, where possible. For more information about the status of FEMA reimbursements, refer to page 5.

Figure 3 - Accounts Receivables Aging as of August 22, 2022

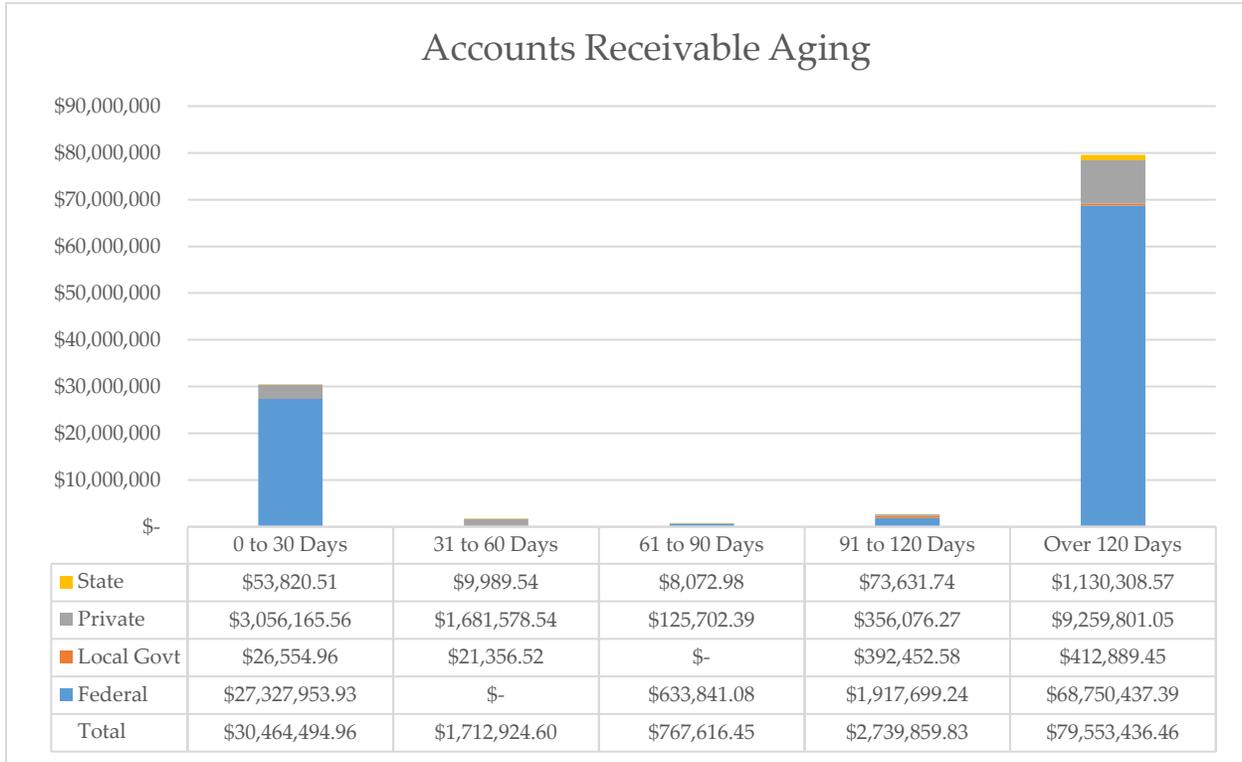


Figure 4 - Total Accounts Receivables as of August 22, 2022



Large Fire Costs

Since the last reporting period, the department submitted two additional 2021 FEMA FMAG applications for the Patton Meadow and 0419/0422 fires. Even though several aged FMAG grant applications are pending FEMA review, in early August the department requested that the FEMA FMAG team prioritize the review of the 2021 Bootleg fire above all other outstanding FMAG grant applications due its significant value (\$16.5 million). Their team agreed to the request for prioritization; however, no additional details were provided to indicate when the review would be completed.

Given that the 2020 wildfires were part of a presidential disaster declaration, all eligible 2020 fire suppression costs were subject to the FEMA PA grant process. Initially, the department submitted grant applications for fire equipment and contract services costs, leaving a remaining balance of estimated costs pending final cost share settlements. With the majority of 2020 cost share settlements completed, the department is actively preparing final grant applications for each 2020 fire that has outstanding estimated costs.

While the department has been working diligently to submit final PA grant applications for the 2020 fire season, noticeable progress has been reported by FEMA Region 10 for previously submitted PA grant applications. As of August 19, all 2020 PA grant applications had completed the Consolidated Resource Center (CRC) review process. Of those, fourteen (\$38.2 million) are pending the Environmental and Historic Preservation (EHP) review; three grants (\$19.8 million) are in the U.S. Congress Large Project Notification queue; and seven grants (\$6.9 million) have been obligated and are in various stages of review and distribution within the Oregon Department of Emergency Management. The “Currently Invoiced” amounts shown below for the 2020 fire season consist primarily of PA grant (Table 2).

Table 2 – Gross Large Fire Cost Summary (red indicates estimates – in millions) as of August 18, 2022

Fire Protection Large Fire Cost Summary								
Fire Season	2015	2016	2017	2018	2019	2020	2021	Total
Fire Costs	76.48	20.74	61.35	108.09	33.79	138.72	145.74	584.91
Currently Invoiced	(0.14)	(0.06)	(0.17)	(0.22)	(0.26)	(66.63)	(28.34)	(95.82)
Outstanding to Invoice	-	-	(0.09)	(0.47)	(0.43)	(8.26)	(51.27)	(60.52)

MGO Update

August has been focused on internal work efforts, continuing our progress towards key deliverables within our [department's Implementation Management Plan v4](#), aligning priorities for mitigating risk with [Macias, Gini & O'Connell's \(MGO\) second assessment](#) of the department. Information Technology positions located within the Administrative Modernization Program continue to be problematic to fill and those recruiting efforts are still ongoing. ODF has completed eight of MGO's recommendations and has made significant progress on nine additional recommendations. MGO will perform subsequent reviews through mid-2023 and our next report to the Board of Forestry is planned for November 2022.

Sincerely,



Cal Mukumoto
Oregon State Forester

c:
Legislative Fiscal Office
Chief Financial Office
Oregon State Treasury
Board of Forestry
Governor's Office

Agenda Item:	B
Work Plan:	Fire Protection Work Plan
Topic:	On-Going Topics
Presentation Title:	Central Oregon District Boundary Change
Date of Presentation:	September 7th, 2022
Contact Information:	Levi Hopkins, 503-949-3572 Wildfire Prevention & Policy Manager Levi.A.Hopkins@odf.oregon.gov

SUMMARY

The purpose of this agenda item is to seek approval from the Board to finalize changes in the Central Oregon Forest District Boundary and to revise the administrative rule which describes the boundary.

CONTEXT

The 1997 Legislature amended ORS 477.225 to require that boundaries of forest protection districts be described in administrative rule. In July 1998, the Board promulgated administrative rules which provided the framework into which individual district boundary descriptions were to be inserted. Since then, all forest protection district boundary descriptions have been inserted. To change a forest protection district boundary, the Board must amend the pertinent Oregon Administrative Rule through the rulemaking process.

BACKGROUND AND ANALYSIS

The changes that we propose to make to the Central Oregon Forest Protection District Boundary occur within the Prineville Unit, specifically in Deschutes County. See draft OAR language in Attachment 2.

A 2021 Central Oregon District review of the protection boundary description in OAR 629-041-0515 identified errors in the existing rule. The intent of the proposed rule change is to correct these administrative errors within the boundary description so that rule language aligns with the boundary on the landscape. Current language within OAR 629-041-0515(2) includes two errors in the legal description which creates overlap and gaps within the boundary and results in an unmappable boundary.

The proposed corrections to the boundary follow what is currently used in spatial data for the department. This boundary is used on current Central Oregon District Protection Maps, wildfire dispatch maps, and interactive maps used in various projects/processes. There are no privately owned forestlands impacted by this proposed rule change. The boundary corrections are both located in remote areas on federal jurisdiction in southern Deschutes County. There will be no change to existing forestland classification or forest patrol assessments.

The Central Oregon District proposes to change the language in OAR 629-041-0515(2) using public land survey descriptions to identify the District Protection Boundary to clarify responsibility for wildfire response for ODF and cooperative firefighting agencies. The proposed rule change does not result in creating unprotected lands.

The Board, on April 27th, 2022, authorized a public hearing on the boundary amendment. A virtual public hearing took place on June 15th, 2022, and written comments were allowed until July 31st, 2022. Two individuals were present for the public hearing, but no oral comments were submitted. There were no written comments submitted.

RECOMMENDATION

The Department recommends that the Board authorizes the department to amend OAR 629-041-0515, the boundary description of the Central Oregon Forest Protection District Boundary.

NEXT STEPS

The Department will file an official final rule with the Oregon Secretary of State.

ATTACHMENTS

1. OAR 629-041-0515(2)—Selected language highlighted
2. Proposed OAR 629-041-0515(2), Central Oregon Forest Protection District Boundary
3. (Map) Current and Proposed Central Oregon District Boundary-Township 20 South, Range 14 East
4. (Map) Current and Proposed Central Oregon District Boundary-Township 20 South, Range 14 East
5. Hearing Officers Report

**Department of Forestry
Chapter 629
Division 41
PROTECTION ADMINISTRATION
629-041-0515
Central Oregon Forest Protection District Boundary**

The area within the Central Oregon Forest Protection District is contained within the boundaries of five units described in subsections (1), (2), (3), (4) and (5) of this rule.

(2) The boundary of the Deschutes Unit of the Central Oregon Forest Protection District is as follows: Beginning at the point where the common boundary of Jefferson County and Linn County, as set forth in ORS 201.160 and 201.220, intersect with the southern boundary of the Warm Springs Indian Reservation, in or near section 5, township 11 south, range 8 east, Jefferson County; thence southerly and easterly on the southern boundary of the Warm Springs Indian Reservation to center of the main channel of Jefferson Creek, in or near section 4, township 11 south, range 8 east, Jefferson County; thence easterly and southerly on the center of the main channel of Jefferson Creek to the center line of the Metolius River, in or near section 35, township 11 south, range 9 east, Jefferson County; thence northerly, southerly and easterly on the center of the main channel of the Metolius River to the line of ordinary high water, at an elevation of approximately 1,945 feet, of the Metolius Arm of Lake Billy Chinook in or near section 18, township 11 south, range 11 east, Jefferson County; thence easterly on the southern line of ordinary high water, at an elevation of approximately 1,945 feet, of the Metolius Arm of Lake Billy Chinook to the western line of ordinary high water, at an elevation of approximately 1,945 feet, of the Deschutes River arm of Lake Billy Chinook in section 27, township 11 south, range 12 east, Jefferson County; thence southerly on the western line of ordinary high water, at an elevation of approximately 1,945 feet, of the Deschutes River Arm of Lake Billy Chinook to the center of the main channel of the Deschutes River in or near section 29, township 12 south, range 12 east, Jefferson County; thence southerly on the center of the main channel of Deschutes River to the center of the main channel of Whychus Creek in or near section 7, township 13 south, range 12 east, Jefferson County; thence southwesterly on the center of the main channel of Whychus Creek to the common boundary of Deschutes County and Jefferson County, as set forth in ORS 201.090 and 201.160, in or near section 34, township 13 south, range 11 east, Jefferson county; thence easterly on the common boundary of Deschutes County and Jefferson County, as set forth in ORS 201.090 and 201.160, to the centerline of United States Forest Service road 6360 in or near section 2, township 14 south, range 11 east, Deschutes County; thence southerly on the centerline of United States Forest Service road 6360 to the centerline of Holmes Road in or near section 11, township 14 south range 11 east, Deschutes County; thence southwesterly on the centerline of Holmes Road to the centerline of Edmundson Road in or near section 32, township 14 south, range 11 east, Deschutes County; thence west on the centerline of Edmundson Road to the centerline of Goodrich Road in or near section 31, township 14 south, range 11 east, Deschutes County; thence south on the centerline of Goodrich Road to the centerline of Oregon Highway 126 in or near section 6, township 15 south, range 11 east, Deschutes County; thence westerly on the centerline of Oregon highway 126 to the centerline of Cloverdale Road in or near section 12, township 15 south, range 10 east, Deschutes County; thence southerly on the centerline of Cloverdale Road to the centerline of Oregon Highway 20 in or near section 25 township 15 south, range 10 east, Deschutes County; thence southeasterly on the centerline of highway 20 to the centerline of Gist Road in or near section 25, township 15 south, range 10 east, Deschutes county; thence southerly on the centerline of Gist Road to the centerline of Plainview Road in or near section 36, township 15 south, range 10 east, Deschutes County; thence easterly on the centerline of Plainview Road to the centerline of Sisemore Road in or near section 31, township 15 south, range 11 east, Deschutes County; thence southeasterly on the centerline of Sisemore Road to the centerline of Couch Market Road in or near section 29, township 16 south, range 11 east, Deschutes County; thence easterly on the centerline of Couch Market Road to the centerline of Collins Road in or near section 28, township 16 south, range 11 east, Deschutes County; thence southerly on the centerline of Collins Road to the centerline of Tumalo Reservoir Road in or near section 33, township 16 south, range 11 east, Deschutes County; thence easterly on the centerline of Tumalo Reservoir Road to the centerline line of Tyler Road in or near section 2 township 17 south,

range 11 east, Deschutes County; thence southerly and easterly on the centerline of Tyler Road to the centerline Johnson Road in or near section 11, township 17 south, range 11 east, Deschutes County; thence easterly and northeasterly on the centerline of Johnson Road to the northeast corner of section 12, township 17 south, range 11 east, Deschutes County; thence south to the centerline of NW Skyline Ranch Road in or near section 13, township 17 south, range 11 east, Deschutes County; thence South to the centerline of NW Skyline Ranch Road in or near section 13, township 17 south, range 11 east, Deschutes County; thence southwesterly on the center line of NW Skyline Ranch Road to the centerline of NW Shevlin Park Road in or near section 25, township 17 south, range 11 east, Deschutes county; thence Northwesterly on the centerline of NW Shevlin Park Road to the centerline of NW Skyline Ranch Road in or near section 25, township 17 south, range 11 east, Deschutes County; thence southwesterly on the centerline of NW Skyline Ranch Road to the common line between section 25 and section 26, township 17 south, range 11 east, Deschutes County; thence south to the centerline of Skyliner Road in or near section 35, township 17 south, range 11 east, Deschutes County; thence southerly on the centerline of NW Skyline Ranch Road to the point it becomes SW Skyline Ranch Road in or near section 12, township 18 south, range 11 east, Deschutes County; thence southerly on the centerline of SW Skyline Ranch Road to the centerline of Oregon Highway 372 in or near Section 12, township 18 south, range 11 east, Deschutes County; thence southwesterly on the centerline of Oregon highway 372 to the common line between section 13 and section 14, township 18 south, range 11 east, Deschutes County; thence south to the southeast corner of section 14, township 18 south, range 11 east, Deschutes County; thence east to the northeast corner of section 19, township 18 south, range 12 east, Deschutes County; thence southeasterly to the centerline of China Hat Road in or near the northwest corner of section 20, township 18 south, range 12 east, Deschutes County; thence southeasterly on the centerline of China Hat Road to the centerline of Knott Road in or near section 20, township 18 south, range 12 east, Deschutes County; thence easterly on the centerline of Knott Road to the centerline of Rickard Road in or near section 14, township 18 south, range 12 east, Deschutes County; thence easterly on the centerline of Rickard Road to the centerline of Arnold Market Road in or near section 23, township 18 south, range 12 east, Deschutes County; thence south and east and south and east on the centerline of Arnold Market Road to the centerline Gosney Road in or near section 29, township 18 south, range 13 east, Deschutes County; thence east to the northeast corner of section 29, township 18 south, range 13 east, Deschutes County; thence south to northwest corner of section 4, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 4, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 4, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southeast quarter of section 4, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of section 9, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 10, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 10, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southeast quarter of section 10, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southeast quarter of section 15, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 14, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the northwest quarter of section 23, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of section 23, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southeast corner of section 23, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 24, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 25, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 30, township 19 south, range 14 east, Deschutes County; thence south to the northeast corner of the northwest quarter of section 6, township 20 south, range 14 east, Deschutes County; thence east to the northeast corner of section 6, township 20 south, range 14 east, Deschutes County; thence south to the northeast corner of section 7, township 20 south, range 14 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 8, township 20 south, range 14 east, Deschutes County; thence south to the northeast corner of the northwest quarter of section 17, township 20 south, range 14 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 16, township 20 south, range 14 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 16, township 20 south, range 14 east, Deschutes County;

township 23 south, range 16 east, Lake County; thence south to the southeast corner of section 22, township 23 south, range 16 east, Lake County; thence west to the southeast corner of section 21, township 23 south, range 16 east, Lake County; thence south to the southeast corner of section 33, township 23 south, range 16 east, Lake County; thence west to the southwest corner of section 35, township 23 south, range 15 east, Lake County; thence north to the southwest corner of section 26, township 23 south, range 15 east, Lake County; thence west to the southeast corner of the southwest quarter of the southeast quarter of section 28, township 23 south, range 15 east, Lake County; thence south to the southeast corner of the northwest quarter of the southeast quarter of section 33, township 23 south, range 15 east, Lake County; thence west to the southeast corner of the northeast quarter of the southeast quarter of section 35, township 23 south, range 14 east, Lake County; thence south to the southeast corner of section 35, township 23 south, range 14 east, Lake County; thence west to the southeast corner of the southwest quarter of section 35, township 23 south, range 14 east, Lake County; thence south to the southeast corner of the southwest quarter of section 2, township 24 south, range 14 east, Lake County; thence west to the southeast corner of section 3, township 24 south, range 15 east, Lake County; thence south to the southeast corner of the northeast quarter of section 10, township 24 south, range 14 east, Lake County; thence west to the southeast corner of the northeast quarter of section 9, township 24 south, range 14 east, Lake County; thence south to the southeast corner of section 9, township 24 south, range 14 east, Lake County; thence west to the southeast corner of the southwest quarter of section 9, township 24 south, range 14 east, Lake County; thence south to the southeast corner of the northwest quarter of section 16, township 24 south, range 16 east, Lake County; thence west to the southeast corner of the northeast quarter of section 17, township 24 south, range 14 east, Lake County; thence south to the southeast corner of section 17, township 24 south, range 14 east, Lake County; thence west to the southeast corner of section 18, township 24 south, range 14 east, Lake County; thence south to the southeast corner of section 19, township 24 south, range 14 east, Lake County; thence west to the southeast corner of section 24, township 24 south, range 13 east, Lake County; thence south to the southeast corner of section 25, township 24 south, range 13 east, Lake County; thence west to the southeast corner of the southwest quarter of the southeast quarter of section 26, township 24 south, range 13 east, Lake County; thence south to the southeast corner of the southwest quarter of the northeast quarter of section 35, township 24 south, range 13 east, Lake County; thence west to the southeast corner of the northwest quarter of section 35, township 24 south, range 13 east, Lake County; thence south to the southeast corner of the northeast quarter of the southwest quarter of section 35, township 24 south, range 13 east, Lake County; thence west to the southeast corner of the northeast quarter of the southeast quarter of section 34, township 24 south, range 13 east, Lake County; thence south to the southeast corner of section 34, township 24 south, range 13 east, Lake County; thence west to the southeast corner of section 33, township 24 south, range 13 east, Lake County; thence south to the southeast corner of section 4, township 25 south, range 13 east, Lake County; thence west to the southeast corner of the southwest quarter of section 4, township 25 south, range 13 east, Lake County; thence south to the southeast corner of the southwest quarter of section 9, township 25 south, range 13 east, Lake County; thence west to the southwest corner of section 12, township 25 south, range 12 east, Lake County; thence north to the southwest corner of section 36, township 24 south, range 12 east, Lake County; thence west to the southwest corner of section 31, township 24 south, range 12 east, Lake County; thence northerly on the common boundary of Klamath County and Lake County, as set forth in ORS 201.180 and 201.190, to the boundary of Deschutes County, as set forth in ORS 201.090, in or near section 6, township 23 south, range 12 east, Lake County; thence westerly on the common boundary of Deschutes County and Klamath County, as set forth in ORS 201.090 and 201.180, to the boundary of Lane County, as set forth in ORS 201.200, in or near section 34, township 22 south, range 6 east, Deschutes County; thence northerly on the common boundary of Deschutes County and Lane County, as set forth in ORS 201.090 and 201.200, to the boundary of Linn County, as set forth in ORS 201.220, near McKenzie Pass, township 15 south, range 8 east, Deschutes County; thence northerly on the common boundary of Deschutes County and Linn County, as set forth in ORS 201.090 and 201.220, to the boundary of Jefferson County, as set forth in ORS 201.160, in or near section 1, township 14 south, range 7 east, Deschutes County; thence northerly on the common boundary of Jefferson County and Linn County, as set forth in ORS 201.160 and 201.220, to the point of beginning.

Department of Forestry
Chapter 629
Division 41
PROTECTION ADMINISTRATION
629-041-0515
Central Oregon Forest Protection District Boundary

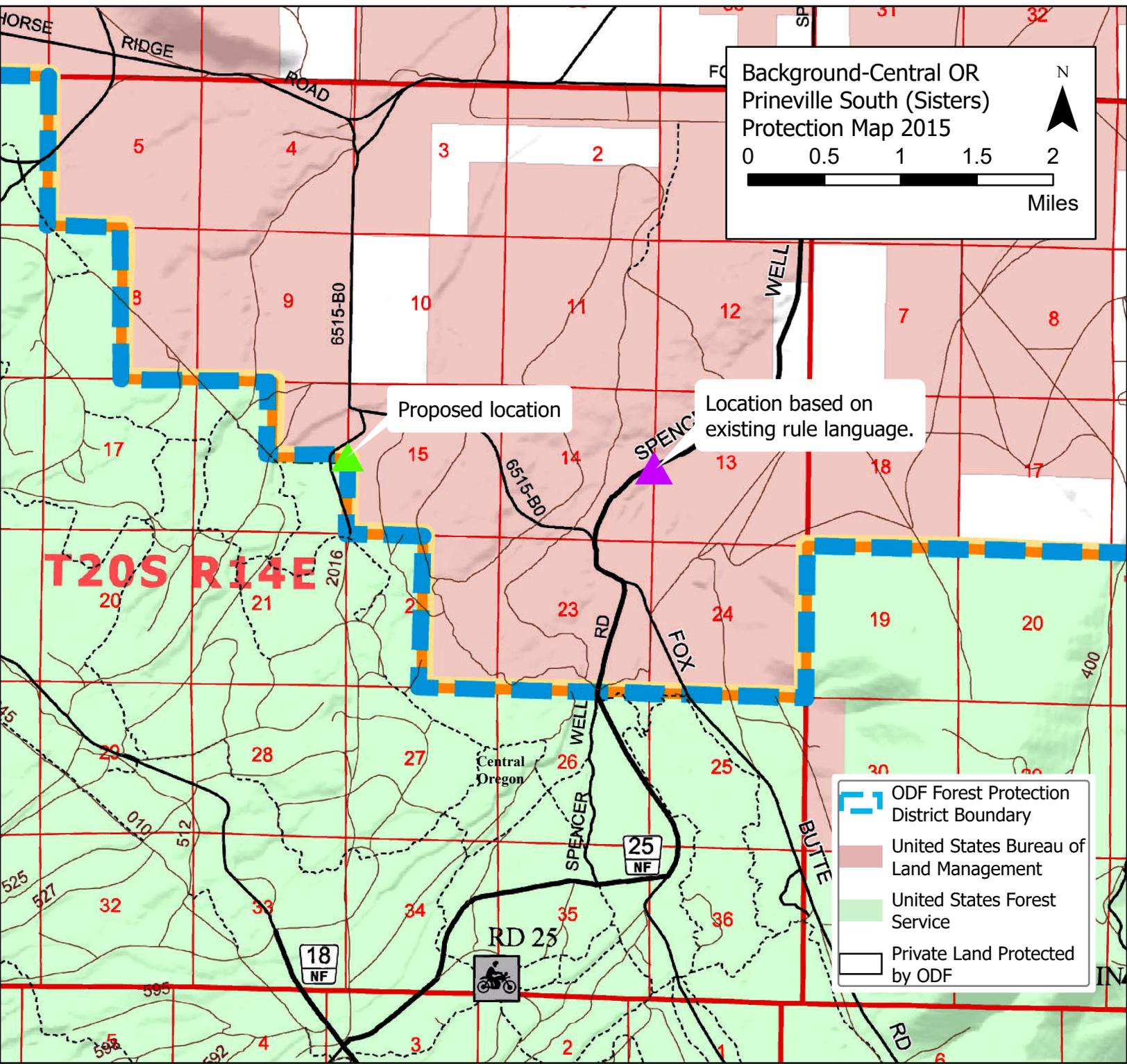
The area within the Central Oregon Forest Protection District is contained within the boundaries of five units described in subsections (1), (2), (3), (4) and (5) of this rule.

(2) The boundary of the Deschutes Unit of the Central Oregon Forest Protection District is as follows: Beginning at the point where the common boundary of Jefferson County and Linn County, as set forth in ORS 201.160 and 201.220, intersect with the southern boundary of the Warm Springs Indian Reservation, in or near section 5, township 11 south, range 8 east, Jefferson County; thence southerly and easterly on the southern boundary of the Warm Springs Indian Reservation to center of the main channel of Jefferson Creek, in or near section 4, township 11 south, range 8 east, Jefferson County; thence easterly and southerly on the center of the main channel of Jefferson Creek to the center line of the Metolius River, in or near section 35, township 11 south, range 9 east, Jefferson County; thence northerly, southerly and easterly on the center of the main channel of the Metolius River to the line of ordinary high water, at an elevation of approximately 1,945 feet, of the Metolius Arm of Lake Billy Chinook in or near section 18, township 11 south, range 11 east, Jefferson County; thence easterly on the southern line of ordinary high water, at an elevation of approximately 1,945 feet, of the Metolius Arm of Lake Billy Chinook to the western line of ordinary high water, at an elevation of approximately 1,945 feet, of the Deschutes River arm of Lake Billy Chinook in section 27, township 11 south, range 12 east, Jefferson County; thence southerly on the western line of ordinary high water, at an elevation of approximately 1,945 feet, of the Deschutes River Arm of Lake Billy Chinook to the center of the main channel of the Deschutes River in or near section 29, township 12 south, range 12 east, Jefferson County; thence southerly on the center of the main channel of Deschutes River to the center of the main channel of Whychus Creek in or near section 7, township 13 south, range 12 east, Jefferson County; thence southwesterly on the center of the main channel of Whychus Creek to the common boundary of Deschutes County and Jefferson County, as set forth in ORS 201.090 and 201.160, in or near section 34, township 13 south, range 11 east, Jefferson county; thence easterly on the common boundary of Deschutes County and Jefferson County, as set forth in ORS 201.090 and 201.160, to the centerline of United States Forest Service road 6360 in or near section 2, township 14 south, range 11 east, Deschutes County; thence southerly on the centerline of United States Forest Service road 6360 to the centerline of Holmes Road in or near section 11, township 14 south range 11 east, Deschutes County; thence southwesterly on the centerline of Holmes Road to the centerline of Edmundson Road in or near section 32, township 14 south, range 11 east, Deschutes County; thence west on the centerline of Edmundson Road to the centerline of Goodrich Road in or near section 31, township 14 south, range 11 east, Deschutes County; thence south on the centerline of Goodrich Road to the centerline of Oregon Highway 126 in or near section 6, township 15 south, range 11 east, Deschutes County; thence westerly on the centerline of Oregon highway 126 to the centerline of Cloverdale Road in or near section 12, township 15 south, range 10 east, Deschutes County; thence southerly on the centerline of Cloverdale Road to the centerline of Oregon Highway 20 in or near section 25 township 15 south, range 10 east, Deschutes County; thence southeasterly on the centerline of highway 20 to the centerline of Gist Road in or near section 25, township 15 south, range 10 east, Deschutes county; thence southerly on the centerline of Gist Road to the centerline of Plainview Road in or near section 36, township 15 south, range 10 east, Deschutes County; thence easterly on the centerline of Plainview Road to the centerline of Sisemore Road in or near section 31, township 15 south, range 11 east, Deschutes County; thence southeasterly on the centerline of Sisemore Road to the centerline of Couch Market Road in or near section 29, township 16 south, range 11 east, Deschutes County; thence

easterly on the centerline of Couch Market Road to the centerline of Collins Road in or near section 28, township 16 south, range 11 east, Deschutes County; thence southerly on the centerline of Collins Road to the centerline of Tumalo Reservoir Road in or near section 33, township 16 south, range 11 east, Deschutes County; thence easterly on the centerline of Tumalo Reservoir Road to the centerline line of Tyler Road in or near section 2 township 17 south, range 11 east, Deschutes County; thence southerly and easterly on the centerline of Tyler Road to the centerline Johnson Road in or near section 11, township 17 south, range 11 east, Deschutes County; thence easterly and northeasterly on the centerline of Johnson Road to the northeast corner of section 12, township 17 south, range 11 east, Deschutes County; thence south to the centerline of NW Skyline Ranch Road in or near section 13, township 17 south, range 11 east, Deschutes County; thence South to the centerline of NW Skyline Ranch Road in or near section 13, township 17 south, range 11 east, Deschutes County; thence southwesterly on the center line of NW Skyline Ranch Road to the centerline of NW Shevlin Park Road in or near section 25, township 17 south, range 11 east, Deschutes county; thence Northwesterly on the centerline of NW Shevlin Park Road to the centerline of NW Skyline Ranch Road in or near section 25, township 17 south, range 11 east, Deschutes County; thence southwesterly on the centerline of NW Skyline Ranch Road to the common line between section 25 and section 26, township 17 south, range 11 east, Deschutes County; thence south to the centerline of Skyliner Road in or near section 35, township 17 south, range 11 east, Deschutes County; thence southerly on the centerline of NW Skyline Ranch Road to the point it becomes SW Skyline Ranch Road in or near section 12, township 18 south, range 11 east, Deschutes County; thence southerly on the centerline of SW Skyline Ranch Road to the centerline of Oregon Highway 372 in or near Section 12, township 18 south, range 11 east, Deschutes County; thence southwesterly on the centerline of Oregon highway 372 to the common line between section 13 and section 14, township 18 south, range 11 east, Deschutes County; thence south to the southeast corner of section 14, township 18 south, range 11 east, Deschutes County; thence east to the northeast corner of section 19, township 18 south, range 12 east, Deschutes County; thence southeasterly to the centerline of China Hat Road in or near the northwest corner of section 20, township 18 south, range 12 east, Deschutes County; thence southeasterly on the centerline of China Hat Road to the centerline of Knott Road in or near section 20, township 18 south, range 12 east, Deschutes County; thence easterly on the centerline of Knott Road to the centerline of Rickard Road in or near section 14, township 18 south, range 12 east, Deschutes County; thence easterly on the centerline of Rickard Road to the centerline of Arnold Market Road in or near section 23, township 18 south, range 12 east, Deschutes County; thence south and east and south and east on the centerline of Arnold Market Road to the centerline Gosney Road in or near section 29, township 18 south, range 13 east, Deschutes County; thence east to the northeast corner of section 29, township 18 south, range 13 east, Deschutes County; thence south to northwest corner of section 4, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 4, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 4, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southeast quarter of section 4, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of section 9, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the northwest quarter of section 10, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southwest quarter of section 10, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southeast quarter of section 10, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southeast quarter of section 15, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 14, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the northwest quarter of section 23, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of section 23, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of the southeast corner of section 23, township 19 south, range 13 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 24, township 19 south, range 13 east, Deschutes County; thence south to the northeast corner of

range 13 east, Lake County; thence west to the southeast corner of section 33, township 24 south, range 13 east, Lake County; thence south to the southeast corner of section 4, township 25 south, range 13 east, Lake County; thence west to the southeast corner of the southwest quarter of section 4, township 25 south, range 13 east, Lake County; thence south to the southeast corner of the southwest quarter of section 9, township 25 south, range 13 east, Lake County; thence west to the southwest corner of section 12, township 25 south, range 12 east, Lake County; thence north to the southwest corner of section 36, township 24 south, range 12 east, Lake County; thence west to the southwest corner of section 31, township 24 south, range 12 east, Lake County; thence northerly on the common boundary of Klamath County and Lake County, as set forth in ORS 201.180 and 201.190, to the boundary of Deschutes County, as set forth in ORS 201.090, in or near section 6, township 23 south, range 12 east, Lake County; thence westerly on the common boundary of Deschutes County and Klamath County, as set forth in ORS 201.090 and 201.180, to the boundary of Lane County, as set forth in ORS 201.200, in or near section 34, township 22 south, range 6 east, Deschutes County; thence northerly on the common boundary of Deschutes County and Lane County, as set forth in ORS 201.090 and 201.200, to the boundary of Linn County, as set forth in ORS 201.220, near McKenzie Pass, township 15 south, range 8 east, Deschutes County; thence northerly on the common boundary of Deschutes County and Linn County, as set forth in ORS 201.090 and 201.220, to the boundary of Jefferson County, as set forth in ORS 201.160, in or near section 1, township 14 south, range 7 east, Deschutes County; thence northerly on the common boundary of Jefferson County and Linn County, as set forth in ORS 201.160 and 201.220, to the point of beginning.

Attachment 3--Central Oregon District

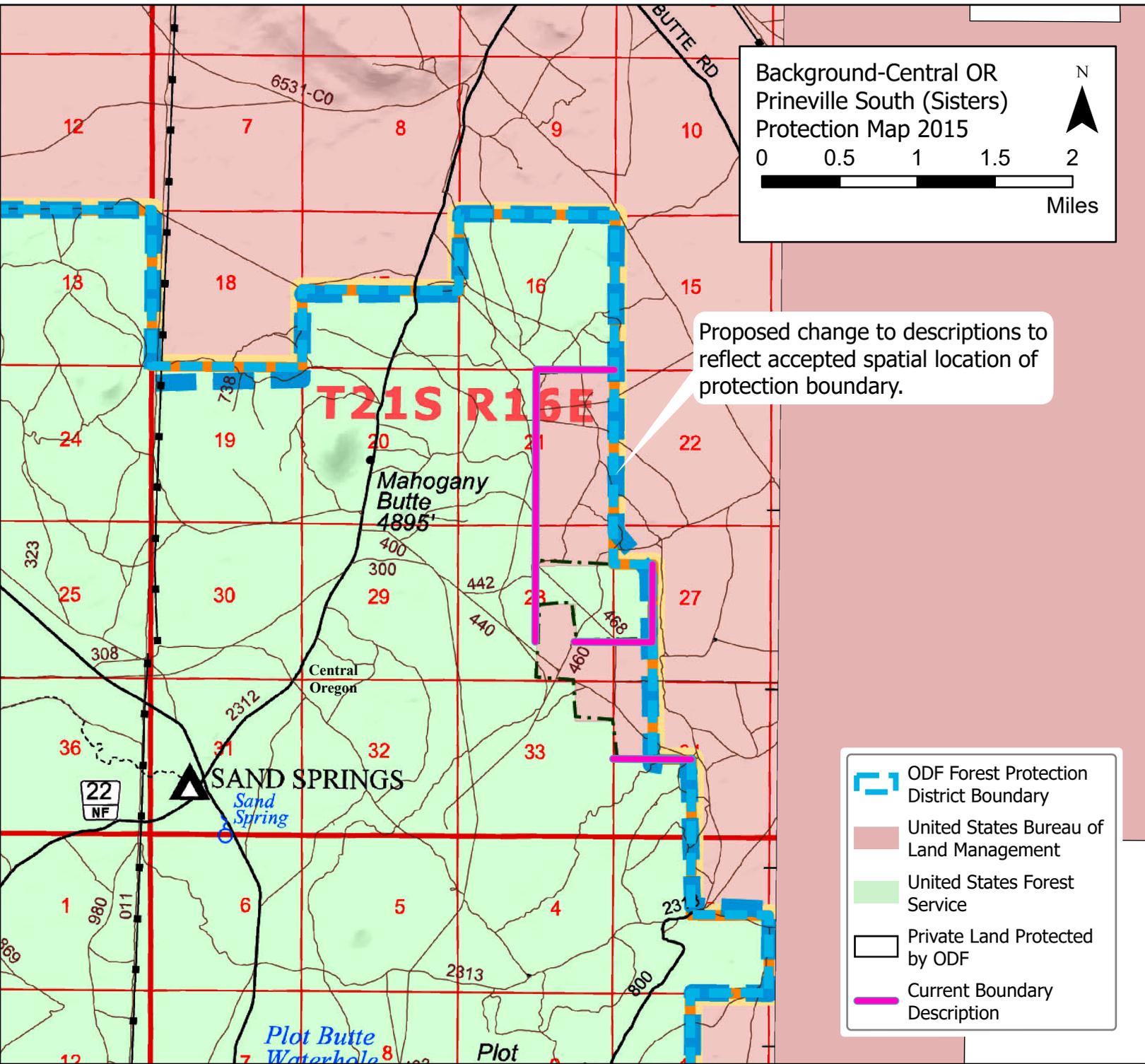


Proposed Change to Oregon Administrative Rule: Chapter 629 Division 41 (Central Oregon Forest Protection District Boundary)

Deschutes Unit-629-041-0515(2)

...thence south to the northeast corner of the southwest quarter of section 16, township 20 south, range 14 east, Deschutes County; thence east to the northeast corner of the southeast quarter of section 16, township 20 south, range 14 east, Deschutes County; thence south to the northeast corner of section 21, township 20 south, range 14 east, Deschutes County; ...

Attachment 4--Central Oregon District



Proposed change to descriptions to reflect accepted spatial location of protection boundary.

Proposed Change to Oregon Administrative Rule: Chapter 629 Division 41 (Central Oregon Forest Protection District Boundary)

Deschutes Unit-629-041-0515(2)

...thence east to the northeast corner of section 16, township 21 south, range 16 east, Deschutes County; thence south to the southeast corner of the northeast quarter of the northeast quarter of section 28, township 21 south, range 16 east, Deschutes County; thence east to the northeast corner of the southwest quarter of the northwest quarter of section 27, township 21 south, range 16 east, Deschutes County; thence south to the northeast corner of the northwest quarter of the southeast quarter of section 34, township 21 south, range 16 east, Deschutes County; thence east to the northeast corner of the southwest quarter of section 34, township 21 south, range 16 east, Deschutes County;...

HEARING OFFICER'S REPORT
Proposed Changes to Administrative Rule for Central Oregon District Boundary

Date: August 1, 2022
To: Oregon Department of Forestry Fire Protection Division
From: Christie Shaw
Subject: Hearing Officer's Report

Hearing Dates: June 14, 2022
Hearing Location: Virtual through Zoom

Public hearing called to receive comments regarding administrative corrections to Oregon Administrative Rule 629-041-0515 (Central Oregon Forest Protection District Boundary) was convened on June 15, 2022 via Zoom.

People attending the hearing were asked to indicate if they wanted to present oral comments during the hearing. They were informed of the procedures for making oral comments and that written comments would also be received no later than 5:00 p.m. July 31, 2022.

Before receiving oral comments, I briefly summarized the purpose for the hearing, described the role and limitations of the Hearing Officer, and outlined requirements of the Agency to complete the rule changes.

Summary of Oral Comments

No Oral Comments were submitted.

Two people were present for the public hearing. One was an employee of the Office of the State Fire Marshal who indicated he wanted to better understand the hearing process. The other person in attendance was a member of the public who was "curious what the hearing was about".

There were no requests for a copy of the Hearing Officer's Report.

Summary of Written Comments

No Written Comments were submitted.

Christie Shaw
Hearing Officer

STAFF REPORT

Agenda Item No:	C
Work Plan Title:	Forest Resources Division
Topic:	Annual topic, Regional Forest Practices Committee
Presentation Title:	Regional Forest Practices Committee Appointments and Reappointments
Date of Presentation:	September 7, 2022
Contact Information:	Nick Hennemann, Interim Deputy Chief FPA & Monitoring Nick.Hennemann@odf.oregon.gov

SUMMARY

The purpose of this agenda item is to recommend the appointment of four new members and the re-appointment of eight existing members to the Regional Forest Practice Committees (RFPC).

CONTEXT

ORS 527.650 requires the Board of Forestry (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 Forest Resources Division Deputy Chief serves as the secretary for all three committees.

BACKGROUND

The last reappointments to the regional committees occurred in September 2021. The regional committees are set with staggered terms so only one-third of committee members come up for reappointment at a time. This approach ensures the continuity of committee work. The Department recently contacted committee members whose terms expire in 2022, regarding their interest in reappointment. Eight members wished to continue serving on the respective committees. Two existing Northwest Oregon Regional Committee members, one existing Southwest Oregon Regional Committee member, and one existing Eastern Oregon Regional Committee member elected to discontinue their membership. Aaron Zweber and Jill Bell have been put forth as the new committee member nominations for Northwest Oregon. Michael Scott has been put forth as the new committee member nomination for Southwest Oregon. Todd Kurtz has been put forth as the new committee member nomination for Eastern Oregon. See attachment 1 for biographies. There is one additional vacancy on the Eastern Oregon Regional committee and the search is underway for new member nominations. The full roster for each committee is in attachment 2.

The recommendation shows current and new members for appointment, and their term expiration dates. The terms are set to maintain the staggered term approach.

RECOMMENDATION

The department recommends the Board make the following eight reappointments and four new appointments:

<u>Northwest Oregon Region:</u>	<u>Term expires September</u>
Jill Bell (New)	2023
Aaron Zweber (New)	2024
Mike Barnes (Chair)	2025
Tally Patton (p)	2025
Candace Bonner (p)	2025
<u>Southwest Oregon Region:</u>	
Michael Scott (New)	2025
Chris Arnold	2025
Garrett Kleiner	2025
<u>Eastern Oregon Region:</u>	
Todd Kurtz (New)	2023
Vacant	2023
Brandon Wood	2025
Paul Jones	2025
Bobby Douglas	2025

(p) Public Member

ATTACHMENT

- (1) Biographies for new RFPC appointments
- (2) Committee rosters

Biography for Todd Kurtz

Todd Kurtz is the Silviculture Area Manager for Manulife Investment Management Forest Management in La Grande, Oregon. Todd leads the layout and reforestation operations. Todd has worked for Manulife (formerly Hancock) since 2010 serving as a Reforestation Forester, Silviculture Forester, Logging Contract Administrator and Senior Forester. During his career in the woods, Todd has also worked for the United States Forest Service in Heppner, OR and as a logger for C&C Logging in Kelso, WA. Todd earned a bachelor's degree in economics with a minor in environmental science resource management from the University of Washington and an M.B.A. degree from Eastern Oregon University. Todd has lived in La Grande since 2013.

Biography for Michael Scott

Michael Scott grew up in Oregon. He has been with Mason, Bruce and Girard (formerly Barnes and Associates) for almost 5 years. Previously, Michael worked as a district forester in Arkansas covering 80,000 acres for Deltic Timber Corp. He also served as a forester for Jefferson Resource Company in Weed, California; and as a forestry tech/wildland firefighter in Northern New Mexico. Michael graduated from Humboldt University in 2009 with a degree in forestry. He has been involved with Society of American Foresters since college and was Coos chapter Oregon SAF chair from 2018-2020.

Biography for Aaron Zweber

Aaron grew up outside of Astoria and graduated from Knappa High School. He pursued his forestry career at Oregon State University. Aaron works for Hampton Family Forests. Professionally Aaron has held positions with Warrenton Fiber/Nygaard Logging, Weyerhaeuser, and Hampton Family Forests out of Astoria. His experience includes working alongside foresters on stocking surveys, fertilization and post sampling. He has working knowledge of harvest unit design, road layout and construction, and as assisted on various stream enhancement projects.

Biography for Jill Bell

Jill Bell is an Area Manager for Weyerhaeuser's Snow Peak Operations, out of Lebanon, Oregon. She has worked for Weyerhaeuser since 2003 as a forest engineer, harvest manager, and area manager. She has a degree in Forest Engineering and a Master of Business Administration, both from Oregon State University. With her background in forest engineering and harvest operations, safety and environmental sustainability are core values to Jill which can be seen in the work she does with her team in silviculture, road construction, and harvesting. As a lifelong Oregonian, Jill is active in the communities where she has the privilege of living and working. She is on the Linn Forest Protective Association board, College of Agriculture Sciences Leadership Academy Advisory Board, and is a regular guest lecture at Oregon State University for forest engineering classes.

CURRENT REGIONAL FOREST PRACTICE COMMITTEE MEMBERSHIP
September 2022

NORTHWEST OREGON REGION

Member Name	Current Term Began	Term Expires	Recommended Expiration
Aaron Zweber (New)	09/2022	09/2024	<u>09/2024</u>
Gregory "Wade" Stringham	09/2021	09/2024	_____
Jon Stewart	09/2006	09/2024	_____
Mike Barnes (Chair)	09/2007	09/2022	<u>09/2025</u>
Tally Patton (p)	09/2007	09/2022	<u>09/2025</u>
Candace Bonner (p)	09/2011	09/2022	<u>09/2025</u>
VACANT		09/2023	_____
Jill Bell (New)	09/2022	09/2023	<u>09/2023</u>
Randy Silbernagel (p)	09/2005	09/2023	_____

SOUTHWEST OREGON REGION

Member Name	Current Term Began	Term Expires	Recommended Expiration
Michael Scott (New)	09/2022	09/2025	<u>09/2025</u>
Erik Culley	09/2021	09/2024	_____
Mikaela Gosney	09/2019	09/2024	_____
Scott Nichols (p)	09/2021	09/2024	_____
Chris Arnold	09/2021	09/2022	<u>09/2025</u>
Garrett Kleiner	09/2016	09/2022	<u>09/2025</u>
Daniel Fugate	09/2005	09/2023	_____
Dana Kjos (Chair)	09/2005	09/2023	_____
Darin McMichael	09/2019	09/2023	_____

EASTERN OREGON REGION

Member Name	Current Term Began	Term Expires	Recommended Expiration
Irene K. Jerome (p), resigned 09/01/2022	09/2006	09/2024	_____
Bob Messinger (Chair)(p)	09/2006	09/2024	_____
Elwayne Henderson	09/2011	09/2024	_____
Brandon Wood	01/2021	09/2022	<u>09/2025</u>
Paul Jones	09/2013	09/2022	<u>09/2025</u>
Bobby Douglas	09/2020	09/2022	<u>09/2025</u>
Vacant		09/2023	_____
Todd Kurtz (New)	09/2022	09/2023	<u>09/2023</u>
Chris Johnson	09/2014	09/2023	_____

(p) Denotes public member

Agenda Item No.:	D
Work Plan:	Agency Administration Work Plan
Topic:	Appointment to Emergency Fire Cost Committee
Presentation Title:	Reappointment of Chris Johnson
Date Presented to Board:	September 7, 2022
Contact Information:	Nancy Hirsch, Emergency Fire Cost Committee Administrator 503-881-5255, Nancy.Hirsch@odf.oregon.gov

SUMMARY

The purpose of this agenda item is to recommend the reappointment of one candidate to a position on the Emergency Fire Cost Committee (EFCC).

BACKGROUND

ORS 477.440 directs that the Board “shall appoint an Emergency Fire Cost Committee consisting of four members, who shall be forest landowners or representatives of forest landowners whose forestland is being assessed for forest fire protection within a forest protection district. At least one member shall be selected from each forest region of the state.” “Members of the Emergency Fire Cost Committee shall be appointed by the board for four-year terms.”

ORS 477.445 gives authority to the Emergency Fire Cost Committee (EFCC) to “supervise and control the distribution of funds from the Oregon Forest Land Protection Fund”. The Oregon Forest Land Protection Fund (OFLPF), established by ORS 477.750, is used to equalize (reimburse) emergency fire suppression costs expended in protecting forestland statewide by forest protection districts, both state and association. The annual expenditure limit of the OFLPF is \$13.5 million – an amount that is reviewed by the Legislature every two years.

Chris Johnson has agreed to his reappointment to the Emergency Fire Cost Committee. His term expired in July 2022. Mr. Johnson represents industrial woodland owners in Oregon’s eastern Oregon forest region on the EFCC. We propose that Chris Johnson with Shanda Asset Management LLC be appointed to the EFCC to a four-year term to expire June 2026.

Attachment 1 contains a list of current committee members; the position scheduled for reappointment is in bold type. Attachment 2 contains a brief biography of Mr. Johnson.

RECOMMENDATION

The Department recommends the Board make the following reappointment:

Reappoint Chris Johnson to the Emergency Fire Cost Committee with a term expiring at the end of September 2026.

ATTACHMENTS

1. Emergency Fire Cost Committee Membership
2. Biography of Chris Johnson

**EMERGENCY FIRE COST COMMITTEE MEMBERSHIP
September 2022**

	First Term Began	Current Term Began	Term Expires
Brennan Garrelts, Chair	1/20	1/20	1/24
Steve Cafferata	3/11	4/19	4/23
Chris Johnson	7/18	9/22	9/26
Erik Lease	9/21	9/21	9/25

*Position recommended for appointment is in **bold**. Appointment term would end September of 2026.

Chris Johnson biography

Chris C. Johnson began working for Shanda Asset Management LLC as its Executive Director of Timber Operations in February 2015 when the timberlands were purchased from Cascade Timberlands (Oregon). Shanda Asset Management LLC timberlands are former Gilchrist Timber Company, Brooks-Scanlon, and Shevlin-Hixon timber holdings within Deschutes, Klamath and Lake counties. Chris has over 30 years of forest operations and administrative experience in eastside forests. His forestry career started as a timber faller in the Oregon coast range. Chris moved to central Oregon in the early 1990's cruising and marking timber. Later his responsibilities covered timber sale preparation and administration.

Chris serves on several forest related boards and committees including Eastern Oregon Fire Protection Association, Klamath Forest Protection Association, Walker Range Forest Patrol board of directors, Eastern Oregon Forest Practices Committee and two committees within the Deschutes Collaborative Forest Project. Chris currently lives in Bend.

State Forester, Board Member, and Public Comments

Agenda Item No.:	2
Work Plan:	Fire Protection
Topic:	Ongoing Topic; Fire Season Update
Presentation Title:	2022 Fire Season Update
Date of Presentation:	September 7, 2022
Contact Information:	Mike Shaw, Interim Chief – Fire Protection Division 503-945-7204, Michael.H.Shaw@odf.oregon.gov

SUMMARY

Oregon revised statutes define the Department’s Fire Protection policy, which requires a complete and coordinated system. This system relies on the partnership between the Department and forest landowners with a commitment to ongoing communication and collaboration with many other state and federal agencies. Fire management leaders from the Department will provide a briefing on some of the ongoing coordination and an up-to-date fire season status report during this agenda item.

Agenda Item No.:	3
Work Plan:	Forest Resources
Topic:	Board Updates
Presentation Title:	Emerald ash borer discovery
Date of Presentation:	September 7, 2022
Contact Information:	Wyatt Williams, Invasive Species Specialist, Forest Resources (503)798-5436; wyatt.williams@odf.oregon.gov Christine Buhl, Entomologist, Forest Resources (503)945-7396; christine.j.buhl@odf.oregon.gov Scott Altenhoff, Urban and Community Forestry Manager (503)945-7390; scott.r.altenhoff@odf.oregon.gov

SUMMARY

This agenda item provides an overview of the Oregon Department of Forestry (ODF) work on the recent detection of the forest invasive species, emerald ash borer (EAB) in Oregon.

BACKGROUND

The emerald ash borer (EAB), *Agrilus planipennis* (Fairmaire), is an invasive wood-boring beetle native to east Asia that attacks ash trees. Since the original discovery in 2002 near Detroit, Michigan, infestations have been detected in 35 states, killing hundreds of millions of ash trees, despite numerous attempts to eradicate and control its spread. Considered a devastating non-native pest for its ability to infest all species of ash (*Fraxinus*) with mortality rates as high as 99% in some cases, EAB presents a significant threat to ash trees throughout North America. This pest will continue to infest and kill ash trees, harming urban forests and natural areas throughout North America. EAB spreads long distances through the transport of firewood and ash nursery stock. In 2021, twenty years after initial detection and with the pest reported in more than two-thirds of the states, the Animal and Plant Health Inspection Service (APHIS) dropped the federal quarantine for interstate movement of EAB and EAB-infested material. This leaves quarantines up to individual states.

In Oregon, surveys for EAB have occurred sporadically when federal funding was available starting in 2005. ODF placed nearly 1,000 traps for EAB during 2013-2016. No EAB were detected, until June 30, 2022, when the first confirmed report of EAB in Oregon was submitted to ODF. Prior to this pest being detected in the state, ODF led the effort to develop an EAB statewide readiness and response plan for Oregon. In 2015, ODF led a United States Forest Service (USFS) grant program and contracted with Oregon State University Forestry Extension to launch the Oregon Forest Pest Detector program. The program trained over 500 natural resource professionals how to recognize, and report suspected EAB. In 2019, ODF and USFS initiated a seed-collecting project for Oregon ash with the aim of collecting 1 million ash seeds from Oregon ash for long-term storage and genetic conservation and resistance trials before the arrival of EAB. The seed project is expected to be completed by the end of 2022.

CURRENT STATUS

On June 30, 2022, the first confirmed report of EAB in Oregon was submitted to ODF. The report was verified by entomologists at the Oregon Department of Agriculture (ODA) and the U.S. Department of Agriculture. This is the first report of EAB on the west coast with the next closest known infestation near Boulder, Colorado. A joint press release was issued by ODF and ODA in early July. On Aug 2, ODA convened an “EAB Task Force” which was attended by approximately 40 state, local and federal agencies. On Aug 9, the EAB Task Force developed 7 subcommittees to tackle issues such as surveying, regulation, technical assistance, communications, funding, and others. ODA is currently developing a quarantine for EAB in Washington County.

EAB presents a significant concern to the Pacific Northwest where native Oregon ash (*Fraxinus latifolia*) is abundant along riparian corridors in western Oregon and Washington. Other ash species have been planted in considerable numbers in cities and towns as street and park trees. For example, Portland in its most recent inventory showed more than 10,000 ash planted as street trees. Oregon ash has a unique ecological role in riparian systems, especially at low-elevation sites in watersheds of the Willamette and Rogue rivers, providing shade and streamside stabilization where other trees are unable to grow. If trends in EAB establishment and spread are like those in other states, severe ash mortality, ecosystem impacts, and economic costs to urban forests are expected across Oregon over the next 10-20 years.

NEXT STEPS

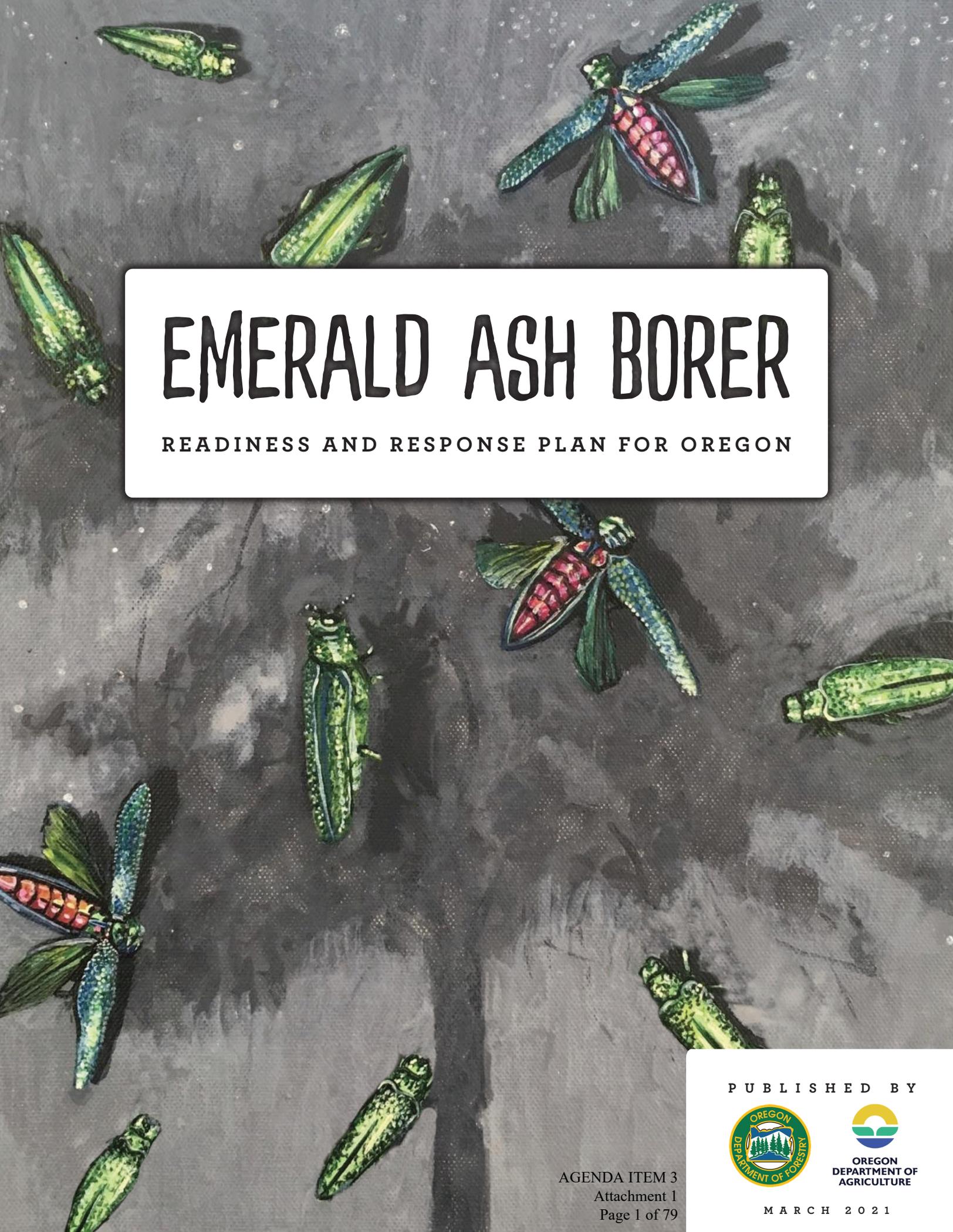
- Continue to identify, engage, and provide support to key partners and community stakeholders
- Continue to assess/monitor extent of infestation, rate of spread, and general behavior of EAB
- Identify areas of greatest vulnerability and options for EAB prevention, management, and recovery
- Assist communities in implementing adaptive management strategies to slow ash mortality and encouraging the planting of climate-adapted, non-host species

RECOMMENDATION

This agenda item is informational only.

ATTACHMENTS

- (1) Oregon’s Statewide EAB Readiness and Response Plan
- (2) 2022 Fact Sheet -- Emerald Ash Borer

The background of the cover is a detailed illustration of a tree trunk with several Emerald Ash Borer (EAB) beetles. Some beetles are shown in their adult stage with their wings spread, revealing a vibrant red and blue pattern. Others are in their larval stage, appearing as green, segmented caterpillars. The illustration is rendered in a style that looks like a watercolor or fine-line drawing, with a focus on the texture of the bark and the intricate details of the insects.

EMERALD ASH BORER

READINESS AND RESPONSE PLAN FOR OREGON

PUBLISHED BY





AUTHORS & ACKNOWLEDGEMENTS

This Readiness and Response Plan for Oregon was made possible thanks to the considerable input and review that was provided by members of the EAB Advisory Committee and from potentially affected stakeholders throughout the state. We would also like to thank those outside Oregon that shared their experiences and lessons learned from living with EAB, as well as forestry and invasive species experts from our neighboring states (WA, CA, ID) who shared EAB planning updates with us.



AUTHORED BY / CONTRIBUTING AUTHORS

Leslie Bliss-Ketchum

Robyn Draheim

Marie Hepner

Olivia Guethling (*design*)

COVER ART by Kendra Larson

Printing of the document was funded by USDA Landscape Scale Restoration Grant (15-DG-11062765-715)

AUTHORS & ACKNOWLEDGEMENTS

The EAB Readiness and Response Steering Committee members are listed below:



Oregon Department of Forestry

Wyatt Williams, Invasive Species Specialist

Christine Buhl, Forest Entomologist

Terry Frueh, Monitoring Specialist

Kristin Ramstad, Urban and Community Forestry Program Manager



Oregon Department of Agriculture

Clint Burfitt, IPPM Manager

Helmuth Rogg, Director



City of Portland: Portland Parks & Recreation

Gina Dake, Botanic Specialist I

Nik Desai, Botanic Specialist I



City of Corvallis: Parks & Recreation

Jon Pywell, Urban Forester



Oregon State University Extension

Amy Grotta, Extension Forester



USDA APHIS

Christopher Deegan, State Plant Health Director

Meg Raabe, Pest Survey Specialist



U.S. Forest Service

Karen Ripley, Forest Entomologist / Forest Health Monitoring Coordinator

TABLE OF CONTENTS

I. Purpose Statement	6
II. Introduction and Background	8
Biology and Life Cycle of EAB.....	10
Natural Areas, Wildlife and Water Quality.....	12
Economic Impacts	16
Urban and Community Forests.....	18
Cultural Resources.....	19
Human Health & Safety.....	20
III. Function and Role of Stakeholders.....	21
IV. Readiness.....	26
A. Risk Assessment.....	27
B. Resilience	32
C. Resources Needed for EAB Response.....	37
D. Detection	39
V. Response.....	44
A. Stakeholders Convene to Create Specific Plan.....	46
B. Communications Plan	47
C. Coordination with Local Government, Landowners, and Tribes.....	48
D. Investigation.....	50
E. Quarantine/Regulation – Enforcement and Compliance.....	51
F. Management.....	52
G. Wood Waste Disposal/Utilization.....	54
VI. Funding.....	55
VII. Appendices.....	57



I. PURPOSE STATEMENT



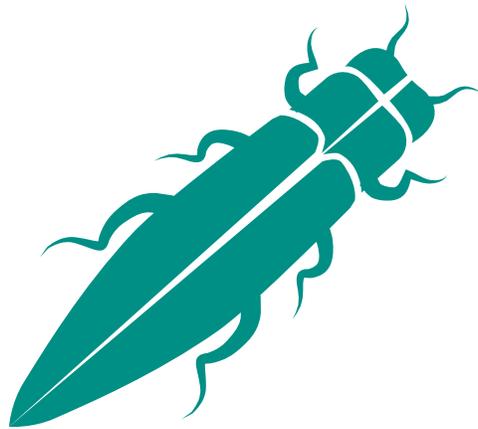
In Oregon, the establishment of emerald ash borer (*EAB*) could devastate whole habitat types, such as ash swales and sensitive riparian zones, as well as reduce urban forest cover. *EAB* has the potential to cause the local extinction of Oregon's native ash species. The loss of these trees could result in wide-reaching economic impacts, endanger important cultural resources, damage water quality and create direct human health impacts.

Strategies to cope with the introduction and spread of *EAB* must be identified and implemented prior to introduction and establishment to best protect Oregon resources. Thus, in preparation for the introduction of *EAB*, The Oregon Emerald Ash Borer Readiness & Response Plan (*plan*) was created to outline important steps, highlight tools and resources already available, and guide the state's approach to handling an *EAB* infestation at all stages. The Readiness & Response plan is organized into four main categories: Function & Role of Stakeholders, Readiness, Response, and Funding. Each of these four categories include the information and necessary resources to prevent and respond to an *EAB* introduction.

The Oregon Emerald Ash Borer Readiness & Response Plan was created through the collaborative efforts of a diverse group of stakeholders that would be actively involved and/or impacted by the introduction and establishment of *EAB* in Oregon. Plan development was initiated by the Oregon Department of Forestry (*ODF*) and the Oregon Department of Agriculture (*ODA*).

This plan will serve as a guide for the state of Oregon to actively prevent the introduction of *EAB* and to control and manage any *EAB* populations that could arrive in the future. The intent of this plan is to capture and elucidate community and stakeholder participation in prevention and readiness efforts, alongside an agency readiness and response plan. It is designed to serve as a tool in helping establish a framework for local *EAB* preparedness and community action by outlining major issues and providing guidance on how to address them. By fostering *EAB* resilient communities, this plan may serve as a model for protecting Oregon resources from other invasive forest pests. After feedback is received from stakeholders and user groups, an evaluation of the overall effectiveness of the Oregon plan will be included in future versions. This plan is a "living" document and will be updated as needed to ensure the information within remains accurate and up-to-date.

II. INTRODUCTION AND BACKGROUND



The emerald ash borer (*EAB*) beetle, *Agrilus planipennis* (*Fairmaire*), possibly the most destructive forest pest in North America, is a wood-boring pest of ash trees. Since the original discovery in 2002 in the vicinities of Detroit, Michigan and Windsor, Ontario, EAB infestations have been detected in 30 states, with the westernmost infestation reported in Colorado. Native to parts of Asia, it is likely that EAB was transported to the U.S. in solid wood packing material. Considered a devastating non-native pest for its ability to infest all species of ash (*Fraxinus*) with mortality rates of up to 99%, EAB presents a significant threat to ash trees throughout North America. Recent research indicates that all 16 native species of ash in North America are susceptible to EAB infestation. No effective native predators or parasites have been encountered, and, unlike in its native range, EAB aggressively kills both stressed and healthy trees.

This pest will continue to infest and kill ash trees, harming urban forests and natural areas throughout North America. The primary host for EAB in North America are ash trees which



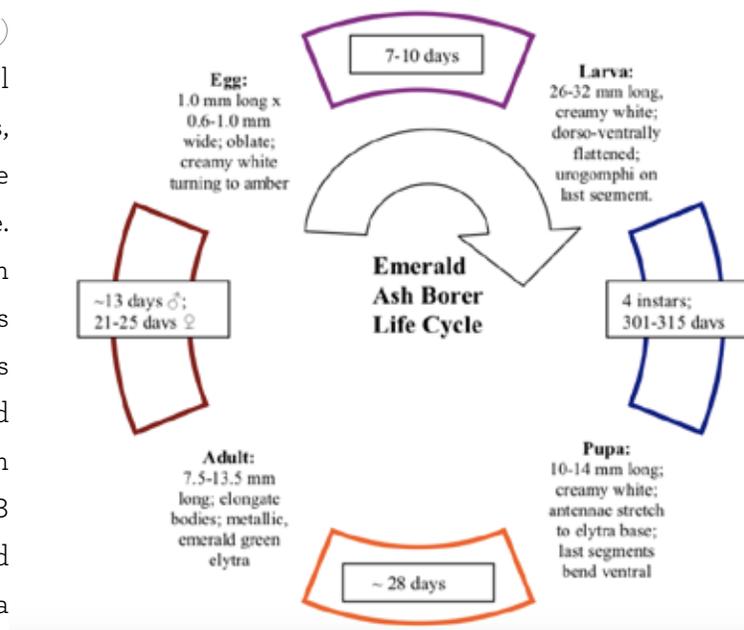
are widespread in the United States, although white fringetree (*Chionanthus virginicus*) and cultivated olive trees (*Olea europea*) may also be at risk. EAB has already killed tens of millions of ash trees and threatens to kill most of the 8.7 billion ash trees throughout North America. Subsequently, the impact on ash in North American forests will be devastating.

EAB presents a significant concern to the Pacific Northwest where Oregon ash (*Fraxinus latifolia*) is abundant along riparian corridors in western Oregon and Washington, and where other ash species are widely used by cities and municipalities as good-fit street trees.

ASH CREEK IS A TRIBUTARY OF THE WILLAMETTE RIVER. THE IMAGE SHOWS THE CREEK IN ITS LOWER REACHES WITHIN THE CITY OF INDEPENDENCE, OR.
PHOTO CREDIT: FINETOOTH (2016).

Biology and Life Cycle of EAB

EAB is a small (*1/2 inch-long*) metallic-green buprestid, or jewel beetle, that bores into ash trees, feeding on tissues beneath the bark, ultimately killing the tree. EAB is capable of infesting all ash trees in the genus *Fraxinus*. In its native range in eastern Asia, EAB is typically found at low densities and usually does not cause mortality in healthy native Asian ash trees. EAB is particularly attracted to stressed trees, meaning trees already in a weakened state from damage, such as broken limbs, lack of water, disease or fungal infection.



EMERALD ASH BORER LIFE CYCLE GRAPHIC.
FROM THE USDA EMERALD ASH BORER PROGRAM MANUAL (2015).

The EAB has four life stages: egg, larva, pupa and adult (*Figure 1*). Research suggests that EAB goes through complete metamorphosis in either a one- or two-year life cycle. Low density EAB populations in healthy ash trees tend to complete a two-year life cycle while stressed trees supporting higher larval population densities tend to host a one-year life cycle. It is unknown exactly how the EAB lifecycle dynamics and behavior might respond to the Oregon environment.

Typically, adults begin to emerge in mid to late May with peak emergence in late June. Females usually begin laying eggs about 2 weeks after emergence. Adult EAB prefer to lay eggs on stressed ash, but will readily lay eggs on healthy trees as well. After 1-2 weeks of incubation, eggs hatch and the tiny larvae bore through the bark of the ash tree and burrow into the cambium layer. After feeding for several months, most EAB larvae will overwinter in the outer bark or outer layer of wood. With spring comes the onset of pupation and a new generation of adults will emerge in late



EMERALD ASH BORER EMERGING FROM D-SHAPED EXIT HOLES.
PHOTO CREDIT: DEBBIE MILLER, USDA FOREST SERVICE, BUGWOOD.ORG.

spring through D-shaped exit holes chewed in the bark. Adult beetles are capable of flight upon emergence but will spend most of the day feeding on ash leaves in the ash canopy. Within 1-3 weeks they will begin mating and laying eggs and the cycle will begin again.

While EAB are attracted to volatile chemical compounds released by stressed ash trees they are also capable of using those same volatiles to find ash trees when dispersed in mixed-species forests.

THE NORTHERN RESEARCH STATION OF THE US FOREST SERVICE CONDUCTED RESEARCH IN MICHIGAN ON EAB DISPERSAL ABILITY:

“We studied the dispersal potential of EAB using flight mills, which allowed us to measure the distance EAB adults flew. We found that mated females flew further than unmated females and males. The average distance flown by mated females was about 3 km, however, 20% flew >10 km and 1% flew >20 km. These findings demonstrate one of the reasons that eradication of EAB in North America has been unsuccessful.”

Natural Areas, Wildlife and Water Quality

The establishment of EAB will likely devastate ash woodlands as well as riparian zones and has the potential to cause the extirpation of an entire species of native ash (*Fraxinus latifolia*, Oregon ash). [The Oregon Conservation Strategy](#) has identified Oregon ash as an important characteristic of deciduous swamps and shrubland as well as riparian habitats. The loss of these trees from an EAB infestation could further endanger wildlife that depend on forested wetlands.

In wetter parts of the Willamette Valley, ash is the predominant tree species and the loss of ash trees will likely result in significant changes. Ash provides important food and habitat resources along creeks and rivers where soils can be poorly draining and where seasonally high water-tables can exclude nearly all other tree species. In dense stands of Oregon ash, understory vegetation is often sparse, consisting primarily of sedges. The loss of ash trees caused by EAB mortality is expected to facilitate colonization by invasive plants and lead to once-forested areas becoming shrub- or grasslands. Standing and fallen dead ash biomass can alter soil pH, mineral concentration (*ash is an accumulator of calcium*), and soil moisture levels. The resulting changes in soil chemistry can affect rates of decomposition, nutrient, and water cycling, thus impacting nutrient resource availability for the remaining trees, while gaps in tree canopy can increase soil erosion, stormwater runoff and elevated stream temperatures.

Along sensitive riparian corridors, the resulting increase in water temperature, nutrient runoff and sediment load could be detrimental to Endangered Species Act (*ESA*) listed species (*Table 1; Figure 2*). In the Willamette River, fish species such as Upper Willamette River steelhead, Upper Willamette River chinook salmon, and the Willamette bull trout, as well as the recently delisted Oregon chub, could be imperiled by the effects of an EAB infestation. Other species of concern to the state of Oregon, including freshwater mussels like the winged floater and the Western ridged mussel, and populations of endemic caddisflies may also be negatively impacted by increased water temperature and sediment load.

Table 1. Oregon threatened and endangered species that will likely be impacted by widespread Oregon ash mortality caused by EAB.

Common Name	Scientific Name	State Status	Federal Status	Potential Impact of EAB
Columbian White-tailed Deer (Lower Columbia River population only)	<i>Odocoileus virginianus leucurus</i>		T	Some
Lower Columbia River Chinook Salmon	<i>Oncorhynchus tshawytscha</i>		T	Some
Lower Columbia River Coho Salmon	<i>Oncorhynchus kisutch</i>		T	High
Lower Columbia River Steelhead	<i>Oncorhynchus mykiss</i>	E*	T	Some
Oregon Coast Coho Salmon	<i>Oncorhynchus kisutch</i>		T	Some
Southern Oregon Coho Salmon	<i>Oncorhynchus kisutch</i>		T	Some
Upper Willamette River Chinook Salmon	<i>Oncorhynchus tshawytscha</i>		T	High
Upper Willamette River Steelhead	<i>Oncorhynchus mykiss</i>		T	High
Nelson’s checkermallow	<i>Sidalcea nelsoniana</i>	T**		High
Peacock larkspur	<i>Delphinium pavonaceum</i>	E**	E	Some
Bradshaw’s desert parsley	<i>Lomatium bradshawii</i>	E**	E	Some

* Listed under the Oregon Endangered Species Act (ORS 496.171 through 496.192)
 **Listed under Oregon endangered, threatened and candidate plants (OAR 603-073)
 +U.S. Endangered Species Act of 1973 (Public Law 93-205, 16 U.S.C. § 1531)

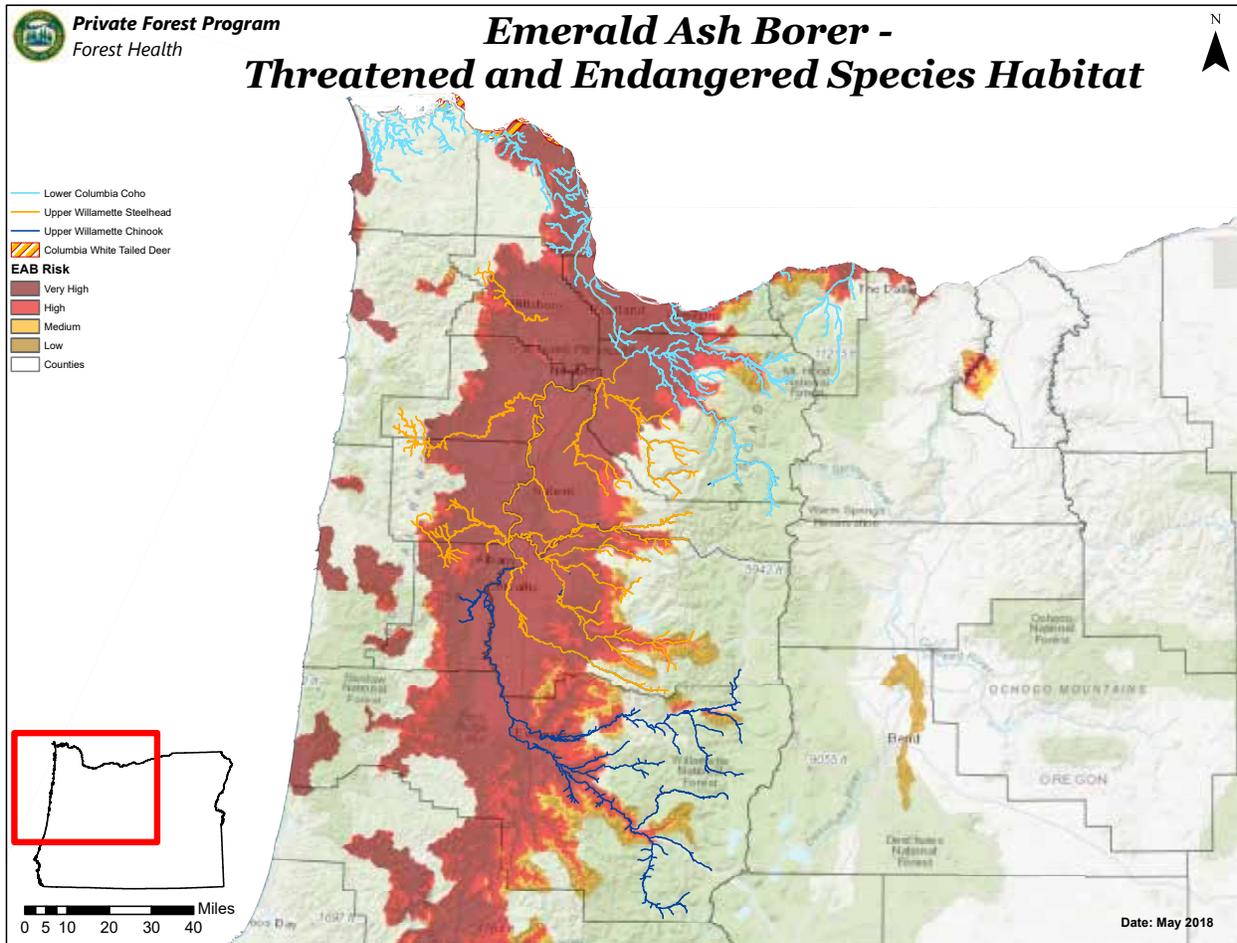


Figure 2. The EAB Threatened and Endangered Species Habitat map shows critical habitat that intersects with EAB risk and the distribution of wild ash in riparian areas of the state. The Threatened and Endangered species includes Lower Columbia Coho salmon (Oregon endangered species, federally threatened species), Upper Willamette Chinook salmon (federally threatened species), Upper Willamette steelhead (federally threatened species), and Columbia white-tailed deer (federally threatened species). Data is not shown for Nelson’s checkermallow (Oregon threatened species).

Of the species addressed in the US Fish and Wildlife Service Recovery Plan for Prairie Species of Western Oregon and Southwest Washington, seven of them can be found in wet prairie habitats. Specifically, Nelson's checker-mallow, peacock larkspur, and Bradshaw's desert parsley can be found in Oregon ash swales, in native wet prairies on the edges of ash wetlands, or along streams in the Willamette Valley. The loss of riparian ash stands and swales may affect critical habitat that supports these and other species of concern. Although the effects of EAB-induced ash mortality may temporarily increase open prairie habitat to the benefit of these species, long-term ash loss can result in the establishment of invasive weeds and an increase in detrimental woody shrubs. Habitat destruction, isolation and fragmentation, invasion by non-native plant species, and succession are underscored in the recovery plan as the primary threats to prairie species. EAB-induced ash mortality could counteract this efficacy of existing restoration strategies.

Oregon ash trees also provide a direct benefit to wildlife. The winged fruit (also known as samara) of the ash are utilized as food by a variety of squirrels and mice, as well as birds such as grosbeaks, wood ducks, finches, and more. Many species of insects, including larval butterflies like the two-tailed swallowtail, feed on the leaves of Oregon ash, while twigs and leaves are eaten by deer and elk. The trees themselves are used as nesting sites for birds, roosting habitat for bats, drill sites for sapsuckers, and provide wood for beaver dams.

For all of the reasons listed above, native Oregon ash plays an important role in ecosystem restoration projects where the management goal is restoration of important wildlife habitats rather than mitigating impacts to a single species of concern. Similar incidental benefits hold true for aquatic wildlife as well, given that many large riparian habitat restoration projects include replanting ash. Not only would EAB induced tree loss cause ecological harm, but the loss of ash trees available for restoration projects could also have negative ramifications on the success of local restoration and mitigation efforts.

Economic Impacts

Emerald ash borer has already caused billions of dollars in damages to natural and urban areas in North America. Economic damages attributed to EAB infestations includes loss of ash trees as a source of timber and firewood, lost value of forested areas, lost value of urban tree canopy, costs incurred in removing diseased trees, and costs incurred by diminished trade/nursery industry attributed to EAB quarantine zones as well as the loss of ecosystem services.

While the nursery value of ash trees in Oregon is unknown, according to the Oregon Association of Nurseries plant finder, there are more than 40 growers/wholesalers/retail nurseries that carry one or more of approximately 20 different varieties of ash from rootstock to containers. If EAB is detected in Oregon, the infested areas could be placed under quarantine, meaning that selected materials, including ash nursery stock, will no longer be allowed to be moved out of infested areas and may need to be destroyed to reduce the chances of spreading EAB. According to the U.S. Department of Agriculture, National Agricultural Statistics Service, Oregon is consistently among the top three producers of nursery stock in the country. Due the state's prominence as a top exporter of nursery stock, EAB could have an impact on Oregon's nursery industry beyond just ceasing the sale of ash trees within Oregon. The 2016 ODA estimated value of Greenhouse & nursery products was \$909,493,000.

Oregon ash is not considered an economically important timber species. It is not generally managed for timber production and its availability for harvest is restricted by regulations governing forestry practices in wetlands and riparian areas. However, it is moderately hard, machines well, has high impact resistance, and is utilized on a small-scale in tool and furniture making. It is also considered a desirable firewood species because it splits easily and has a high heat value, but because it is a non-durable wood species its value can quickly degrade post felling.

City trees, which include various ash species and other cultivated varieties (cultivars), provide various benefits that increase over the lifetime of the trees. Thus, management decisions that contribute to the long-term health and maintenance of the urban forest are considered a valuable investment. However, the cost of caring for the majority of urban trees falls on private property owners. Once infested trees die, they are quick to rot and become public-safety hazards. While

removal of infested trees can be a significant expense to private tree owners, it can cost cities tens of thousands of dollars to deal with an EAB infestation in a public park or along an ash-lined street. Additional costs incurred may also include loss of ecological services, a drop in property values, and the time and cost of replanting a comparable replacement. The loss of these shade trees will negatively impact both the property owner and the local community.



ASH TREES LINING A RESIDENTIAL STREET IN PORTLAND.
PHOTO CREDIT: PORTLAND PARKS & RECREATION URBAN FORESTRY

Investing public resources in prevention and slowing the spread of threats to the urban forest, such as EAB, will help reduce these costs, as will investments in research on EAB biology and management. Managers can assess the costs of prevention versus projected economic damage incurred by EAB as well as compare the costs of replacing infested trees with EAB-resistant species versus inoculation of full-size healthy ash trees.

More difficult to calculate is the economic value provided by the healthy ecological function of natural ash areas and the forested riparian corridors that ash provide, especially those adjacent to agricultural areas.

Urban and Community Forests

While Oregon ash is the only ash native to the Pacific Northwest, other species and cultivars of ash can be found within Oregon's urban forests, widening the impact of an EAB infestation. Extensive research has been conducted to assess the benefits provided by urban forests which include trees in densely populated areas in parks, on streets, and on private property. The benefits of urban forests include reduction of the urban heat island effect, filtering air pollution, increasing property values, reducing stormwater runoff, providing habitat for wildlife, improving human health, and providing aesthetic value.

While urban forests are complex, living resources that have many well-documented positive benefits, there are also costs associated with their management. Since city trees are an important component of a community's green infrastructure and livability, proactive planning for resiliency through increasing species diversity, tracking changes via tree inventories and canopy analyses, and investing in public education on how trees contribute to communities are important components for maintaining the overall health of our urban forests.

THE VALUE OF STREET TREES

Given that trees can increase property values by .08%, the median value of a mature ash tree would be \$3,120 in Portland, OR or \$2,192 in Eugene, OR. Values are based on the median value of a single family home in Portland, OR (\$390,000) and Eugene, OR (\$274,000) in June 2017.

Cultural Resources

EAB threatens the cultural heritage of indigenous communities that have traditional uses for Oregon ash. Ethnobotanical records report medicinal and ceremonial uses of ash (leaves, bark, twigs, and roots) in addition to the use of ash trees as fuel. Records and artifacts also show that ash wood was used in the construction of tools, such as poles, canes, and pipes. The Cowlitz used Oregon ash to make canoe paddles and digging sticks. The Karuk used the root fibers of ash trees to weave baskets. Traditional Costanoan tribal wisdom suggested Oregon ash sticks and leaves would repel venomous snakes.



Human Health & Safety

Direct threats to human health and safety from EAB encompass hazards caused by dead and rotting trees, including falling trees and tree limbs, both within cities and in natural areas. Indirect threats, while difficult to quantify, relate to the consequences of losing significant urban tree canopy. City tree canopy can positively impact human health by reducing the urban heat island effect, filtering air and water pollution, and improving human health and well-being. Studies conducted by foresters and epidemiologists with rapid loss of ash trees caused by the EAB in the Midwest suggest that the loss of trees was correlated with increased mortality related to cardiovascular and lower-respiratory-tract illness.



TREES MARKED FOR REMOVAL DUE TO EAB INFESTATION IN ROELAND PARK, KANSAS.
PHOTO CREDIT: RYAN ARMBRUST, KANSAS FOREST SERVICE, BUGWOOD.ORG.

III. FUNCTION AND ROLE OF STAKEHOLDERS



There are numerous state agencies that have invasive species functions and key responsibilities as outlined in the Emerald Ash Borer Readiness and Response Plan for Oregon. The following is a summary of general duties of the agencies and groups located within Oregon that may be involved in the eradication and management of emerald ash borer. See Appendix A for agency contact information.

Primary State Agencies

OREGON DEPARTMENT OF AGRICULTURE (ODA):

- Lead agency for the state of Oregon for quarantine and enforcement
- Conduct detection surveys of insects, pathogens and plants
- Implement emergency measures at the state level to prevent spread
- Provide laboratory support
- Provide information to the public and media
- Inspect and regulate movement of nursery stock
- Issue and review interstate plant movement permits
- Review international and interstate plant and plant pest movement permits issued by APHIS (Animal and Plant Health Inspection Service)
- Regulate pesticide registration and use
- Provide information to national pest reporting systems
- Administer state rules on intrastate movement of regulated materials
- Collaborate with the U.S. Department of Agriculture (USDA) and other state and local agriculture agencies
- Represent Oregon on national and regional plant boards
- Designate and regulate invasive plant and plant pest species
- Participate as appropriate in an incident command system

Primary State Agencies *(continued)*

OREGON DEPARTMENT OF FORESTRY (ODF):

- Conduct annual aerial surveys of forest health conditions
- Cooperate with state and federal agencies on monitoring and detection surveys and limiting spread of pests
- Identify and control forest pests on state and private forestlands
- Educate forest industry and state land managers and landowners about forest pests
- Communicate with forest industry, managers, and landowners
- Advise and develop forest management protocols for state and private forestlands
- Seek and apply for special funding assistance through the USDA Forest Service or Natural Resource Conservation Service for established forest pests
- Assist with planning for solid waste disposal and or utilization strategies
- Participate as appropriate in an incident command system
- Provide technical assistance to impacted landowners

OREGON DEPARTMENT OF FISH & WILDLIFE (ODFW):

- Assist with other agencies with pest surveys on state lands and share information
- Assist with public education about forest pests
- Cooperate with other agencies to manage forest pests on state lands
- Participate as appropriate in an incident command system

Other Principal Agencies and Partner Institutions

- USDA Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine:
- Maintain and fund Cooperative Agricultural Pest Survey (CAPS) program and surveys
- Provide final confirmation of pest identifications
- Provide pest traps and lures, if available
- Implement emergency measures at the federal level to prevent spread of pests
- Administer quarantines on interstate movement of regulated materials
- Provide international liaison services between individual states and foreign regulatory bodies
- Provide emergency funding for survey and response, as appropriate and available
- Develop and improve survey and control protocols and measures
- Provide survey data repository, if appropriate
- Participate as appropriate in an incident command system

Other Principal Agencies and Partner Institutions *(continued)*

USDA FOREST SERVICE (USFS), FOREST HEALTH PROTECTION:

- Provide current information and technical assistance for detection surveys and control activities on federal lands
- Evaluate and develop new technologies for pest management
- Implement detection surveys, evaluation assessments, and control measures on federal lands
- Provide information and educational materials
- Coordinate interstate initiatives, as appropriate
- Provide funding through Cooperative Forest Health and other programs to state and private organizations
- Participate as appropriate in an incident command system

OREGON STATE UNIVERSITY (OSU) RESEARCH AND EXTENSION:

- Share results of relevant research with state and federal agencies
- Conduct research on plant and plant pest biology, ecology, impact, and management
- Coordinate Oregon Forest Pest Detectors training programs
- Provide information through Extension, Master Gardener, Master Woodland manager and other programs
- Participate as appropriate in an incident command system

OREGON INVASIVE SPECIES COUNCIL:

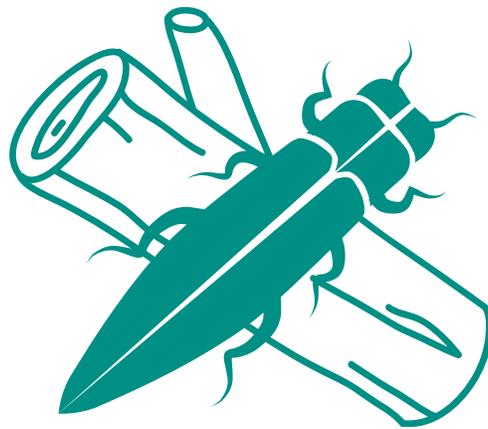
- Coordinate exchange of timely and relevant information among a diverse group of state, federal, local, and non-governmental entities
- Provide information to the public and media
- Manage the Oregon Invasive Species Online Hotline

Other Principal Agencies and Partner Institutions *(continued)*

CITY OF PORTLAND:

- Require permitting, removal, and replacement of infected trees in the city of Portland through authority of the city's tree ordinance
- Provide an inventory of ash trees, using existing street and park tree inventory data
- Promote the Oregon Forest Pest Detector program to City of Portland employees, contractors, and other networks
- Incorporate information on invasive pests into existing outreach efforts, including websites and education programs
- Cooperate with regional partners in planning and response
- Participate as appropriate in incident command system

IV. READINESS



Prior to the arrival of EAB, it is important for the state of Oregon to remain proactive and fully prepared for the arrival of EAB. This includes knowing where ash is located throughout the state, understanding how/where it is likely to be introduced, and identifying the required resources to deal with its aftermath, among other readiness actions. Readiness is broken down into four sections: Risk Assessment, Resilience, Resources for Response, and Detection.

A. Risk Assessment

Assessing and mapping where the greatest risk of EAB establishment is provides a starting point for understanding where in Oregon the economic, environmental, and social impacts of an infestation would be most felt. The risk that a pest such as EAB becomes established in a new location requires an assessment or evaluation of several factors including the risk of EAB being introduced (risk exposure) and the abundance of ash trees in the exposed location. Risk assessments provide information that can be used to maximize the efficacy of both early detection and rapid response efforts. By identifying areas of high risk, outreach campaigns and citizen monitoring efforts can also be targeted to these areas.

1. DISTRIBUTION OF OREGON ASH IN NATURAL AREAS

Native Oregon ash distributions have been modeled by ODF and can be used to facilitate targeted detection and control efforts in both wild and managed natural ash habitat (Figure 3; Figure 4).

Additional EAB Risk Maps by region can be found in Appendix B.

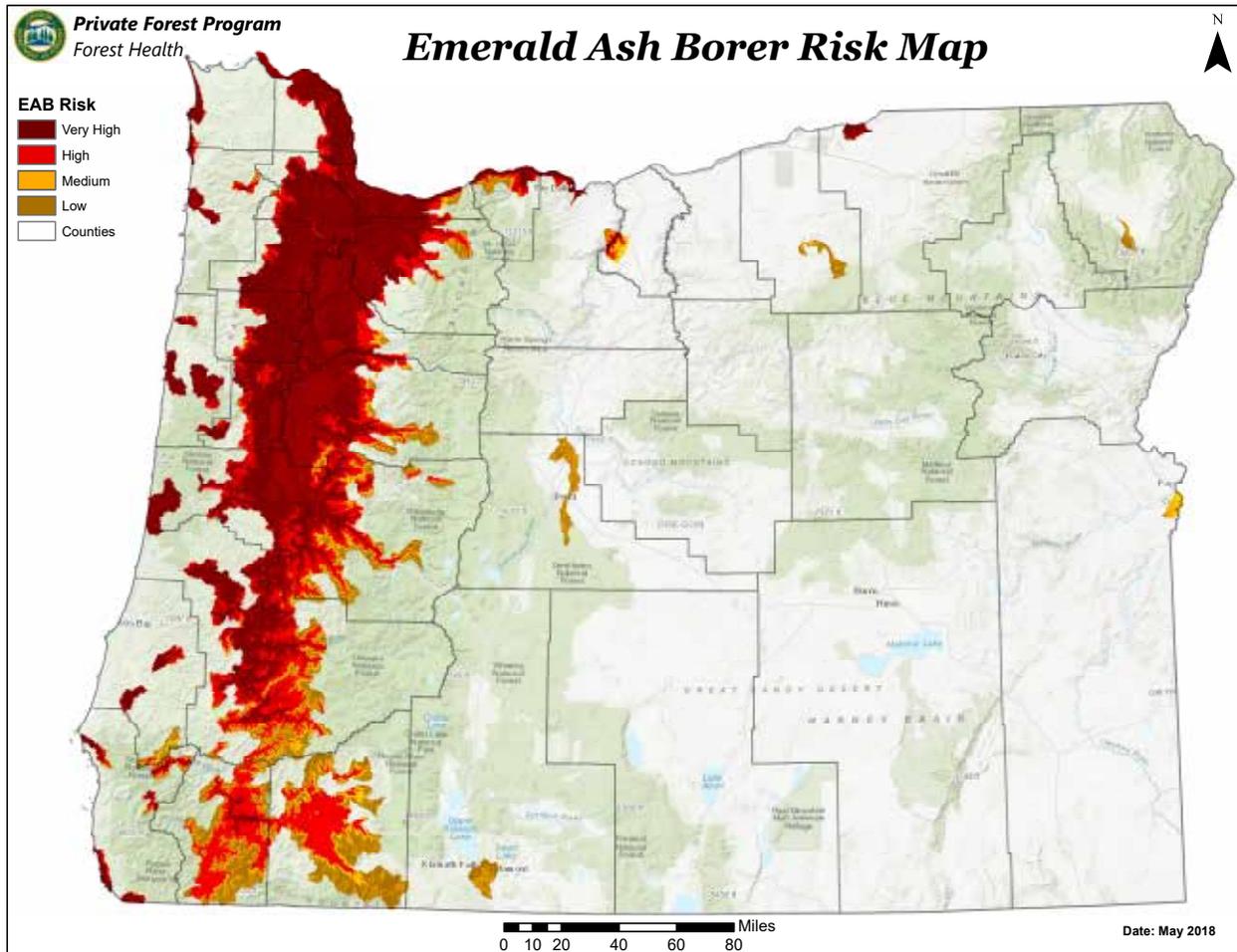


Figure 3. Risk for emerald ash borer (*EAB*) is mapped based upon known occurrences of ash (*Fraxinus sp.*) at the local watershed level (hydrologic unit code 12, or HUC-12) in Oregon. Point data for Oregon’s two wild, naturalized species of ash, Oregon ash (*F. latifolia*) and green ash (*F. pennsylvanica*), were used to create the map. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project, and emerald ash borer surveys conducted by the Oregon Department of Forestry. EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: $\leq 1,000'$ above sea level, High: 1,000 to $\leq 2,000'$, Medium: 2,000 to $\leq 2,500'$, and Low: $> 2,500'$.

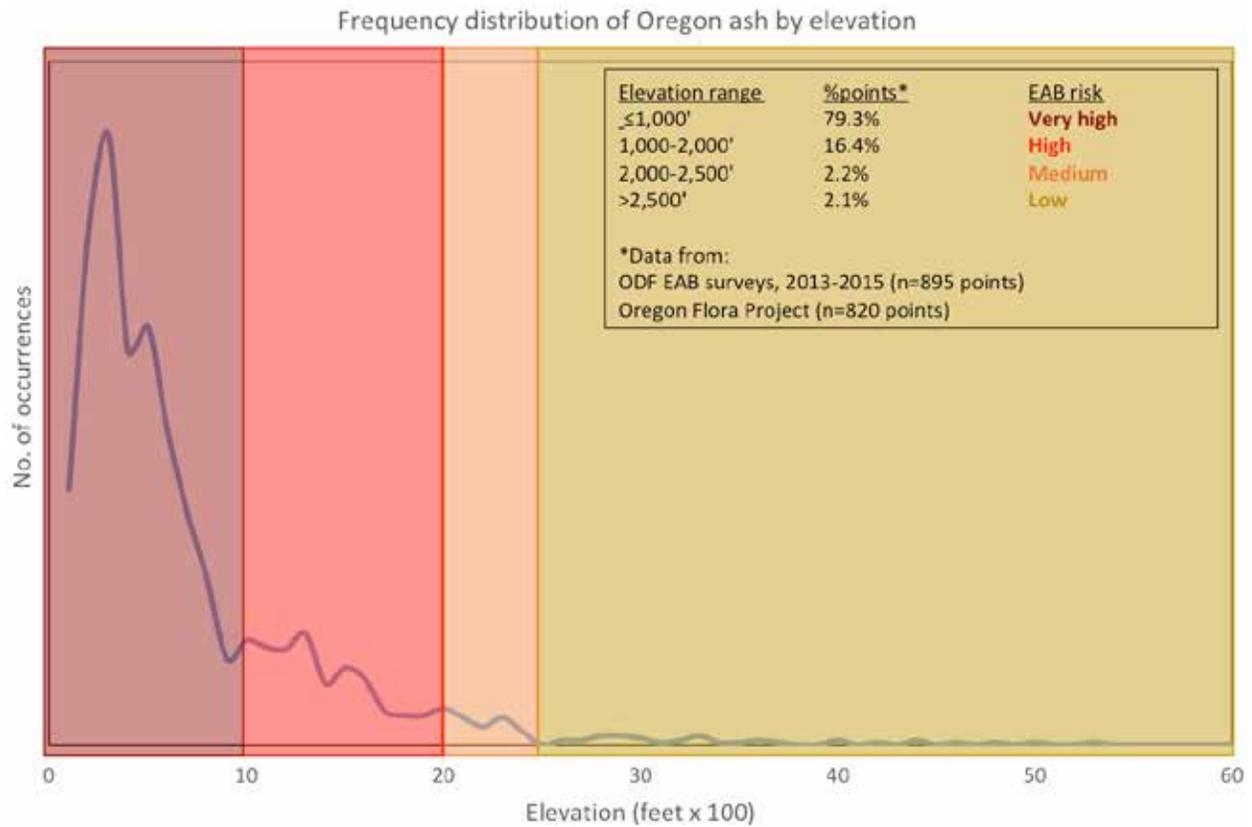


Figure 4. This figure depicts the distribution of wild, naturalized ash (Oregon ash, *Fraxinus latifolia*, and green ash, *F. pennsylvanica*) by elevation and corresponding risk of EAB introduction and establishment. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project (820 points), and emerald ash borer surveys conducted by the Oregon Department of Forestry (895 points). EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: ≤1,000' above sea level, High: 1,000 to ≤2,000', Medium: 2,000 to ≤2,500', and Low: >2,500'

INFESTATION TIMELINE

Since ash often do not show symptoms during the first years of an infestation, EAB can go unnoticed for several years after it is introduced. Cities already dealing with EAB have estimated that EAB was present for 2-3 years before detection. As local populations enter the fourth year post-establishment, EAB larval densities build high enough to cause rapid mortality of ash trees. Previous studies have suggested that ash populations in forested sites can go from healthy to nearly 100% mortality of mature trees within 6 years of an infestation.

2. MAP THE RISK OF IMPORTED FIREWOOD TRANSPORTED BY OUT-OF-STATE RECREATIONISTS

The primary interstate pathway by which EAB is thought to be moved long-distances is via the transport of infested firewood by the general public. Using zip codes of out-of-state campers, the risk of potential infested materials movement into federal, state, and private campgrounds has been modeled. These models can help determine the highest risk areas based on locations where native ash distributions and visitors from EAB quarantine areas coincide (Figure 5).

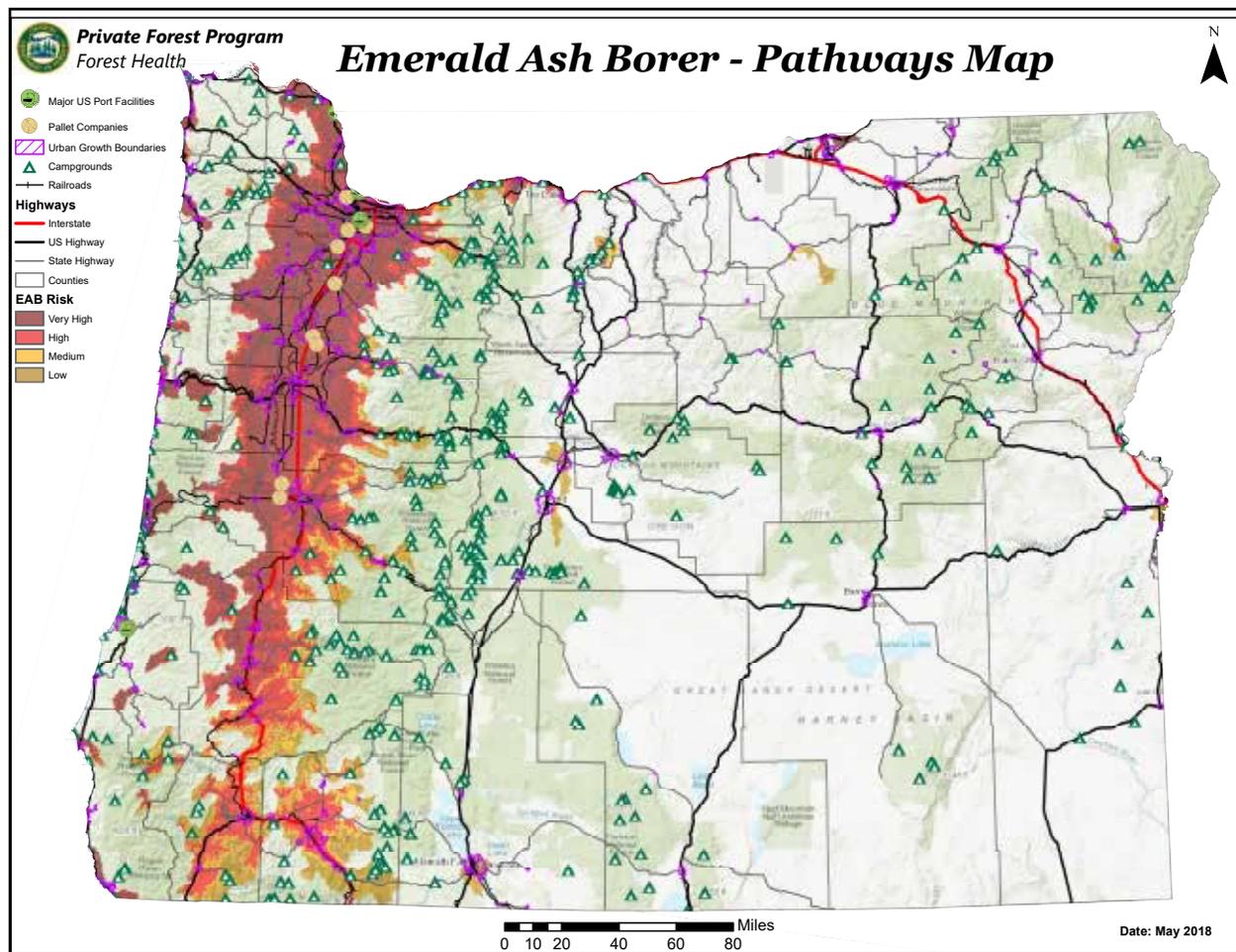


Figure 5. The EAB Pathways map shows all state and federal campgrounds, major U.S. ports facilities, and pallet companies, as well as major railroads and highways – all known pathways for movement of emerald ash borer.

3. EDUCATE GROUPS AND INDUSTRY WITH HIGH RISK OF INTRODUCTION

To increase vigilance for EAB and awareness for how it is transported, recreationalists such as out-of-state game hunters, mushroom hunters, and other backcountry user groups should be provided information on how to not only positively identify EAB, but also ways to decrease the chance of transporting EAB. Additionally, those primarily using wood heat for their homes as well as specialty mills and hobby woodworkers should also be aware of the risk of importing ash from quarantine or near-quarantine areas. Educating local nurseries should also be a priority to ensure they are aware of the potential introduction of EAB through nursery stock.

4. COMPLETE URBAN TREE INVENTORIES FOR OREGON ASH AND OTHER ASH SPECIES

Ash trees can be common in urban and suburban areas. Urban tree inventories allow managers to identify those urban forests that are more vulnerable to invasion and subsequent extensive tree loss, as well as identify high-value urban trees (*such as designated heritage trees*) that may merit protection via prophylactic measures. A list of cities that have completed tree inventories can be found in Appendix C. Tree inventories should be updated and/or refined as appropriate to maintain current inventory data on ash.

5. ESTIMATE THE COST OF AN EAB INFESTATION

The estimated cost of an EAB infestation can be calculated using existing tools such as Purdue University's "[Emerald Ash Borer Cost Calculator](#)" or the "[Emerald Ash Borer Planning Simulator](#)". These tools can provide an estimate of the costs of different EAB management options for specific, high-risk areas such as municipalities.

B. Resilience

The capacity of an ecological system to buffer itself against disturbance is known as resilience. The more biodiversity in urban forests, the more resilient it will be to costs incurred by pests, pathogens, and increasing climate stressors. If managed sensibly, diversity can act as an important buffer against catastrophic tree loss via pests, such as EAB, in forested systems.

EAB RESILIENT COMMUNITY

Prior to a major disturbance, communities can preemptively manage their urban forests in a manner that promotes resilience. A model EAB Resilient Community will have the following components completed, or will have a plan in place to address each:

- **Up-to-date Urban Tree Inventory**
- **Biodiverse urban tree canopy**
- **EAB Prevention Plan and accompanying efforts**
- **Education and outreach**
- **EAB monitoring** (*formal and informal reporting*)
- **EAB Response Plan**
- **Emergency fund**
- **Native ash seed storage** (*if applicable*)

1. DISCOURAGE PLANTING OF AT-RISK SPECIES

Municipal street tree resources across Oregon recommend planting Oregon ash as well as a variety of other ash species and cultivars. With the growing threat of EAB, municipalities are encouraged to revise their lists with the goal of increasing urban street tree biodiversity. Municipalities should also consider the removal of susceptible *Fraxinus* species and other EAB hosts currently established (Table 2).

For restoration projects located in high risk areas and where ash is heavily used, managers may want to minimize percent ash planting in order to bolster EAB resiliency. Managers may also consider alternative species because of the potential devastation to ash trees after the arrival of EAB.

STREET TREE RESILIENCE THROUGH DIVERSITY

Urban forest species diversity is evaluated using the 10-20-30 rule. This rule recommends that urban tree diversity be composed of no more than 10% of one species, 20% of one genus, or 30% of one family. However, pests with broad host ranges can leave urban areas highly vulnerable to catastrophic tree loss and result in significant long-term costs for removal and replacement of dead and diseased trees. A new 5-10-20 goal has been undertaken by many temperate urban areas in order to bolster the resiliency of urban forests.

For example: According to the City of Portland's 2016 Street Tree Inventory, Ash (*Fraxinus spp.*) represents approximately 4.2% of all street trees in Portland. At under 5% of city-wide street tree diversity, *Fraxinus spp.* are well within the progressive urban forestry guidelines for protecting the urban forest from catastrophic harm from plant pests and pathogens. However, with more than 9,000 ash street trees, the impact of EAB on the urban forest would still be profound, with homeowners potentially incurring considerable costs.

Table 2. Wild and cultivated ash species (*Fraxinus spp.*) in Oregon. Source: Oregon Department of Forestry, 2017.

Latin Name	Common Name	Origin	OR wild populations	OR cultivated/urban	USDA zones
<i>Fraxinus latifolia Benth.</i>	Oregon ash	OR, WA, CA	●		7-9
<i>Fraxinus pennsylvanica Marshall</i>	green ash	eastern U.S.	●	●	3-9
<i>Fraxinus americana L.</i>	white ash	eastern U.S.		●	4-9
<i>Fraxinus angustifolia Vahl</i>	narrow-leafed ash	Eurasia		●	6-9
<i>Fraxinus excelsior L.</i>	European ash	Europe		●	4-7
<i>Fraxinus nigra Marshall</i>	black ash	eastern U.S.		●	7-10
<i>Fraxinus nigra Marshall</i>	flowering ash	Eurasia		●	6
<i>Fraxinus quadrangulata Michx.</i>	blue ash	eastern U.S.		●	4-7
<i>Fraxinus uhdei (Wenzig) Lingelsh.</i>	shamel ash	Central America		●	8-10
<i>Fraxinus velutina Torr.</i>	velvet ash	Southwestern U.S.		●	7-10

*Ash species in bold font are the most common planted and wild ash in the state. Less common species of ash may also be rarely encountered.



PHOTO CREDIT: KEW GARDENS.

2. NATIVE ASH SEED COLLECTION AND STORAGE

Collecting and storing native ash seed is essential to preserve the genetic diversity of Oregon ash in preparation for the threat of infestation, and the potential for finding EAB resistance and/or replanting if a successful control measure is found.

To access ash seed collection resources, visit [The National Seed Laboratory webpage](#) for Ash. Developing partnerships with local or regional entities for seed collection and storage efforts should also be explored to combine resources and collect from culturally significant ash sources.

ASH SEED COLLECTION

While discussing lessons learned with states already dealing with EAB, Michigan shared that they regret not collecting seeds from their native ash and they have now lost native seed diversity as a result.

Seed collection of native ash for nursery cultivation and use in local restoration projects has already been conducted locally in Oregon. For instance, in 2015 Metro crews planted 42,000 ash trees at Smith and Bybee Wetlands Natural Area that had been grown from seeds collected in summer 2013. Scholls Valley Native Nursery nurtured them for two years in preparation for planting. These efforts can be combined with seed storage guidance to create a viable seed collection of native ash diversity for future use in post-EAB restoration efforts.

3. PRE-EMPTIVE REMOVAL OF ASH

Since EAB are more strongly attracted to stressed ash, inventoried trees can be prioritized for removal by condition. The cost of pre-emptive tree removal can be estimated above (*see section V. A. 4. "Estimate the Cost of an EAB Infestation"*). Municipalities may also wish to strike a balance between inoculation and preemptive replacement. If preemptive removal will be conducted, it should be implemented by the time the EAB infestation is within 100 miles (*see also "Integrated Pest Management for Emerald ash borer" Appendix D*).

Guidance for proper disposal should be developed and/or utilized and appropriate ash disposal sites should be identified prior to any removal. More information on wood disposal can be found below in section V. C. 3. "Wood Waste Disposal & Treatment".

POOLING RESOURCES AT THE NEIGHBORHOOD SCALE

For areas with a large number of urban ash that need to be treated or removed, one potential option for landowners to save money is for neighbors to pool together and accept bids from arborists to treat several trees in one area. Arborists may be willing to offer a better price if they are able to treat and/or remove multiple trees in one area at the same time.

C. Resources Needed for EAB Response

Carefully planned treatment, removal, and/or disposal of possibly infested ash is a critical component of containing the spread of EAB. Response actions must consider the origin of the EAB infestation in order to effectively treat, remove, and dispose of ash, and to avoid further spread. Prior to any response, it will be important to determine and clearly communicate who is ultimately responsible for ash treatment and removal in terms of urban, residential, and natural ash locations throughout the state.

1. PESTICIDE USE AND APPLICATORS

Systemic pesticides, such as imidacloprid, dinotefuran, or emamectin benzoate, are most commonly used as a protective treatment against EAB infestation, although they can be used to treat EAB infested trees that still retain >50% of their canopy. Preventive chemical treatments for healthy, uninfested trees can be initiated when known EAB infestations are within 10-15 miles (see also “*Integrated Pest Management for Emerald ash borer*” Appendix D). For more information please visit [Insecticide Options for Protecting Ash Trees from Emerald Ash Borer](#). Certified pesticide applicators can also be found through the [Oregon Department of Agriculture’s Pesticide Licenses](#) search engine.

2. TREE REMOVAL RESOURCES

When considering tree removal, you will want to utilize qualified arborists and landscape contractors located within your region. Information that can help find and choose qualified arborists near you is available through Pacific NW ISA: [Find an Arborist](#).

3. WOOD WASTE DISPOSAL & TREATMENT

Fenced disposal sites can be located on public or private land, with the caveat that the specific location will have to be identified based on proximity to where EAB was first detected, as to not encourage spread of the infestation. The size of the site will be dependent on potential wood volume, proximity to other yards and merchandising activities that will take place and can range from 3 to 10 acres. Treatments to eliminate EAB from these materials include, but are not limited to:

Chipping:

Wood, brush, and stump grindings must be chipped or ground down to a size of no more than 1” in two dimensions (*two of the three measurements- length, width, depth- must be 1” or smaller*). Typical chippers used in tree care operations will not reliably create chips that meet this specification. Chippers equipped with a 1” screen will assure compliance.

Debarking:

At minimum, a complete removal of bark is required. The removed bark (*and any removed wood*) must be chipped down to a maximum size of 1” by 1” in 2 dimensions.

Heat:

Wood must be heated according to established pest or disease specific BMPs. For regulated pests and diseases, the wood temperature must reach 160 degrees F for 75 minutes in the center of the piece.



ASH LOGS IN CHIPPING YARD IN SOUTHEAST MICHIGAN.
PHOTO CREDIT: DAVID CAPPAERT, BUGWOOD.

D. Detection

Early detection, coupled with rapid response, can stop the spread of new and emerging invasive species before they become established, making it one of the most cost-effective methods for controlling invaders. Early detection of wood boring pests such as EAB is critical to the success of efforts to eradicate the invaders, isolate the infestation, and minimize its impacts to urban and natural areas. Unfortunately, EAB is notoriously difficult to detect and trees may not develop signs for up to four years after the initial infestation.

1. DEVELOP AND SUPPORT STRATEGIC DETECTION TRAP SURVEYS

Building capacity for early detection efforts can be done by increasing the number and types of EAB surveys, increasing the efficiency of trapping and other survey methods, prioritizing high-risk areas, training individuals already working in high-risk areas (*such as arborists*), and increasing outreach to the general public in high-risk communities. Early detection capacity can be prioritized and/or expanded across agencies, stakeholders, and communities.

Effectively locating early detection efforts relies on analyzing the sources and pathways with the greatest potential for EAB importation into the area (*campgrounds & recreation areas, nurseries & garden centers, and high-traffic shipping & receiving centers*). Focusing early detection activities in areas where out-of-state firewood and nursery stock are transported is the most effective and cost-efficient strategy. Methodologies and strategies should be adjusted as EAB trapping technology and science advances. Priority targeted survey techniques are outlined below (*see also "Integrated Pest Management for Emerald ash borer" Appendix D*).

Visual Survey:

Looking for the outwardly visible signs and symptoms of EAB. Can also include inspection of nursery stock or firewood .

Professional Assessment:

Arborists contracted to closely examine tree canopies in a given area. Branch sampling or other closer assessment may be made.

“Trap Tree” System:

Artificially wounding (*girdling*) trees to increase stress and make them more attractive to EAB. Requires expendable ash trees, and thus may not be practical.

Attractant-Baited Traps:

Set and monitor Purple Prism Traps (*PPTs*). Surveys can be conducted over a larger area and at considerably less expense than other methods. When purchased in bulk, the purple prism trap and lure (*z-3 hexanol*) can be purchased for under \$7.00 per unit. See 2018 [EAB Trapping Protocols](#) from USDA APHIS PPQ for more information.



VISUAL SIGNS AND SYMPTOMS OF EAB INFESTATION INCLUDE CANOPY THINNING (LEFT), EPICORMIC SPROUTING (RIGHT), AND WOODPECKER DAMAGE.

PHOTO CREDIT: JOSEPH O'BRIEN, USDA FOREST SERVICE, BUGWOOD



PURPLE PRISM TRAP (PPT).

PHOTO CREDIT: KENNETH R. LAW, USDA APHIS PPQ, BUGWOOD.ORG

2. SUPPORT AND EXPAND THE OREGON FOREST PEST DETECTORS PROGRAM

Oregon Forest Pest Detectors (OFPDs) are volunteers that help prevent the damaging impacts of invasive forest pests by monitoring for and reporting potential infestations. Typically, participants already have some baseline knowledge of tree/insect identification and are likely to encounter an infestation as part of their work. Forest Pest Detectors could be: arborists, foresters, landscape contractors, cargo distribution center employees, neighborhood tree volunteers, state park and campground personnel, OSU Extension volunteers, watershed council members, and others in the restoration community. Utilization and support of this program will increase the number of highly-trained EAB detectors. Ways to support the OFPD program include ensuring there is adequate funding for training, increasing the number and locations of trainings (*especially within EAB high-risk areas*), creating incentives that encourage professional trainings, and making the OFPD training program a requirement for campground staff and/or ISA members.



WYATT WILLIAMS FROM THE OREGON DEPARTMENT OF FORESTRY SHOWS A GROUP OF OFPD PARTICIPANTS INSECT GALLERIES ON SAMPLES OF ASH BARK AT A FIELD TRAINING. PHOTO CREDIT: AMY GROTTA, OREGON STATE UNIVERSITY EXTENSION SERVICE.

3. PUBLIC ENGAGEMENT

In addition to educating groups of the public that are most likely to unintentionally introduce EAB into Oregon (*campers, out-of-state game hunters, mushroom hunters, etc.*), these groups should also be encouraged to get involved in detection efforts. This includes active vigilance of EAB and other forest pests when in Oregon, spreading the word to others within their network, and taking the initiative to report any suspected sightings.

4. REPORTING

When the presence of EAB is suspected, specific steps must be taken swiftly to ensure the possible detection is responded to in an appropriate and timely manner. Anyone submitting a report should be prepared to give a detailed description of the sighting, including the signs/symptoms observed and the exact location of the ash tree(s). Agency personnel will promptly investigate the suspected EAB infested ash. Below are the required actions if/when EAB is suspected:

Agency professionals must immediately contact Oregon Department of Agriculture Insect Pest Prevention & Management (ODA-IPPM) in the event EAB is suspected by emailing plant-entomologists@oda.state.or.us or calling 503-986-4636 / 1-800-525-0137.

Members of the general public, conservation groups, volunteers, city workers, or other entities doing surveys are encouraged to report all suspected EAB sighting to the Oregon Invasive Species Hotline by calling 1-866-INVADER or by going to oregoninvasiveshotline.org.



SCREENSHOT OF THE OREGON INVASIVE SPECIES ONLINE HOTLINE, WHERE USERS CAN SUBMIT SUSPECTED SIGHTINGS OF EAB.

5. COLLECTION, IDENTIFICATION AND VERIFICATION

It is important that the collection and submission of specimen(s) follow Oregon Department of Agriculture-Insect Pest Prevention & Management (ODA-IPPM) guidelines to ensure specimen quality is not compromised. Contact ODA-IPPM directly to ensure proper collection methods are utilized (plant-entomologists@oda.state.or.us). Specimen(s) collected from suspected ash will be sent to ODA-IPPM for identification at:

**Oregon Department of Agriculture
Insect Pest Prevention & Management
635 Capitol St NE
Salem, OR 97301**

If the inspection of the collected specimen results in a positive identification, the specimen will then be forwarded to USDA's Systematic Entomology Laboratory (SEL) for further confirmation. The steps laid out in (4) Reporting and (5) Collection, Identification, and Verification must be taken each time EAB is suspected in a new county or region of the state.



V. RESPONSE



Once EAB arrives, swift response actions will be necessary to lessen the overall impact to the state. An understanding of designated agency roles and adherence to thorough communication and coordination of collaborative efforts are key to successfully responding to an introduction of EAB. Response is broken down into eight sections: Stakeholder Actions, Communications Plan, Local Coordination, Investigation, Quarantine/Regulation, Management, Wood Waste/Utilization, and Restoration & Replanting.



A. Stakeholders Convene to Create Specific Plan

ODA will take the lead in the event of an EAB detection in Oregon and will work together with ODF, OSU Extension, ODFW, USFS, APHIS, local governments, and entities in the detection zone to immediately determine a preliminary plan of action. Items to be addressed will include:

- Identify missing partners that should be at the table
- Identify a communications team to develop a communications plan
- Review details about the detection
- Review existing information on the pest and identify information gaps
- Develop plans for a delimiting survey
- Develop proposals for regulatory activities
- Quarantine determination and boundaries
 - Review State and Federal processes and timing
- Identify staffing and resource needs
- Finalize Incident Command structure and staffing for:
 - Planning and Finance
 - Operations
 - Communications
- Develop Response Team and Utilization Task Force

For more information on the general response, structure, and components necessary to create a preliminary plan of action in the event of an EAB introduction, see the Oregon Department of Agriculture's Plant Health Emergency Response Plan.

B. Communications Plan

In the event of an EAB introduction, efficient communication will be essential to garner the resources and assistance necessary to control the infestation. The primary agencies involved in the detection and announcement of an EAB infestation will compose a unified message to release to the media and interested parties. Communication between locally affected area(s) and their neighboring municipalities as well as between Oregon and neighboring states will be required in an effort to prevent the natural and anthropogenic spread of EAB.

- Develop a communication plan
 - See the [Kansas Emerald Ash Borer Readiness and Response Plan](#) for an example of an EAB communications plan
- Identify the Public Information Officer for all media contacts
- Set up contact personnel and website resources for the public in order to address questions and provide more information
- Inform the public
 - Submit a press release (*a sample press release can be found in Appendix E*)
Host local resident meetings, visit affected residents, or use other outreach techniques to share information as soon as possible and to ensure all local residents are aware of the detection and the actions that will follow
 - Utilize social media to inform and communicate with the public

C. Coordination with Local Government, Landowners, and Tribes

Schedule an emergency meeting with local and tribal government representatives, landowners, regulated industries, utility companies, recreational areas, and others within the affected areas. See Appendix F for a preliminary list of potential outreach groups and collaborative partners. A Community Checklist (*below*) may be useful to discuss possible management actions with community representatives:

- Educate yourself, community staff, and community volunteers on the pest and its potential effects. Go to the [Emerald Ash Borer Information Network](#) and USDA APHIS Emerald Ash Borer websites and contact professionals for the most up to date information.
- Convene a Task Force of community decision makers, community volunteers, and agency individuals that can help evaluate potential decisions.
- Gather pertinent street tree and community owned tree documents: Inventories, maps of trees in your community, and applicable ordinances.
- Determine your level of risk: How many susceptible trees do you have? Who is responsible for their management? What is their condition?
- Determine your management strategies: Removal, replacement, treatment with pesticides, or a combination of actions.
- Determine your timeline for implementing management.
- Evaluate your budget for conducting management actions and identify other possible funding sources.
- Determine who will be executing the management: Community staff/employees? Contracted arborists and pesticide companies?
- Create a plan for dealing with/capitalizing on wood waste.
- Determine whether your community will assist with privately owned trees.
- Develop a dissemination plan for community residents and businesses concerning EAB and your decisions.
- Monitor public and private trees for signs and symptoms of EAB infestation

EXAMPLE INVASIVE SPECIES OUTREACH: JAPANESE BEETLE

The largest infestation of Japanese beetles ever found in Oregon was detected in 2016 in the area of Cedar Mill and Bethany of Washington County, Oregon. In response, the Oregon Department of Agriculture (ODA) prioritized public education and outreach efforts as well as consistent communication and coordination between agency professionals, affected landowners and business owners, and landscaping crews in order to maximize support of eradication efforts and lessen the likelihood of transporting Japanese beetle out of the treatment zone. Learn more about this 5-year project here:

<http://www.japanesebeetlepx.info>



THE OREGON DEPARTMENT OF AGRICULTURE TEAM TALKING WITH RESIDENTS OF THE TREATMENT AREA DURING ONE OF THE MANY OUTREACH EVENTS IN 2017.
PHOTO CREDIT: JESSICA RIEHL.

D. Investigation

A delimiting survey and dendrochronology techniques will provide information on EAB population density and dispersal as well as how long EAB has been present. This information can help guide planning and management strategies. Depending on the extent, severity, and age of the infestation, goals of the response efforts could range from complete eradication to slowing the spread of EAB to new areas.

1. ORIGIN AND DISSEMINATION

Investigate not only the location and possible pathway of original infestation, but also the likelihood that additional introductions could occur through the same path. Dendrochronology techniques could also be utilized to identify the timeline of the infestation. Trace forward and trace back movement of infested material and associated commodities.

2. SPREAD

If the infestation is relatively geographically contained and was established within the last three years, then eradication efforts can likely proceed. However, if the infestation is across a large area and/or has been established for four or more years, then quarantine and containment efforts should be enacted in order to slow the spread of EAB to other parts of the state.

3. DELIMITATION

Determine the extent of the EAB infestation to provide information necessary to make quarantine determinations and establish quarantine boundaries.

E. Quarantine/Regulation – Enforcement and Compliance

If an EAB infestation is detected within four years of arrival, there are several actions that can be taken in an effort to eradicate EAB from Oregon including pesticide treatment and preemptive tree removal. In the event that EAB cannot be eradicated, municipalities within the state of Oregon should shift their focus to managing and containing the local EAB infestation to prevent further spread to nearby areas. Containment efforts follow [Emerald Ash Borer Program Manual](#) established by USDA or from research conducted by state or federal agencies.

As of January 14, 2021, interstate movement of EAB-infested materials and products is no longer prohibited by the U.S. Government (USDA Docket APHIS-2018-0056). There are currently no federal restrictions in the movement of ash firewood, nursery stock, or other items across the United States. Under Oregon Administrative Rule, Chapter 603 Division 52, Oregon Department of Agriculture can impose its own quarantine for emerald ash borer which could prohibit items from other states infested with emerald ash borer as well as establish control areas in Oregon if EAB were to establish in the state.

See Appendix G for a list of applicable state and federal quarantine laws and regulations.



EAB INFESTED ASH TREE REMOVAL IN PENNSYLVANIA.

PHOTO CREDIT: PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES- FORESTRY, BUGWOOD.ORG

F. Management

1. TREE REMOVAL FOR CONTAINMENT AND LOCAL ERADICATION

Tree removal can be conducted on both infested and uninfested host trees. There may be opportunities where selective removal of trees can remove “stepping stone” trees to protect vulnerable ash population (*i.e. hinder the ability of EAB to spread*).

2. LONG TERM MANAGEMENT: BIOCONTROL

Due to the long life cycle of trees and the large number of ash trees and species throughout North America, it will be many years before we know if biological control (*biocontrol*) can effectively protect ash species against EAB. However, biocontrol has been used for over 100 years in the U.S. and has successfully controlled similar invasive insect pests such as gypsy moth, winter moth, ash whitefly, and eucalyptus longhorned borer.

Four species of hymenopteran parasitoids are approved for release as biocontrol agents of EAB in the U.S. and others are currently under consideration. The four approved species are *Oobius agrili*, *Spathius agrili*, *Tetrastichus planipennisi*, and *Spathius galinae*. It will be important to evaluate these biological control options, specifically in reference to their performance in Oregon ash and common urban street trees in the state.

BIOCONTROL OF EAB

In 2007, Massachusetts released parasitic wasps to kill EAB. One important lesson learned was that the phenology of EAB needs to be considered and compared to that of the parasitoid (*i.e. whether it has a 1 or 2 year life cycle and whether its life cycle lines up with that of EAB*). Another lesson learned was that there is no “one-size-fits-all” parasitoid. For example, one of the wasps that established well in the North was unable go through thick bark (*aka large trees*), while another wasp was much larger and could go through thick bark, but did not seem to establish well. However, there is a new parasitoid species from Russia on the horizon that came out in Spring 2018 and is better synchronized with EAB in the North.

When selecting release sites, there are specific characteristics to consider in order to ensure the highest probability of establishment. For example, natural areas, at least 40 acres in size, with ash density 25% or higher, that are difficult to manage by tree removal or insecticide treatment and are proximal to areas where EAB is being managed (*such as urban areas*), are good candidates for biocontrol release sites.

Information about EAB biocontrol can also be found at the USDA Forest Service's [Biological Control of the Emerald Ash Borer](#) and protocols for EAB biocontrol use in Oregon can be found in [Emerald Ash Borer Biological Control Release and Recovery Guidelines](#).



SPATHIUS GALINAE, A PARASITOID WASP FROM RUSSIA, HAS BEEN APPROVED FOR RELEASE TO HELP CONTROL THE EMERALD ASH BORER.

PHOTO CREDIT: USDA AND UNIVERSITY OF DELAWARE.

SLOW ASH MORTALITY (SLAM)

In 2008, researchers in Michigan set out to evaluate unsuccessful EAB eradication and quarantine efforts and wound up creating a pilot field project that proposed using a combination of response tools to slow the onset and progression of ash mortality. SLOW Ash Mortality (SLAM) is a site-based approach that integrates different management options based on the characteristics of an infested site and seeks to increase the success of EAB responses within the urban tree canopy. SLAM management options include girdling and debarking ash trees, prophylactic insecticide treatment, and selective ash removal. Over a 10-year horizon, simulations showed that annual treatment of 20% of ash trees protected 99% of trees after 10 years, and the cumulative costs of treatment were substantially lower than costs of removing dead or severely declining ash trees.

G. Wood Waste Disposal/Utilization

The EAB response team can convene a Utilization Task Force to identify wood disposal and/or utilization options, investigate resources that are available, and develop best management practices for handling wood waste.

1. MARSHALLING YARDS

Wood collection or marshalling yards have proven to be an effective way to collect infested wood harvested by various groups into one accessible location where it can be sorted, processed, treated, and merchandised. These yards will also play a regulatory role by enabling state and local officials to contain large amounts of affected material and inspect finished products efficiently. Partners, such as ODOT, will play an important role, providing expertise in site locations, equipment, etc.

2. BIOFUEL, WOODWORKERS, LANDSCAPING (CHIPS), AND OTHERS

The recommended options for utilizing properly treated wood waste include lumber products (*with no bark present*), chipped wood waste for landscaping, trail surfaces, bedding material for farmers, or a carbon source for compost piles. Wood waste can also be used as boiler fuel in a boiler equipped with the appropriate air pollution control equipment (*consult individual boiler owners for required fuel specifications*), or as firewood for wood burning stoves and outdoor campfires (*residential outdoor wood fired boilers are not recommended due to their heavy release of fine particulate matter pollution*).

VI. FUNDING



Eradication and program expenses are often covered by the state with funding through cooperative agreements with USDA APHIS and/or USDA Forest Service. These agencies may provide emergency funds for selected pest management activities and/or for restoration, above any base-level funding for pest detection and surveys. State emergency funds can also be requested by the responsible state agencies. If eradication efforts fail and the pest becomes well established, annual costs for control will likely be incurred by the towns, cities, communities, and landowners. Sources of federal and state funds for control of established populations are uncertain and may be partially dependent on the pest of concern.

Since funding sources are not guaranteed, affected communities should look into multiple sources of potential funding. Actions that could generate funds for EAB detection efforts include implementing a firewood tax, increasing campground fees, or charging students of the OFPD training program, which is currently offered at no charge. Below is a preliminary list of potential partners who could assist in finding and securing funds for control activities:

Preliminary list of potential partners that may provide assistance in finding and securing funds for control activities:

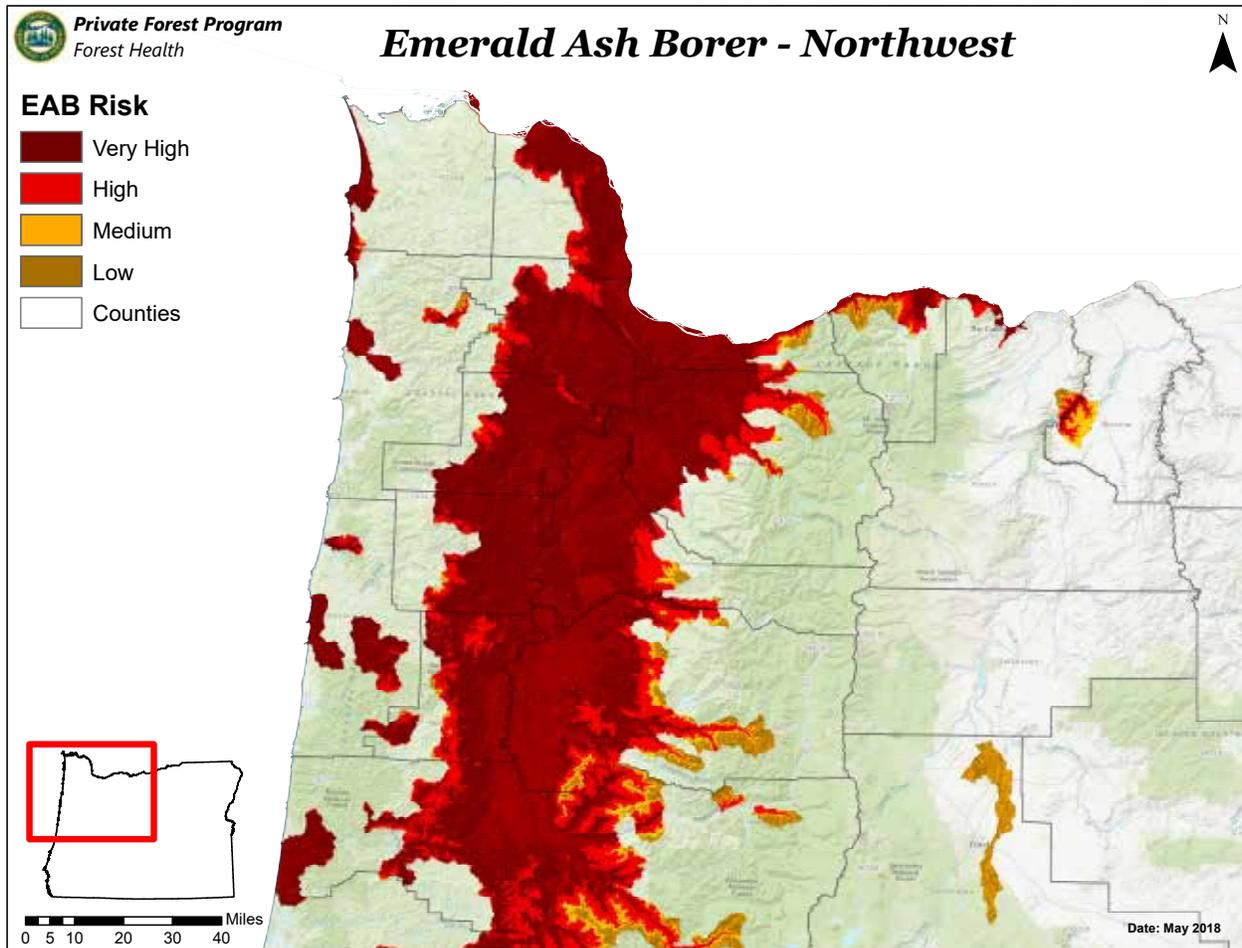
- APHIS
- Forest Service
- EBoard
- Oregon Invasive Species Council-
Emergency Account
- Oregon Forest Industries Council
- Office of Emergency Management
- League of Oregon Cities
- Association of Oregon Counties
- Marine Board
- Bureau of Land Management (BLM)
- Oregon Watershed Enhancement Board (OWEB)
- State Parks
- FEMA
- Nature Conservancy
- Audubon Society
- Builders Association
- Oregon Association of Nurseries -
Emergency Account
- Cost sharing with neighboring municipalities

VII. APPENDICES

A. Stakeholder group contact info

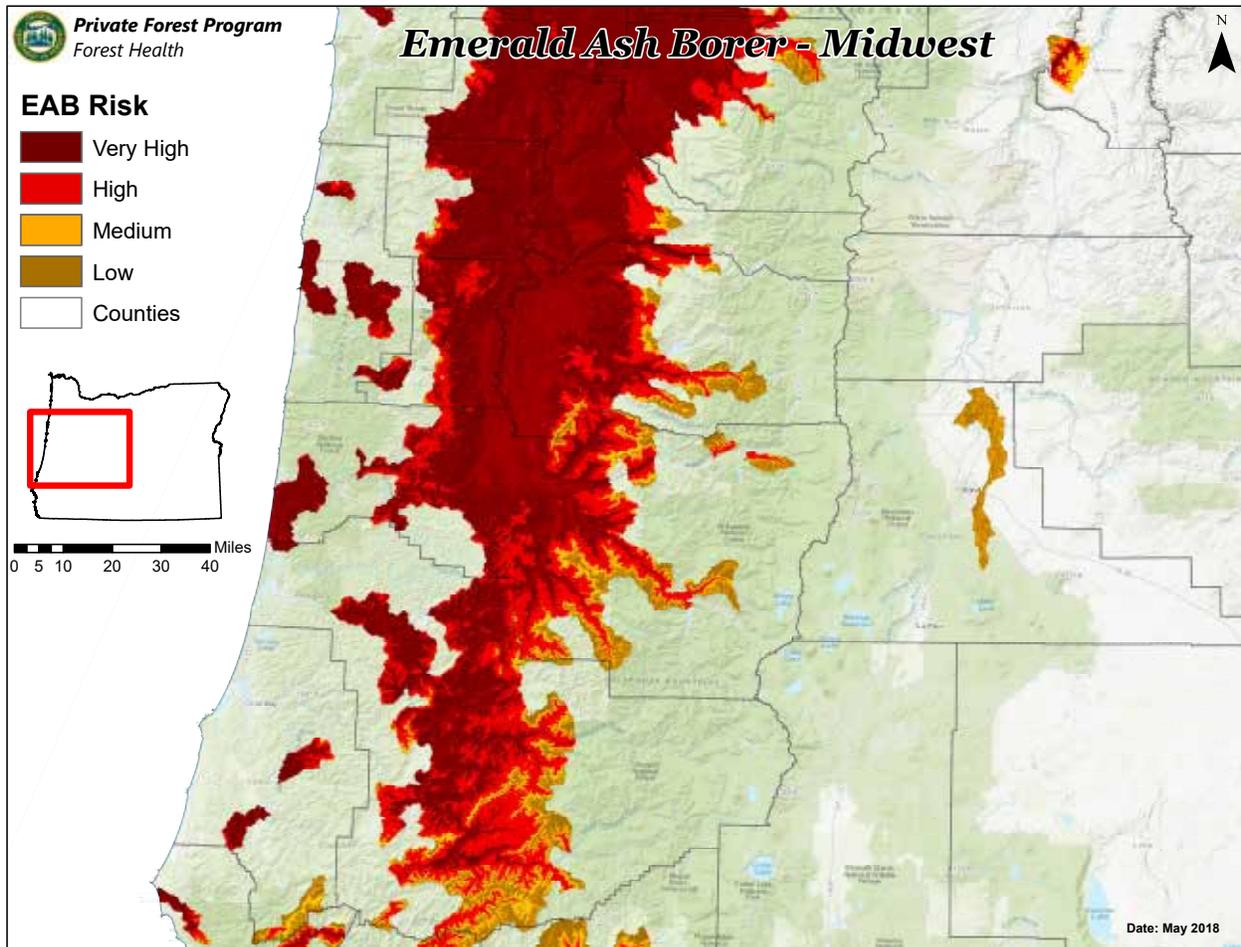
Agency	Title	Phone
Oregon Department of Agriculture	IPPM Program Manager	503-986-4663
Oregon Department of Forestry	Forest Health Program: Invasive Species Specialist	503-945-7472
Oregon Department of Fish and Wildlife	Aquatic Invasive Species/ Wildlife Integrity Coordinator	(503) 947-6308
USDA APHIS	State Plant Health Director	503-326-2814
US Forest Service	Forest Entomologist / Forest Health Monitoring Coordinator	503-808-2674
Oregon State University	Extension Forester	503-397-3462
Oregon Invasive Species Council	Coordinator	971-998-0573
City of Portland: Portland Parks & Recreation Urban Forestry	Botanic Specialist I	503-823-1650

B. EAB Risk Maps by Region



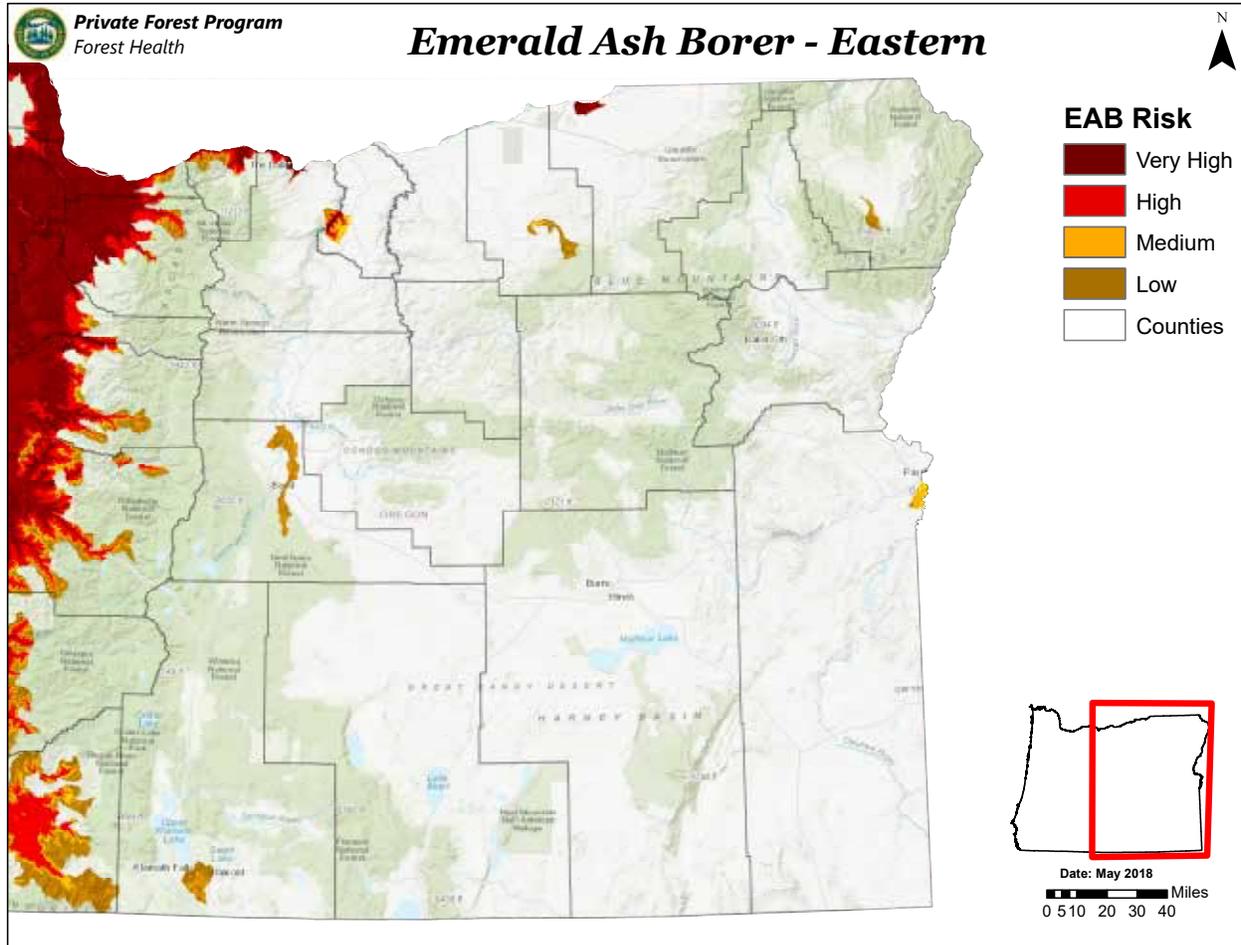
Risk for emerald ash borer (EAB) is mapped based upon known occurrences of ash (*Fraxinus* sp.) at the local watershed level (hydrologic unit code 12, or HUC-12) in Oregon. Point data for Oregon's two wild, naturalized species of ash, Oregon ash (*F. latifolia*) and green ash (*F. pennsylvanica*), were used to create the map. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project, and emerald ash borer surveys conducted by the Oregon Department of Forestry. EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: $\leq 1,000'$ above sea level, High: $1,000$ to $\leq 2,000'$, Medium: $2,000$ to $\leq 2,500'$, and Low: $> 2,500'$. The EAB risk map is shown in four regional maps for the state of Oregon.

B. EAB Risk Maps by Region (continued)



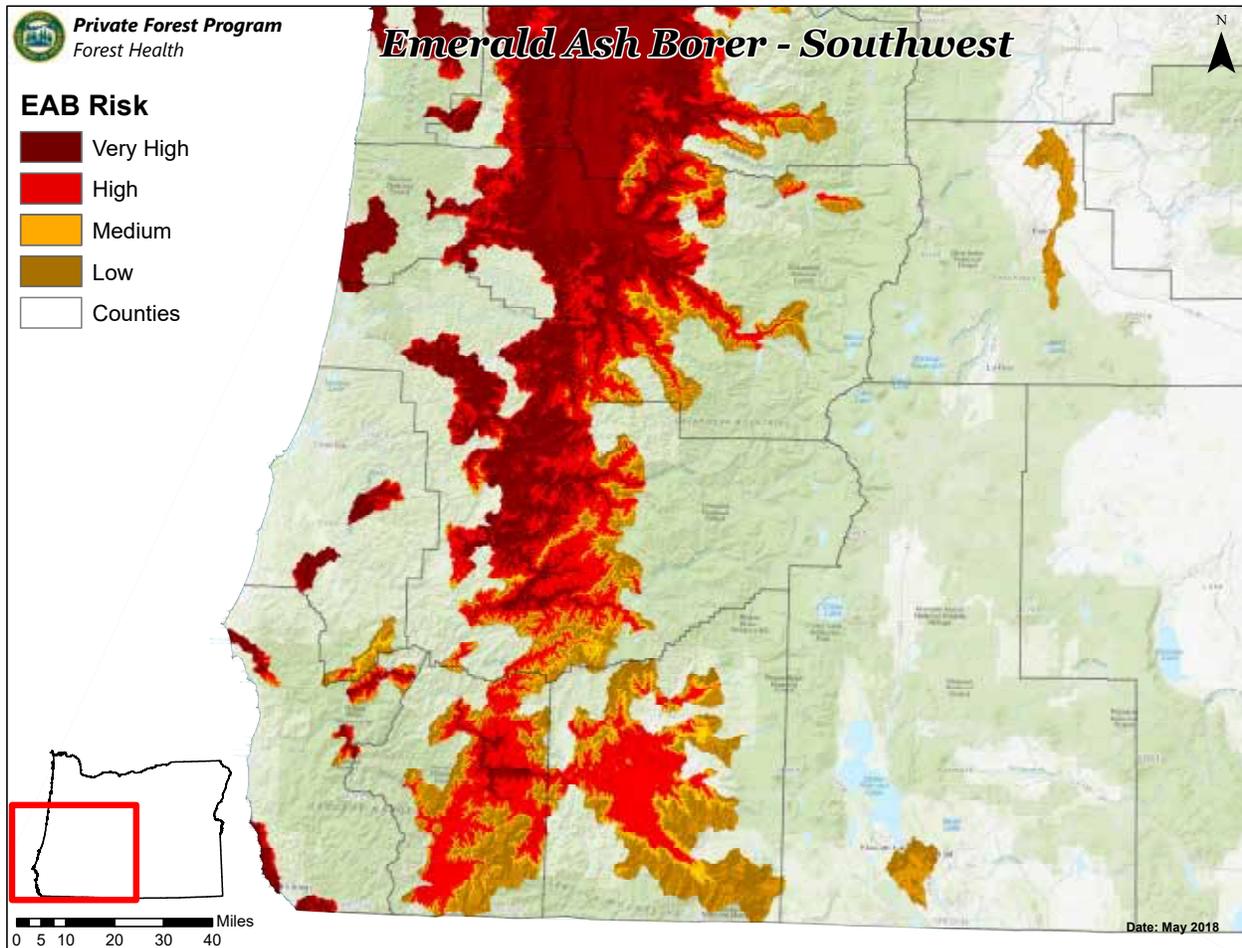
Risk for emerald ash borer (EAB) is mapped based upon known occurrences of ash (*Fraxinus* sp.) at the local watershed level (hydrologic unit code 12, or HUC-12) in Oregon. Point data for Oregon's two wild, naturalized species of ash, Oregon ash (*F. latifolia*) and green ash (*F. pennsylvanica*), were used to create the map. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project, and emerald ash borer surveys conducted by the Oregon Department of Forestry. EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: $\leq 1,000'$ above sea level, High: $1,000$ to $\leq 2,000'$, Medium: $2,000$ to $\leq 2,500'$, and Low: $> 2,500'$. The EAB risk map is shown in four regional maps for the state of Oregon.

B. EAB Risk Maps by Region *(continued)*



Risk for emerald ash borer (EAB) is mapped based upon known occurrences of ash (*Fraxinus* sp.) at the local watershed level (hydrologic unit code 12, or HUC-12) in Oregon. Point data for Oregon's two wild, naturalized species of ash, Oregon ash (*F. latifolia*) and green ash (*F. pennsylvanica*), were used to create the map. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project, and emerald ash borer surveys conducted by the Oregon Department of Forestry. EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: $\leq 1,000'$ above sea level, High: $1,000$ to $\leq 2,000'$, Medium: $2,000$ to $\leq 2,500'$, and Low: $> 2,500'$. The EAB risk map is shown in four regional maps for the state of Oregon.

B. EAB Risk Maps by Region (continued)



Risk for emerald ash borer (EAB) is mapped based upon known occurrences of ash (*Fraxinus* sp.) at the local watershed level (hydrologic unit code 12, or HUC-12) in Oregon. Point data for Oregon's two wild, naturalized species of ash, Oregon ash (*F. latifolia*) and green ash (*F. pennsylvanica*), were used to create the map. Data on ash distribution originated from two sources: the Oregon Plant Atlas, a product of the Oregon Flora Project, and emerald ash borer surveys conducted by the Oregon Department of Forestry. EAB risk categories were determined based on the frequency distribution of ash by elevation above sea level and corresponding human activities associated with known pathways of EAB introduction and establishment: Very high: $\leq 1,000'$ above sea level, High: $1,000$ to $\leq 2,000'$, Medium: $2,000$ to $\leq 2,500'$, and Low: $> 2,500'$. The EAB risk map is shown in four regional maps for the state of Oregon.

C. List of Oregon Cities with Tree Inventories

Some city inventories may only include city parks and/or street trees. It is recommended that cities work toward complete community-wide inventories and update information at regular intervals as appropriate to ensure accurate information is available.

City Name
Albany
Baker City
Beaverton
Canby
Cannon Beach
Corvallis
Cottage Grove
Dallas
Dayton
Durham
Eagle Point
Estacada
Eugene
Grants Pass
Gresham
Jacksonville
La Grande
Madras
Malin
Metolius
Milwaukie
Portland
Salem
Sandy
Sisters
St. Paul
Sunriver
Tillamook
Tualatin
Turner
Wilsonville
Woodburn

D. Integrated Pest Management (IPM) recommendations for EAB

IPM is a holistic strategy of pest prevention or pest reduction that incorporates economic, ecological, and social values while minimizing impacts and risks to human health, non-target organisms, and the environment. Acceptance of some level of resource loss is central to IPM ideology. Thresholds, either economic or environmental, are established before arrival of the pest and serve to trigger an appropriate management response. The IPM process involves continuous monitoring for the pest in question, understanding the pest's biology and opportunities for control, and responding with an appropriate array of IPM tactics after thoughtful review of ecological and economic consequences of doing so. IPM control tactics include chemical, biological, mechanical, and cultural methods, as well as the option of "doing nothing," or waiting until conditions are more favorable for control to be employed. See Table 3 for available IPM tactics and optimal timing for each. Record keeping, follow-up monitoring and maintaining a flexible response to current pest conditions are keys to success for IPM.

Six step process to decision-making in IPM:

1. Identify the problem or pest with awareness that more than one stressor may be present
2. Determine the severity of the problem
3. Assess management options
4. Select and apply one or more options
5. Measure the efficacy of options applied
6. Record the results; monitor, and follow-up

Table 3. Table of actions and thresholds for common EAB IPM tactics.

IPM Tactic	Action	Threshold/Timing
Monitoring	Trap surveys/trap trees	Annually; Trapping season May-Aug
	Visual surveys	Annually; Reports filed to Hotline
Cultural Control	Promote local firewood	Continuous
	Inventory/document ash in cities	Continuous; best done May-Sept when leaves are on trees
	Remove ash from city street tree lists	Ongoing
	Pre-emptive removal of ash	When nearest confirmed EAB is 100 miles in proximity; dry/debark/use wood ASAP
Mechanical Control	Tree removal and chipping	Active EAB infestation or invasion front (10-15 miles from known EAB population)
	Tree burial or incineration	Active EAB infestation or invasion front (10-15 miles from known EAB population)
Biological Control	Request/release agents from ODA/APHIS	Active EAB infestation or invasion front (10-15 miles from known EAB population)
Chemical control	Systemic insecticides	Active EAB infestation or invasion front (10-15 miles from known EAB population)
	Foliar sprays	Not recommended

COMMON TACTICS FOR EMERALD ASH BORER IPM:

Monitoring:

- Purple prism traps, coated with insect-trapping adhesive and baited with lures Z-3-hexenol and Manuka oil, are placed 3-10 m high in ash trees before and during peak adult flight period.
- Girdled “trap trees” – ash trees that have been intentionally killed by mechanical girdling – can be left in place, or bolts of freshly-cut ash stems can be hung in ash canopies or placed in other areas to monitor for attacks by EAB adults.
- Visual monitoring for EAB symptoms on trees and the insect itself are made by the public, private tree care professionals, government natural resource workers, and others. Report suspected findings of EAB to the Oregon Invasive Species Online Hotline: oregoninvasiveshotline.org
- State and federal agencies conduct monitoring surveys for EAB, contingent upon funding. Current quarantine maps for EAB in the United States can be found on the web at www.emeraldashborer.info. However, once EAB has been found in a county, surveys by regulatory agencies typically end. Thus, quarantine maps may not adequately reflect the current distribution of EAB.

Cultural control:

- Prevent the spread of EAB by not moving infested firewood, logs, or nursery stock
- Inventory urban forests to understand risks and costs associated with EAB-killed trees.
- Consider omitting or reducing susceptible host tree species (*Fraxinus* spp.) from lists of approved tree species for community or neighborhood plantings. Plant resistant or non-host tree species.
- Once EAB is nearing close proximity (e.g. 100-200 miles) consider pre-emptive removal of healthy ash trees to spread removal costs across several years. See tool to estimate cost of ash tree removal in IPM References and Further Reading section below.

Mechanical control:

- Timely removal of EAB-infested trees and chipping the infested material to small size - less than 1" on each of two sides
- Burial or incineration of infested wood material if chipping is not possible

Biological control:

- Release and monitor biocontrol agents in areas that are infested with EAB. Since 2007, the U.S. Department of Agriculture has been actively importing and researching several species of EAB parasitoids - insects that feed and develop exclusively on EAB - in attempts to provide population control after EAB has been established in an area. The egg parasitoid, *Oobius agrili* (*Encyrtidae*), and the larval parasitoids, *Tetrastichus planipennisi* (*Eulophidae*), *Spathius agrili*, and *S. galinae* (*Braconidae*), have been approved for release. Native parasitoids (*Phasgonophora sulcata* and *Atanycolus* spp.) have also been shown to attack EAB. Imported biocontrol agents for EAB can be requested through the U.S. Department of Agriculture. See IPM References and Further Reading section below.
- Increase or promote habitats for woodpeckers, which are generalist predators but have been shown to consume up to 30% of EAB larvae in severely infested areas in the eastern U.S.

Chemical control (Table 4):

- Pesticide applicators must read, understand and follow all label directions for pesticides. The pesticide label is the law. Pesticide labels and registrations change frequently, and it is the responsibility of the pesticide applicator - whether professional or home owner - to follow the directions on the label. See Oregon Department of Agriculture Pesticide Program in the reference section for latest regulatory information on applying pesticides.

- Some insecticides, such as neonicotinoids, have been implicated in decline of pollinators. The latest information on safety and legal use of insecticides in Oregon can be found through the Oregon Department of Agriculture Pesticide Program.
- Chemical control options, regardless of delivery system or active ingredient, are only effective when less than 50% of the canopy of an infested tree has been killed by EAB. If the tree has over 50% canopy mortality, it will likely not be able to recover and should be mechanically removed and disposed of properly.
- Trees with trunks greater than 15” diameter at breast height should be treated by a professional applicator.
- Healthy, uninfested trees can be preventively treated with pesticides and protected from EAB when known EAB infestations are within 10-15 miles. Chemical treatments that begin too early waste money and increase the risk of affecting non-target organisms.
- The most effective insecticides for EAB are systemic, meaning they are transported throughout the tree’s vascular system. These systemic insecticides, which target both adults and larvae, should be applied in mid-April through May, before the peak flight of adult EAB (*late May through June*). Drought stress greatly inhibits the uptake of systemic insecticides. Supplemental watering, beginning a month or more in advance of treatment, may be needed to increase effectiveness of chemical application.
- Depending on the active ingredient and the particular product, systemic insecticides for EAB can be applied through soil drenching, soil injections, basal bark sprays, or direct injections into the tree itself. Some of these application techniques require specialized equipment and a professional pesticide applicator license.
- Broadcast foliar sprays target adults and are less desirable than systemic insecticides due to the larger volume that needs to be applied as well as the chance for drift and associated non-target effects.
- Systemic insecticides can provide >95% protection against EAB but must be reapplied every 1-3 years. Broadcast foliar sprays must be reapplied every year.

Table 4. Chemical control options for EAB.

Delivery	Active ingredient	Chemical class	Level & extent of control	Applicator	Target
Trunk injection	emamectin benzoate	Macrocyclic lactone	Excellent, 1-3 yrs	Professional	Larvae or adults
	imidacloprid	Neonicotinoid	Very good, 1-2 yrs	Professional	Larvae or adults
	azadirachtin	Botanical	Very good, 1-2 yrs	Professional	Larvae or adults
Soil drench or soil injection	imidacloprid	Neonicotinoid	Good, 1 yr	Home owner or professional	Larvae
	dinotefuran	Neonicotinoid	Good, 1 yr	Home owner or professional	Larvae
Trunk spray	dinotefuran	Neonicotinoid	Very good, 1 yr	Home owner or professional	Larvae or adults
Broadcast foliar spray	bifenthrin	Pyrethroid	Fair, 1 yr	Home owner or professional	Adults
	carbaryl	N - m e t h y l carbamate	Fair, 1 yr	Home owner or professional	Adults
	cyfluthrin	Pyrethroid	Fair, 1 yr	Home owner or professional	Adults

IPM References and Further Reading:

Cost calculator for determining control measures by community or neighborhood:

<http://int.entm.purdue.edu/ext/treecomputer/>

Log a report of suspected EAB in Oregon:

<https://oregoninvasiveshotline.org/>

U.S. Department of Agriculture EAB monitoring and biological control program:

https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/emerald-ash-borer/ct_emerald_ash_borer

Academic research on EAB chemical control guidelines:

http://www.emeraldashborer.info/documents/Multistate_EAB_Insecticide_Fact_Sheet.pdf

Oregon Department of Agriculture Pesticide Program:

<http://www.oregon.gov/ODA/programs/Pesticides/Pages/default.aspx>

E. Sample Press Release

Contact: Jane Doe, <title here>, XXXXXXXXXXXX

EMERALD ASH BORER FOUND IN <City/Location>, MEETING PLANNED

<City/Location>, OR. -

Emerald ash borer (EAB), an exotic beetle that infests ash trees, was recently discovered in the <City/Location> area. EAB is now considered the most destructive forest pest ever seen in North America and has the potential to create billions of dollars in damages nationwide if not dealt with. The <municipality> is sponsoring an EAB informational meeting on <date, time> at the <meeting location> (<street address>). The public is invited. EAB specialists from <education/information resource> and regulatory specialists from the Oregon Department of Agriculture will be on hand to explain what EAB is and how it will be handled <City/Location>.

“This pest is very destructive, and people should know what to look for and what to do if they find it,” says <name, title>. “We will provide information on identifying the pest, the signs and symptoms of EAB infestation, what treatment options are available, and tree species that are good options for replacing ash trees. There will also be information from an Oregon Department of Agriculture representative on EAB regulations and quarantine measures.”

For more information, call <Name> at XXXXXXXXXXXX. Additional EAB information can be found at the EAB Web site: www.oregoneab.info.

####

F. Outreach Groups and Collaborative Partners

The following list includes groups, agencies, institutions, and businesses that may be impacted by the arrival of EAB in Oregon and/or might be interested in receiving and sharing important information related to pre- and post-arrival actions. This is by no means an exhaustive list and is intended only to be a starting point for planning outreach and collaborative efforts.

Asplundh	Oregon Invasive Species Council
Association of Oregon Counties	Oregon Association of Loggers
Audubon Society of Portland	Oregon Association of Nurseries
Beyond Toxics	Oregon Department of Agriculture
Burns Paiute Tribe	Oregon Department of Environmental Quality
City of Albany	Oregon Department of Fish & Wildlife
City of Ashland- City Risk Manager	Oregon Department of Forestry
City of Central Point	Oregon Department of Transportation
City of Eugene: Parks & Open Spaces	Oregon Farm Bureau
City of Eugene: Emergency Management Program	Oregon Forest & Industries Council
City of Medford: Parks and Recreation	Oregon Forest Research Institute
City of Portland	Oregon Health Authority
City of Portland: Urban Forestry Commission	Oregon Interactive Corporation
City of Salem: Parks and Recreation	Oregon Office of Emergency Management
City of Salem: Risk Manager	Oregon Parks & Recreation
Clackamas County: Urban Lumber Program	Oregon Pest Control Association
Clean Water Services	Oregon Refuse & Recycling Association
Coast Fork Willamette Watershed Council	Oregon Small Woodlands Association
Confederated Tribes of Coos, Lower Umpqua & Siuslaw	Oregon State Beekeepers Association
Confederated Tribes of Grand Ronde	Oregon State University
Confederated Tribes of Siletz	Oregon State University Extension
Confederated Tribes of the Umatilla Indian Reservation	Oregon Stream Protection Coalition
Confederated Tribes of the Warm Springs Reservation of Oregon	Oregon Tree Farm
Coos Forest Protective Association	Oregon Watershed Enhancement Board
Coquille Indian Tribe	Pacific Northwest ISA
Coquille Watershed Association	Partnership for the Umpqua Rivers
Covanta - Marion County	PDX Ecologists Unite
Cow Creek Band of Umpqua Indians	Portland Bureau of Transportation

Cow Creek Band of Umpqua Tribe of Indians	Portland Community College
Department of State Lands	Siuslaw Watershed Council
Douglas Forest Protective Association	Society of Municipal Arborists
Eugene Water & Electric Board	Soil and Water Conservation Commission- Deschutes area
Forest Park Conservancy	Soil and Water Conservation Commission- Lower Willamette area
Friends of Trees	Soil and Water Conservation Commission- northern coast area
Greenbelt Land Trust	Soil and Water Conservation Commission- southern Oregon area
Harney County Watershed Council	Soil and Water Conservation Commission- Upper Willamette area
Hood River Soil & Water Conservation District	Southern Oregon Beekeepers Association
Intertwine Alliance	Tillamook Bay Watershed Council
Keep Oregon Green	Tillamook Forest Center
Klamath Tribes	Trees Inc. (Roseburg)
Klamath Watershed Partners	Tualatin Hills Nature Park
League of Oregon Cities	Tualatin River National Wildlife Refuge
Lower Rogue Watershed Council	Tualatin River Watershed Council
Luckiamute Watershed Council	University of Oregon (Exterior Maintenance Customer Service)
Metro	Upper South Fork John Day Watershed Council
Mid-John Day Watershed Council	US Fish and Wildlife Service
Middle Deschutes Watershed Council	USFS Portland
National Firewood Association	USGS
Necanicum Watershed Council	West Multnomah SWCD
Network of Oregon Watershed Councils	Weyerhaeuser
NOAA Fisheries- West Coast	Xerces Society
Northwest Center for Alternative Pesticides	

G. State and Federal Laws for Invasive Species

USDA APHIS

The Plant Protection Act of 2000 (7 U.S.C. 7701 et seq) as amended by the Noxious Weed Control and Eradication Act of 2004 (P.L. 108-412).

USDA Forest Service

Wyden Amendment (P.L. 109-54, Section 434)

USDA APHIS and Forest Service

Executive Order 13112

OR Revised Statutes for Forest Invasive Species

ORS Chapter 527 Insect and Disease Control; Forest Practices

ORS Chapter 561.510 to 561.600 – Quarantine Powers (ODA)

ORS Chapter 569 – Weed Control

ORS Chapter 570 – Plant Pest and Disease Control; Invasive Species

ORS Chapter 571.038 Plant Pest and Disease Emergency Response Fund

ORS Chapter 571.560 Inspection for pest, disease and weed control

ORS Chapter 634 – Pesticide Control

OR Department of Forestry Administrative Rules for Forest Invasive Species

OAR 629-025- 0040 General Forest Recreation Rules (Weed Free Forage)

OAR 629-051- 0210 Management and Control Actions (Forest Insects and Disease)

OAR 629-051- 0220 Costs of Control (Forest Insects and Disease)

OAR 629-051- 0230 Introduced Pests (Forest Insects and Disease)

OR Department of Agriculture Administrative Rules for Forest Invasive Species

OAR 603-010- 0055 Feral Swine

OAR 603-052- 0075 Quarantine; Chestnut Blight

OAR 603-052- 0114 Quarantine; Dutch Elm Disease and Elm Yellow's Phytoplasma

OAR 603-052- 0120 Quarantine; Oak Wilt Disease

OAR 603-052- 1080 Firewood Restrictions To Prevent Transport Of Invasive Species
OAR 603-052- 1200 Quarantine; Noxious Weeds
OAR 603-052- 1205 Weed-Free Tree Seedling Nurseries
OAR 603-052- 1230 Quarantine: Phytophthora ramorum
OAR 603-054- 0027 Notification of Imported Trees and Shrubs
OAR 603-056- 0205 Prohibited and Restricted Noxious Weed Seed
OAR 603-057- 0001 to 603-057- 0425 Pesticide Control
OAR 609-010 Oregon Invasive Species Control Account

FOR MORE INFORMATION

Emerald Ash Borer (EAB)

Haight, Robert G.; Kovacs, Kent; Liebhold, Andrew M.; McCullough, Deborah G. 2009. Economic assessment of potential emerald ash borer damage in urban areas in the United States. In: McManus, Katherine A; Gottschalk, Kurt W., eds. Proceedings. 20th U.S. Department of Agriculture interagency research forum on invasive species 2009; 2009 January 13-16; Annapolis, MD. Gen. Tech. Rep. NRS-P-51. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 32-33.

Knight, Kathleen S.; Brown, John P.; Long, Robert P. 2013. Factors affecting the survival of ash (*Fraxinus spp.*) trees infested by emerald ash borer (*Agrilus planipennis*). Biological Invasions 15: 371-383.

Kovacs, Kent F.; Haight, Robert G.; McCullough, Deborah G.; Mercader, Rodrigo J.; Siegert, Nathan W.; Liebhold, Andrew M. 2010. Cost of potential emerald ash borer damage in U.S communities, 2009-2019. Ecological Economics 69: 569-578.

Houping Liu, Under Siege: Ash Management in the Wake of the Emerald Ash Borer, Journal of Integrated Pest Management (2017). DOI: [10.1093/jipm/pmx029](https://doi.org/10.1093/jipm/pmx029)

McCullough, D.G., Mercader, R.J. 2012. Evaluation of potential strategies to slow ash mortality (*slam*) caused by emerald ash borer (*agrilus planipennis*): Slam in an urban forest. International Journal of Pest Management 58(1): 9-23.

Poland, Therese M., Yigen Chen, Jennifer Koch, and Deepa Pureswaran. 2015. Review of the emerald ash borer (*Coleoptera: Buprestidae*), life history, mating behaviours, host plant

selection, and host resistance. Canadian Journal of Entomology. 147: 252-262

Rice, K.B. & Klooster, W. n.d. Emerald ash borer invasion of North American forests. Ohio State University Extension- Ohio Agricultural Research and Development Center. Visited July 10, 2017. https://www.nrs.fs.fed.us/environmental_literacy/curricula/TreEab/local-resources/downloads/Background/EAB%20impact%20on%20forests.pdf

Saffell, B. & Grotta, A. 2017. Oregon Forest Pest Detector Watch: Emerald ash borer (EAB). Bilingual Factsheet. Oregon State University Extension Service. Visited February 13, 2018. <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9160.pdf>

USDA-APHIS. 2015. Emerald Ash Borer Program Manual, *Agrilus planipennis* (Fairmaire) USDA-APHIS-PPQ-Emergency and Domestic Programs-Emergency Planning, Riverdale, Maryland. 111pp.

USDA-APHIS. 2017. Emerald Ash Borer. Visited June 19, 2017. <http://goo.gl/2wZ3BU>

USDA-NRS. 2013. Effects of emerald ash borer on forest ecosystems. USDA-Forest Service-Northern Research Station. Visited July 10, 2017. https://www.nrs.fs.fed.us/disturbance/invasive_species/eab/effects_impacts/effects_of_eab/

Wegner, B. 2015. Beware the emerald ash borer: our forests and water quality at risk. Riverkeeper blog- Catskill Watershed, New York. Visited July 10, 2017. <https://www.riverkeeper.org/blogs/docket/beware-the-emerald-ash-borer-an-ecological-disaster-in-the-making/>

EAB Management Plans

Boulder County. 2015. Emerald Ash Borer Management Plan for Boulder County Managed Ash Trees. <https://assets.bouldercounty.org/wp-content/uploads/2017/03/emerald-ash-borer-management-plan.pdf>

Colorado Emerald Ash Borer Response Team. 2015 The Colorado Emerald Ash Borer Management Plan Creation Guide: Considerations and Supplemental Resources to Assist with EAB Management Plan Development
https://www.colorado.gov/pacific/sites/default/files/atoms/files/Colorado_EAB_Management_Planning_Guide_-_June_2015.pdf

Cornell University Cooperative Extension. 2010. New York State Emerald Ash Borer Community Preparedness Plan Development Workbook.
https://www.dec.ny.gov/docs/lands_forests_pdf/eabplanwkbk.pdf

Macomb Tree Board. 2014. Macomb, Illinois Emerald Ash Borer (EAB) Management Plan. <http://www.emeraldashborer.info/documents/IL/EAB%20Management%20Plan%20Approved%203-26-14.pdf>

Michigan Department of Natural Resources. 2008. Emerald Ash Borer Community Preparedness Plan.
https://www.michigan.gov/documents/mda/EAB_preparedness_194302_7.pdf

Montana Department of Natural Resources And Conservation. 2015. Emerald Ash Borer Readiness and Response Plan.
http://dnrc.mt.gov/divisions/forestry/docs/assistance/urban/final_eab-response-and-readiness-plan-for-the-dnrc.pdf

Nebraska Forest Service. 2015. Nebraska Emerald Ash Borer Response Plan.
<https://nfs.unl.edu/NebraskaEABResponsePlan.pdf>

Perry, S., S. Lovering, and L. Frey. 2014. Emerald Ash Borer Preparedness Plan Johnson, Vermont.
http://townofjohnson.com/wp-content/uploads/2014/02/Johnson_EABPreparednessPlan_final.pdf

USDA- Forest Service. 2011. National Response Framework for Emerald Ash Borer.
https://www.fs.fed.us/foresthealth/docs/EAB_National_Framework.pdf

Oregon and Oregon Ash

Oregon State University. Oregon Wood Innovations Center. Oregon ash.

<http://owic.oregonstate.edu/oregon-ash-fraxinus-latifolia>

Prive, S. 2016. Overstory structure and community characteristics of Oregon Ash (*Fraxinus latifolia*) forests of the Willamette Valley, Oregon. Master of Science thesis submitted to Oregon State University on May 27, 2016.

ETHNOBOTANICAL USES OF OREGON ASH

Bocek, Barbara R., 1984. Ethnobotany of Costanoan Indians, California, Based on Collections by John P. Harrington, *Economic Botany* 38(2):240-255. As cited by: Native American Ethnobotany: Oregon Ash. Visited November 11, 2017. <http://Naeb.Brit.Org/Uses/Search/?String=Fraxinus+Latifolia>

Chestnut, V. K., 1902, Plants Used By The Indians Of Mendocino County, California, Contributions From The U.S. National Herbarium 7:295-408. As cited by: Native American Ethnobotany: Oregon Ash. Visited November 11, 2017.

Naeb.Brit.Org

Curtin, L. S. M., 1957, Some Plants Used By The Yuki Indians ... Ii. Food Plants, *The Masterkey* 31:85-94. As cited by: Native American Ethnobotany: Oregon Ash. Visited November 11, 2017.

Naeb.Brit.Org

Gunther, Erna, 1973, Ethnobotany Of Western Washington, Seattle. University Of Washington Press. Revised Edition. As cited by: Native American Ethnobotany: Oregon Ash. Visited November 11, 2017.

Naeb.Brit.Org

Schenck, Sara M. And E. W. Gifford, 1952, Karok Ethnobotany, Anthropological Records 13(6):377-392. As cited by: Native American Ethnobotany: Oregon Ash. Visited November 11, 2017. Naeb.Brit.Org

URBAN FORESTS

Disalvo, Angie, Julie Fukuda, And Jeff Ramsey. 2017. Street Tree Inventory Report. Report Prepared for The City of Portland, April 2017. 44pp. <https://www.portlandoregon.gov/parks/article/638773>

Duh, Steve and Terry Flanagan. 2009. Corvallis Urban Forestry Management Plan 2009. Prepared for The City of Corvallis. 129pp. <https://www.corvallisoregon.gov/modules/showdocument.aspx?documentid=5851>

EPA - Urban Heat Island And Urban Forests, <https://Www.Epa.Gov/Heat-Islands/Using-Trees-And-Vegetation-Reduce-Heat-Islands>

Livesley, S. J., E. G. McPherson And C. Calfapietra. 2016. The Urban Forest and Ecosystem Services: Impacts On Urban Water, Heat, And Pollution Cycles at The Tree, Street, And City Scale. Journal of Environmental Quality. Vol. 45 No. 1, P. 119-124

Parks and Recreation City of Corvallis. 2017. About Our Urban Forest. <http://www.corvallisoregon.gov/index.aspx?page=1902>. Accessed June 27, 2017.

Raupp, Michael J., Anne Buckelew Cumming, And Erin C. Raupp. 2006. Street Tree Diversity In Eastern North America And Its Potential For Tree Loss To Exotic Borers. Arboriculture & Urban Forestry 2006. 32(6):297-304.

Wolf, K.L. August 2007. City Trees and Property Values. Arborist News 16, 4: 34-36.



Forest Facts:

Emerald Ash Borer (EAB)

Agrilus planipennis Fairmaire



EAB adult. D. Cappaert.

Background

Emerald ash borer (*Agrilus planipennis* Fairmaire), referred to as EAB, is a highly destructive invasive forest pest that has killed over 100 million ash trees in the eastern U.S. since its first detection near Detroit, Michigan, in 2002. Several North American ash species (*Fraxinus* spp.) are at risk, including the native Oregon ash (*Fraxinus latifolia*) and non-native ash species widely planted as landscape trees. **EAB was detected in Oregon on June 30, 2022, in Forest Grove.**

After its initial detection in the eastern U.S., EAB spread quickly beyond containment lines despite several aggressive eradication attempts. Only 20 years after its arrival in North America, five eastern U.S. ash species – green, white, black, blue and pumpkin ash – are already listed as “critically endangered” by the International Union for Conservation of Nature. In Oregon, efforts are underway to determine the extent and spread of EAB in and around Forest Grove as well as efforts to conserve native Oregon ash from the threat of EAB.

Wildland forest pest

Oregon ash is known from research trials to be highly susceptible to EAB. Oregon ash is a key part of riparian forests and wetlands west of the Cascades. It grows along streams, rivers and wetlands below 2,000’ elevation, with 80 percent of the species occurring below 1,000’ elevation. At the lowest elevations (below 500’) it forms pockets of pure stands. EAB is

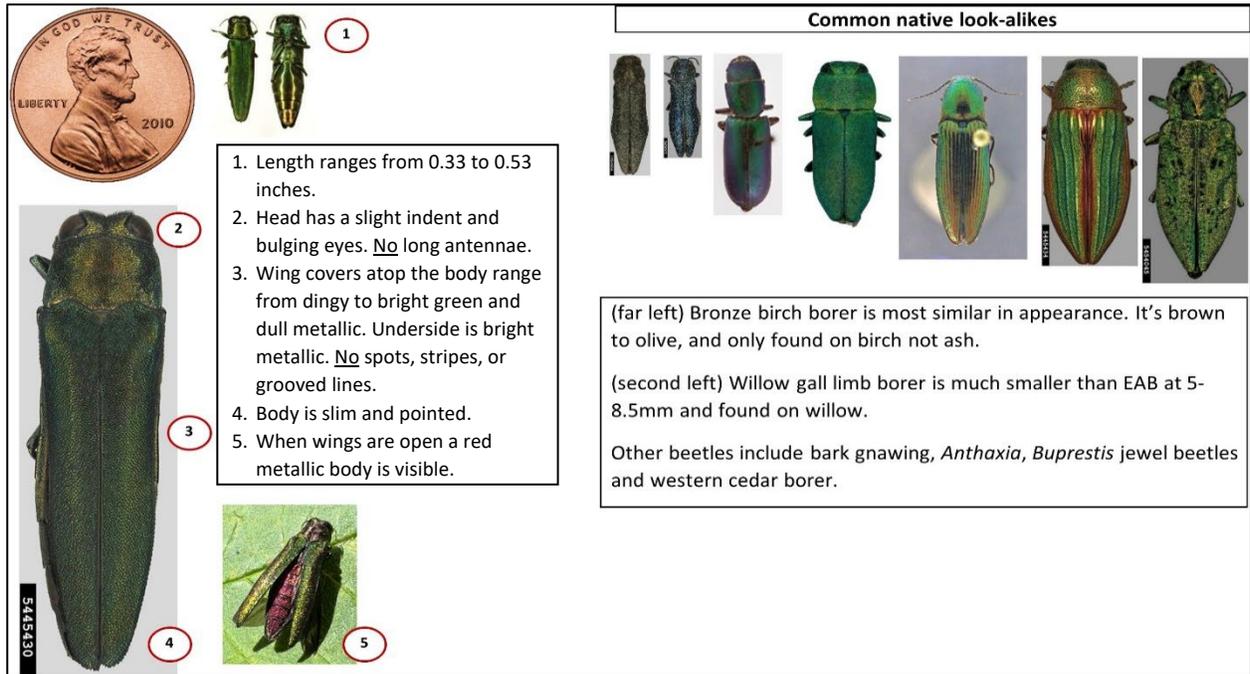


Oregon ash in a small riparian system near Marcola, Oregon. W. Williams.



Oregon ash (*F. latifolia*) with male flowers. W. Williams.

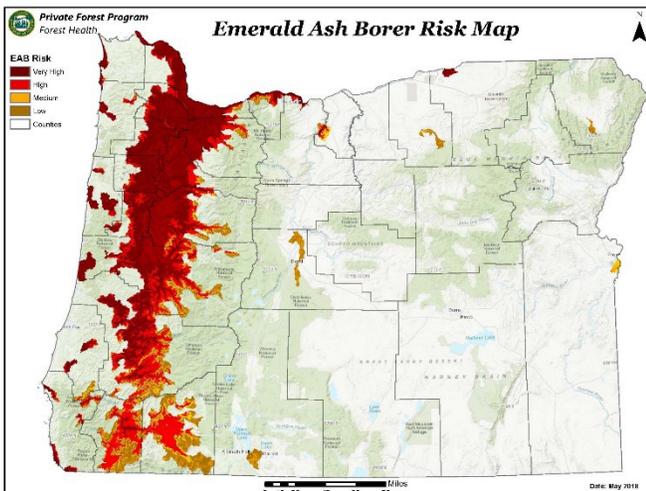
capable of killing entire stands of these ash. Oregon ash occurs on both lands zoned for forestry and for agriculture. Oregon ash is widely used for stream restoration plantings due to its ability to stabilize soil, control sediment, and moderate stream temperatures. It is assumed that widespread death of Oregon ash will lead to ecological changes in water quality, stream temperatures and riparian plant communities. Oregon ash has limited use in Oregon as a timber species. However, a number of small specialty mills process this hardwood for woodworking.



EAB and common Oregon look-alikes. C. Buhl.

Urban and community pest

Besides native Oregon ash, susceptible EAB hosts in Oregon include common landscape ash species: green, white, narrow-leafed (especially the cultivar 'Raywood'), and European ash. EAB is also known to feed on botanical relatives of ash, including white fringetree (*Chionanthus virginicus*) and cultivated olive (*Olea europaea*). In the eastern U.S., EAB has caused over \$2 billion in damages. Most of the costs are from losses in residential property values, tree removal and replanting in urban areas. EAB moves quickly; it can cause nearly complete mortality of ash trees within about 10 years after detection.



EAB risk map for Oregon. M. Lathrop.

Insect biology

EAB is native to eastern Asia, including far eastern Russia, China, Mongolia, Japan, Taiwan and the Korean Peninsula. It is only a minor pest of ash trees native to east Asia. In North America, however, it attacks both stressed and healthy trees. EAB was likely introduced to the Great Lakes area through international shipping of infested solid-wood material, such as wood pallets. Since 2002, EAB has spread to over 35 states and five Canadian provinces. The first detection on the West Coast of North America was in Forest Grove, Oregon on June 30, 2022. The next closest known EAB population is Boulder, Colorado.

EAB adults emerge May into July. Eggs are laid in crevices of bark. The larvae hatch and begin tunneling through and consuming the inner phloem, cambium and outer xylem, just beneath the bark. The feeding action of many hundreds or thousands of EAB girdles the tree, cutting off the flow of sugars produced in the leaves to the storage systems in the roots, effectively starving trees to death. There are four larval molts before the insect pupates and overwinters.

There are certain signs and symptoms that are characteristic of EAB, most of which are very long lasting, well after the insect has completed its development and left the tree. If the bark of affected trees are removed, one can observe the meandering “serpentine-shaped” galleries caused by hundreds and even thousands of larvae



Serpentine galleries caused by larval EAB feeding. W. Williams.

feeding on the vascular cambium. Second, the adults in this group of beetles leave a characteristic “D-shape” exit hole about an eighth of an inch wide when exiting the tree. Last, after about three or four years of repeated attack and feeding by EAB, ash trees show significant



“D-shaped” exit holes from EAB adults. C. Buhl.

canopy dieback. In an effort to stay alive, trees often produce shoots or suckers along the trunk. Other signs of EAB include woodpecker damage and loose bark. Typically, it can take three to four years before a tree will start to decline from EAB. This is well after the insect has bred and dispersed to other trees, making early detection difficult. Traps for EAB are only partially effective for attracting and monitoring EAB.

Detecting and reporting EAB

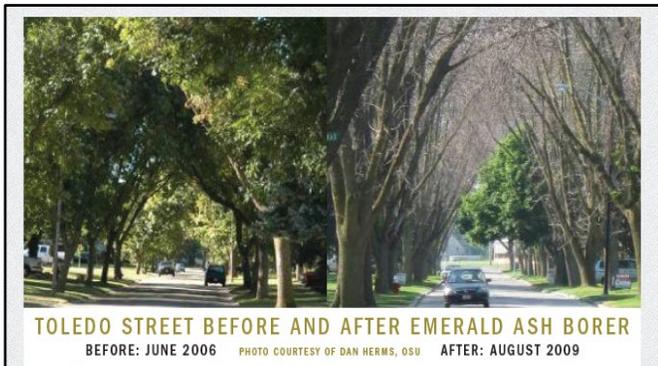
EAB is more often detected by keen eyes than by traps. In 2015, Oregon Department of Forestry, with financial aid from U.S. Forest Service and in conjunction with Oregon State University Extension, Oregon Department of Agriculture and the USDA Animal and Plant Health Inspection Service, developed a program to train over 500 of Oregon’s natural resource specialists from local and state agencies on how to detect and report EAB and other invasive pests. Read



Dead canopy and epicormic shoots of tree with severe decline caused by EAB. D. Herms. Inset: Infested ash tree at the initial detection site in Forest Grove, Oregon. Note the thinning canopy. W. Williams.

about the Oregon Forest Pest Detector program at <https://extension.oregonstate.edu/ofpd>.

Graduates of the Pest Detector program and any member of the public can report a suspected ash tree through the online reporting tool at <https://oregoninvasiveshotline.org/>.



Street trees, before and after EAB, Toledo, Ohio. EAB can move through an entire community in 3-10 years. D. Herms.

Treatments for EAB

First, make sure that the trees in question are true ash trees. Ash trees have compound leaves and opposite branching, and bark furrows become diamond shaped as trees age. Their seeds are paddle-shaped, hang in branches, and are present on female trees in late summer/early fall. Foliage turns from bright green to yellow in the fall, although some selections have purple or red fall color. Watch for any sign of initial canopy thinning, top dieback or other symptoms listed above.

There are no effective means of eradicating entire populations of EAB once the insect is established in an area. Individual trees can be protected before EAB arrives using stem-injected or soil-drenched systemic insecticides. Once a tree canopy has been thinned or reduced by 30% or more by EAB feeding activity, it is too late to protect it. Some of the systemic insecticides can only be applied by professional pesticide applicators, while others are available to the public. For a complete list of insecticides and their effectiveness, see the Oregon Statewide EAB Readiness and Response Plan, www.oregoneab.info.

For established populations of EAB, another method of management includes biological control – the practice of using an insect’s natural enemies to control population growth. The USDA Animal and Plant Health Inspection Service has a biological control program for EAB in the eastern U.S. Releasing tiny parasitic wasps that specialize on EAB can help reduce, but not eliminate, population growth and spread of EAB. The Oregon Department of Agriculture Insect Pest Prevention and Management Program may be developing a similar biological control program for EAB in Oregon (<https://www.oregon.gov/oda/programs/ipppm/pages/aboutippm.aspx>).

Other management options include pre-emptive removal of ash near an active infestation. Municipalities are encouraged to inventory ash trees and have a plan to spread the cost of ash tree removal over several years. Once removed, ash trees should be chipped to pieces one inch in dimension to stop the growth of EAB insects inside the tree. The chips should be covered with thick plastic or buried to stop the spread of EAB adults that may still emerge. Ash is a wonderful firewood but is also a prime pathway for the insect to move across the state. Therefore, ash firewood that is recently cut and split should also be covered by thick plastic for at least one year. Firewood should not be moved more than 30 miles from where it was harvested. See <https://www.dontmovefirewood.org/>.



Ash firewood should not be moved. Campers should buy kiln-dried firewood at campgrounds. Source: The Nature Conservancy.

Proactive preparations

Because the threat of EAB has been known for some time, Oregon has led the effort among states on the West Coast to prepare for this destructive pest. With financial assistance from the U.S. Forest Service State and Private Forestry program, ODF is collecting 1 million seeds of Oregon ash from across its range in Oregon. The seeds are being sent to researchers at USDA Genetic Resource Center near Cottage Grove, Oregon, as well as the USDA Seed Lab in Fort Collins, Colorado. Seeds were collected following a protocol that is designed to capture the genetic diversity of Oregon ash in the state. The hope is that one day there will be tree breeding programs to develop Oregon ash that is resistant to EAB and restore affected areas. The seed collection will provide genetic material to start the breeding program.



Stand of pure ash is home to elk and other wildlife species. Ankeny National Wildlife Refuge. W. Williams.

Since the introduction of EAB to North America, international regulations now require solid wood material used in international shipping to be debarked and heat treated to sanitize for tree-killing insects and disease. Within the United States, interstate spread of EAB occurs through the ash nursery trade and through the transportation of infested firewood. To protect our state from new pests, purchase locally sourced nursery stock and do not move firewood which could contain tree-killing insects and diseases.

Plant nursery companies and their customers should be on the lookout for ash saplings as small as 1" diameter infested with EAB. These should

be promptly destroyed. Firewood gatherers and producers should cover fresh-cut ash trees or kiln-dry wood (most effective method for killing EAB is 60 min at 140 degrees F). Cities and homeowners should start planning now for replacement tree species used in restoration projects, street tree programs and other urban landscapes while choosing native and climate-adapted tree species above others. See details on preparing your community for EAB at www.oregoneab.info.

Resources and further reading

Emerald Ash Borer Readiness and Response Plan for Oregon: www.oregoneab.info

Oregon Forest Pest Detector program, Oregon State University Extension.

<https://extension.oregonstate.edu/ofpd>

Oregon Forest Pest Detector Field Guide, Oregon State University Extension.

<https://catalog.extension.oregonstate.edu/em9127>

Oregon Invasive Species Council Online Hotline for reporting EAB:

<https://oregoninvasiveshotline.org/>

Ash Genetic Conservation Program, US Forest Service:

<https://www.fs.usda.gov/nsl/GeneticConservation/Ash.html>

Emerald ash borer information network:

<http://www.emeraldashborer.info/>

Emerald Ash Borer fact sheet, USDA Animal and Plant Health Inspection Service:

<https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/emerald-ash-borer>

USDA Emerald Ash Borer Fact sheet:

<https://www.ars.usda.gov/ARSUserFiles/80620520/EABfactsheet.pdf>

Oregon Department of Agriculture Insect Pest Prevention and Management Program:

<https://www.oregon.gov/oda/programs/ippm/pages/aboutippm.aspx>

Trees to know in Oregon:

<https://extension.oregonstate.edu/trees-know-oregon-washington>

Agenda Item No.:	4
Work Plan:	Overarching Issues Work Plan
Topic:	Fall Board Retreat
Presentation Title:	October Board Retreat Discussion
Date of Presentation:	September 7, 2022
Contact Information:	Ryan Gordon, Planning Branch Director 503-945-7393, Ryan.P.Gordon@odf.oregon.gov

SUMMARY

Department staff will lead a discussion with the Board of Forestry (Board) about key topics for the October retreat, including proposed changes to work plans and agenda development, Board governance, and revision of the Forestry Program for Oregon (FPFO). This is an information item only, intended to begin a dialog with the Board in advance of the fall retreat. There will be additional time for deeper discussion of all topics at the retreat. Any resultant decisions will be considered at a subsequent Board meeting.

CONTEXT

The fall retreat is typically the time when the Board and Department staff discuss and begin to plan the next year’s Board meetings and topics. Part of that process includes reviewing and adjusting (as needed) Board work plans, considering the next year’s meeting schedule, and considering agenda development. Based on the dialog between the Board and Department staff, there is interest in adjusting these processes, particularly as the Board begins a substantial revision of the Forestry Program for Oregon (FPFO, the Board’s strategic plan). Of note, a subcommittee of three Board members has been formed to provide direct input to the FPFO revision. This agenda item will allow for a review and discussion of the key areas where changes have been proposed; it will also allow time for members of the subcommittee to engage the full board in initial thoughts about the FPFO revision.

BACKGROUND AND ANALYSIS

Key topics proposed for discussion at the fall retreat include the following:

- Board Workplans & Agenda Development: Board work plans have traditionally been completed each biennium, with one plan per operating program. Some issue-specific (i.e., SB 762) work plans have been developed in addition to the programmatic plans. These work plans drive agenda development. They have traditionally been evaluated and adjusted annually based on progress, emerging needs, and other factors. Planned discussions will explore the value and functionality of the current work plan method versus a more fluid and collaborative agenda development planning process. *A summary of current work plans has been provided (attachment 1).*

- Meeting Frequency and Duration: Over the past two years, the frequency of Board meetings has increased significantly. The increase has, in part, been driven by specific policy needs. The frequency and pace have become a challenge for staff and Board members. In part because of changes through the pandemic, changes in format have also decreased opportunities for board members to interact with each other and the public. Planned discussions will explore alternate models for planning less frequent, longer duration meetings with the opportunity for short duration special meetings as emerging policy needs arise.
- Board Advisory Committees: There are several standing committees that are advisory to the Board of Forestry, such as the Committee for Family Forestlands, State Forests Advisory Committee, and the Regional Forest Practices Committees. The Board has the authority to create and disband committees as business needs dictate. Planned discussions will explore the current committee structure, business needs, and the connection between committees and Board information needs or decision-making processes.
- Board Governance: Over the past several years the Board has discussed issues of governance but has not engaged in a process to formally identify and develop a governance model. The Board adopted a Governance Policy at the July 2020 meeting, stating an intent to “have a set of bylaws to direct and clarify its actions, procedures, and organization, which include expectations of members. The Board will establish written documentation for Board processes and procedures developed to execute its statutory responsibility.” Planned discussions will explore Board intent around this policy and opportunities to build a board policy manual, which would ultimately support the implementation of the FPFO.

Governance Policy: <https://www.oregon.gov/odf/board/bof/bof-governance.pdf>

- Forestry Program for Oregon Revision: The Board, in collaboration with staff, has initiated the process of revising the FPFO, which has traditionally served as the Board’s strategic plan. A three-member subcommittee has been formed to assist with this process. Planned discussions will explore the vision for the revision, including the plan’s relevance and connection to the Department’s operations.

NEXT STEPS

This is an information item only, intended to begin dialog with the Board in advance of the fall retreat. There will be additional time for deeper discussion of all topics at the retreat. Any resultant decisions will be considered at a subsequent Board meeting.

ATTACHMENT

- (1) 2022-2024 Board Work Plan Summary

Work Plan Summary

ODF Board of Forestry | Jan. 2022 through Mar. 2024

2022-2024 Board of Forestry meetings projected topics based on draft Board work plans

Topics are subject to change as Agency responds to COVID-19 and other shifting priorities. Board Executive Sessions not included.

*January 5, 2022 – Virtual Board Meeting	*March 9, 2022 – Board Meeting	April 6, 2022 – Board Policy Workshop
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Information or updates
<ul style="list-style-type: none"> • Admin: 1). Legislative Concepts – Guiding principles and direction decision, 2). Legislative Concepts – Review and Board input on a list of potential LC’, 3). Agency Budget Development – Review and approve guiding principles and direction, 4) Board Governance Best Practices Self-Evaluation – Individual review of 2021 Board governance evaluation criteria decision, 5). 2022-2024 Board Work Plan discussion and decision. • SB762: 1). Enforcement rule clarification rulemaking initiation • SF: 1). Draft Western Oregon Forest Management Plan – Management focus of the lands decision. 	<ul style="list-style-type: none"> • Admin: 1). Legislative Concepts – Approval of LC for submission to DAS, 2). Annual Approval of the State Forester’s Financial Transactions. • FP: 1). Rangeland protection association additions and expansions. • FR: 1). 2022-2024 Board work plan. • SB762: 1). WUI Definition & Criteria rulemaking decision, 2). Wildfire Risk Classification rulemaking decision • SF: 1). Elliott State Forest Decertification, 2). Endangered Species Management Plan – Agency role and content framework decision. 	<ul style="list-style-type: none"> • BOF: 1). Forestry Program for Oregon Revision – Information Session
Information or updates	Information or updates	
<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). 21-22 Firefighting expense insurance policy overview, 3). Intro to MGO #16 Recommendation Board Policy on Financial Oversight. • SB762: 1). SB 762 Implementation – Small woodland grant and 20-year plan update • FR: 1). Operator of the Year Awards, 2). Post-fire restoration. 	<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report. 2). 2023 Policy option packages • EOI: 1). Forestry Program for Oregon – Revision scope discussion. • FR: 1). Private Forests Accord discussion, 2). Forest Practices Agency Meeting Report. • SF: 1). Draft Western Oregon Forest Management Plan – Strategies and Engagement update. 	

April 27-28, 2022 – Offsite Board Meeting & Tour <i>Tour idea: Living with Fire</i>	May 10, 2022 – Special Meeting	May 16, 2022 – Special Meeting
<p>Board Decision, Discussion, or Input</p> <ul style="list-style-type: none"> • Admin: 1). Agency Budget Development – Review and Board input on draft budget concepts, 2). Board Governance Best Practices Self-Evaluation – Review and approval of 2021 Board governance evaluation criteria. • CC: 1). Framework for climate change assessment – Development of framework. • EOI: 1). Forestry Program for Oregon – Adopt a plan for revision scope and process final decision. • FP: 1). Rangeland Protection Association formations, 2) Initiate Central Oregon district boundary change rulemaking. • FR: 1). Private Forest Accord HCP Contractor decision. • SB762: 1). Enforcement rule clarification final rulemaking. 	<p>Information or updates</p> <ul style="list-style-type: none"> • SF: 1) Western Oregon State Forests Habitat Conservation Plan draft environmental impact statement review, Board discussion, and conversation with FTLAC members. 	<p>Board Decision, Discussion, or Input</p> <ul style="list-style-type: none"> • FR: 1). Contested case review and decision. • Admin: 1) Emergency fire funding legislative concept decision.
<p>Information or updates</p> <ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Agency Budget Development – Review and Board input on draft budget concepts, 3). ODF MGO Implementation Management Plan Updates, 4). Annual report on Tribal working relationships and activities • SF: 1). Western Oregon Habitat Conservation Plan status update. • Tour: 1). Field tour overview 		

*June 8, 2022 – Board Meeting	July 20, 2022 – Offsite Board Meeting	August 24, 2022 – Special Meeting
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Board Decision, Discussion, or Input
<ul style="list-style-type: none"> • Admin: 1). Agency Budget Development – Review and Board input on final budget concepts. • FP: 1). Forest Protection District and Rangeland Protection Association annual budget approval. • SB762: 1). WUI Definition & Criteria final rulemaking decision, 2). Wildfire Risk Classification final rulemaking decision. 	<ul style="list-style-type: none"> • Admin: 1). Agency Budget– Approve 2023-25 Agency Request Budget and Transmittal Letter, 2). Board Governance Self-Evaluation – Approve summarized report, 3). Annual Performance Progress Report review. • FP: 1). Regional Forest Protection Association’s formations. • FR: 1). Committee for Family Forestlands Appointments, 2). Committee for Family Forestlands report. • SB762: 1). Certified Burn Manager/Prescribed Fire rulemaking decision, 2). Baseline Fire Protection Standards rulemaking decision. 	<ul style="list-style-type: none"> • Admin: 1). Agency budget development and decision. • FR: 1). Private Forest Accord rulemaking discussion and decision.
Information or updates	Information or updates	
<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Annual letters to the State Forester • CC: 1). Pacific Crest Regional Forest Carbon Analysis, 2). DLCD Climate and Resource Assessments • FP: 1). Fire season readiness report. • SF: 1). Draft Western Oregon Forest Management Plan – Modeling outcomes analysis, draft FMP, and engagement updates. 	<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Human Resources Dashboard, 3). Facilities Capital Management Plan, 4). Public Information Request Report. 5). ODF Implementation Management Plan progress. • FP: 1). Letters to State Forester from FPAs, 2) Fire season report, 3). Bureau of Land Management-West Oregon Operating Plan update, 4). Wildfire Prevention Program Overview. • FR: 1). ODF and DEQ MOU Progress Report • SB762: 1). SB 762 Implementation –20-year strategic plan update. 	

*September 7, 2022 – Board Meeting	October 12-13, 2022 – Offsite Board Retreat	October 26, 2022 – Special Meeting
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Board Decision, Discussion, or Input
<ul style="list-style-type: none"> • Admin: 1). Emergency Fire Cost Committee reappointment decision. • FP: 1) Central Oregon district boundary change final rulemaking. • FR: 1). Regional Forest Practices Committee Appointments decision. 	<ul style="list-style-type: none"> • BOF: 1). Leadership intent, 2) Board and Department working relationships, 3) Good Governance, 4). Forestry Program for Oregon Revision – Work Session, 5) Work plan mid-course correction, 6) Performance review of State Forester. 	<ul style="list-style-type: none"> • FR 1). Private Forest Accord final rulemaking decision, and 2). Discuss the process for sovereign Tribes to join the HCP application.
Information or updates		
<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Summary of Board issues for 2023 and agenda development discussion. • CC: 1). Forest Carbon Implementation and policy discussion. • FP: 1). Fire season update • FR: 1). Emerald Ash Borer discovery • SF: 1). State Forests Carbon and Inventory, 2). Western Oregon Habitat Conservation Plan status update. <p>Meeting may be abbreviated for fire season</p>	<p>Board Chair and State Forester develop agenda</p>	

November 16-17, 2022 – Offsite Meeting & Tour <i>Tour idea: TBD</i>	*January 4, 2023 – Virtual Board Meeting	*March 8, 2023 – Board Meeting
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Board Decision, Discussion, or Input
<ul style="list-style-type: none"> • FR: 1). Adaptive Management program committee member appointments, 2). PFA Habitat Conservation Plan application progress discussion and decision. • SB762: 1). Certified Burn Manager and Prescribed Fire program final rulemaking. • SF: 1). Endangered Species management plan decision. 	<ul style="list-style-type: none"> • Admin: 1). Review of the annual Board governance self-evaluation criteria. • FR: 1). Annual report on Private Forest Accord implementation 	<ul style="list-style-type: none"> • Admin: 1). Annual Approval of the State Forester’s Financial Transactions decision. • CC: 1). Framework for climate change assessment – Final version developed to conduct analysis, ready for final decision. • FR: 1). Independent Science and Research team member appointments. • SB762: 1). Prevention Program Advancement rulemaking decision.
Information or updates	Information or updates	Information or updates
<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). ODF Implementation Management Plan Updates, 3). MGO Interim update. • CC: 1). Climate Change and Carbon Plan adoption implementation progress. • FR: 1). Develop the Climate Smart Forestry Award program. • SF: 1). Draft western Oregon Forest Management Plan, engagement update. • Tour: 1). Field Tour Overview 	<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Agency Budget Development – Budgetary outcomes update, 3). Placeholder for Large Fire Funding fix update. • FR: 1). Post-fire restoration update, 2). The Operator of the Year awards. • SF: 1). Draft Western Oregon Forest Management Plan modeled outcomes. 	<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). ODF Implementation Management Plan Updates, 3). MGO Interim update. • FP: 1). Smoke Management annual update. • FR: 1). Forest Practices agency meeting report, 2). Amend other rules to align with the Legislative report.

April 26, 2023 – Offsite Board Meeting	*June 7, 2023 – Board Meeting	July 19, 2023 – Offsite Board Meeting
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Board Decision, Discussion, or Input
<ul style="list-style-type: none"> • Admin: 1). Board Governance Best Practices Self-Evaluation – Review and approval of 2022 Board governance evaluation criteria, final decision. • SF: 1). Western Oregon HCP implementation decision on direction. <p>May 2023, a special meeting may be requested to finalize the draft FMP and initiate rulemaking.</p>	<ul style="list-style-type: none"> • Admin: 1). Emergency Fire Cost Committee appointment and reappointments. • CC: 1). Placeholder for climate change assessment framework to be incorporated in rule action protocols and modification of existing administrative rules discussion and decision. • FP: 1). Forest Protection District and Rangeland Protection Association annual budget final decision. • FR: 1). Amendment of other rules to align with Legislative report discussion and decision. • SB762: 1). Prevention Program Advancement final rulemaking decision. 	<ul style="list-style-type: none"> • Admin: 1). Board Governance Best Practices Self-Evaluation – Approve summarized evaluation report and metrics of Board governance criteria, final decision. • FR: 1). Committee for Family Forestlands Report and Appointments decision.
Information or updates	Information or updates	Information or updates
<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report. • CC: 1). Agency estimation of GHG footprint • FR: 1). Western Oregon streamside protections review 	<ul style="list-style-type: none"> • Admin: 1). Financial dashboard report, 2). Human Resources Dashboard, 3). Facilities Capital Management Plan, 4). Public Information Request Report, 5). MGO update on ODF Implementation Management Plan • CC: 1). American Forests – Carbon and Climate Change Modeling, 2). Forest Carbon – Enhanced Forest change awareness. • FP: 1). Fire season readiness report, 2). Letters to State Forester from FPAs. 	<ul style="list-style-type: none"> • Admin: 1). Legislative outcomes update, 2). Agency budgetary outcomes update, 3). Financial dashboard report, 4). Annual Performance Progress Report – KPM review, 5). Large Fire Funding Fix update. • FP: 1). Fire season report.

*September 6, 2023 – Board Meeting	October 11-12, 2023 – Offsite Board Planning Retreat	November 15-16, 2023 – Offsite Board Meeting & Tour
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	Board Decision, Discussion, or Input
<ul style="list-style-type: none"> FR: 1). Regional Forest Practices Committee Appointments decision. <p>Meeting may be abbreviated for fire season</p>	<ul style="list-style-type: none"> BOF: 1). Leadership intent, 2) Board and Department working relationships, 3) Good Governance, 4). Forestry Program for Oregon Revision, 5) Strategic Initiative and work plan discussion, 6) Performance review of State Forester. <p>Board Chair and State Forester develop agenda</p>	<ul style="list-style-type: none"> SF: 1) Western Oregon Forest Management Plan finalized and final rulemaking decision.
Information or updates		Information or updates
<ul style="list-style-type: none"> Admin: 1). Financial dashboard report, 2). Assessment of Issues and Trends. FP: 1). Fire season report. FR: 1). Federal Forest Restoration update, 2). Forest Health Report, 3). Forest Practices Monitoring Report, 4). Urban and Community Forestry Report, 5). Non-Industrial Forest Landowner Report, 6). Post disturbance rule analysis completion by 2025 update. 		<ul style="list-style-type: none"> Admin: 1). Financial dashboard report. CC: 1). Climate Change and Carbon Plan adoption implementation progress. FR: 1). Specified Resource sites rule analysis: Marbled murrelet update.

*January 3, 2024 – Board Meeting	*March 6, 2024 – Board Meeting	Work Plan items to-be-determined for 2023-2024
Board Decision, Discussion, or Input	Board Decision, Discussion, or Input	
<ul style="list-style-type: none"> Admin: 1). Legislative Concepts – Guiding principles and direction decision, 2). Legislative Concepts – Review and Board input on a list of potential LCs, 3). Agency Budget Development – Review guiding principles and direction decision, 4). Board Governance Best Practices Self-Evaluation – Individual review of 2023 Board governance evaluation criteria decision. 	<ul style="list-style-type: none"> Admin: 1). Emergency Fire Cost Committee appointments and reappointments, 2). Legislative Concepts – Approval of LC for submission to DAS, final decision, 3). Guiding principles for Agency Budget development decision, 4). Annual Approval of the State Forester’s Financial Transactions decision. FP: 1). Baseline Fire Protection Standards final rulemaking decision. 	<ul style="list-style-type: none"> 2023-2025 biennial budget outcomes Private Forests Accord outcomes 2022 and 2023 Legislative session outcomes (e.g., Harvest tax) Large fire funding fix SB 762, 20-year strategic plan SB 762 Legislative modifications, and funding Forestry Program for Oregon revision BLM West Oregon Operating Plan
Information or updates	Information or updates	
<ul style="list-style-type: none"> Admin: 1). Financial dashboard report. FR: 1). Climate Smart Forestry Award, 2). Operator of the Year Award. 	<ul style="list-style-type: none"> Admin: 1). Financial dashboard report. FR: 1). Forest Practices agency meeting report, 2). Placeholder for Tethered logging rule analysis initiation. 	

Work Plan Topic Owners

Admin – Administrative

CC – Climate Change and Forest Carbon

EOI – Emerging & Overarching Issues

Fire - Fire Protection

FR – Forest Resources

SF - State Forests

BOF – Board

SB 762 – All Divisions

STAFF REPORT

Agenda Item No.:	5
Topic:	*Executive Session
Date of Presentation:	September 7, 2022
Contact Information:	Oregon Department of Forestry

SUMMARY

The Board will meet in Executive Session for the purpose of reviewing the State Forester's Annual Performance, pursuant to ORS 192.660(2)(i).

STAFF REPORT

Agenda Item No.:	6
Topic:	Forest Trust Land Advisory Committee
Presentation Title:	FTLAC Testimony to the Board of Forestry
Date of Presentation:	September 7, 2022
Contact Information:	David Yamamoto, FTLAC Chair and Tillamook County Commissioner John Sweet, FTLAC Vice-Chair and Coos County Commissioner

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

Agenda Item No.:	7
Work Plan:	State Forests Work Plan
Topic:	State Forests Carbon and Inventory
Presentation Title:	State Forests Carbon and Inventory
Date of Presentation:	September 7, 2022
Contact Information:	Tyson Wepprich, Adaptive Management Specialist 503-945-7381, Tyson.M.Wepprich@Oregon.gov Michael Wilson, State Forests Division Chief 503-945-7374, Michael.Wilson@Oregon.gov

SUMMARY

The State Forests Division has overhauled its forest inventory program to improve its capacity to inform planning and operations following recommendations made by an internal Forest Inventory Needs Assessment (2017-2019). As part of the 2020 initiation of the Enhanced Forest Inventory (EFI), forest biometrics were concurrently monitored with systematically located ground plots and wall-to-wall aerial lidar collection. The Division is analyzing the results of the EFI and integrating it with the legacy Stand Level Inventory (SLI) to provide continuity for the data needs of core business while transitioning to a new system. A timeline is outlined for the remaining EFI rollout and anticipated products.

Because carbon in aboveground woody biomass is a direct linear function of tree volume, data improvements in inventory will aid in upcoming Performance Measures related to carbon. Questions about trends in carbon storage in live trees were raised at the November 3, 2021 Board of Forestry meeting and addressed in a follow-up memo included in the minutes for the June 8, 2022 Board of Forestry meeting. There is a mismatch between recent carbon trends on State Forests measured by ground plots and those in externally developed remote-sensing products. The differences are presented as well as potential reasons for the disagreement.

BACKGROUND AND ANALYSIS

Enhanced Forest Inventory

The EFI will contain metrics collected using different methodologies and different scales compared with those in the legacy SLI. Remotely sensed data including lidar and satellite imagery allow ODF to measure a comprehensive suite of forest inventory biometrics on every acre of State Forests land. These data provide reliable forest inventory estimates at the landscape scale and reasonable estimates at finer operational scales. The final products resulting from this effort will include overall estimates of current standing inventory across the ownership; local calibration for growth modeling, mortality functions, and yield table development; and an evaluation of statistical confidence for the inventory estimates. Furthermore, a series of core stand metrics (board volume, quadratic mean diameter, tree species composition, canopy closure, etc.) will be mapped across the ownership and summarized at multiple scales (e.g. management units, watersheds). The

Inventory Program is currently exploring the feasibility and reliability of predicting secondary biometrics such as snags and coarse woody debris using remotely-sensed data. The Inventory Program expects this suite of wall-to-wall inventory products to meet all of the Division’s forest inventory needs for the purposes of strategic long-range landscape planning, including Forest Management Plans, Habitat Conservation Plans, and 10-Year Implementation Plans, as well as providing a robust basis for monitoring.

The wall-to-wall inventory is only one component of the forest inventory system, which also includes ground sampling, information management, decision support, adaptive management, and reporting (Figure 1). While lidar acquisition and ground plots in 2020 have been analyzed, there are many steps to make the EFI operational in the next year. This summer, the State Forest Division is sampling a network of 90 supplemental plots designed to improve the wall-to-wall model predictions. In addition, the Inventory Program is sampling stands delineated in the current revision of SLI this year to validate the EFI model accuracy and directly compare the legacy inventory with the nascent EFI. These results will be analyzed in winter 2022 so that the EFI can be used in the spring 2023 Implementation Plan development under the proposed Forest Management Plan.

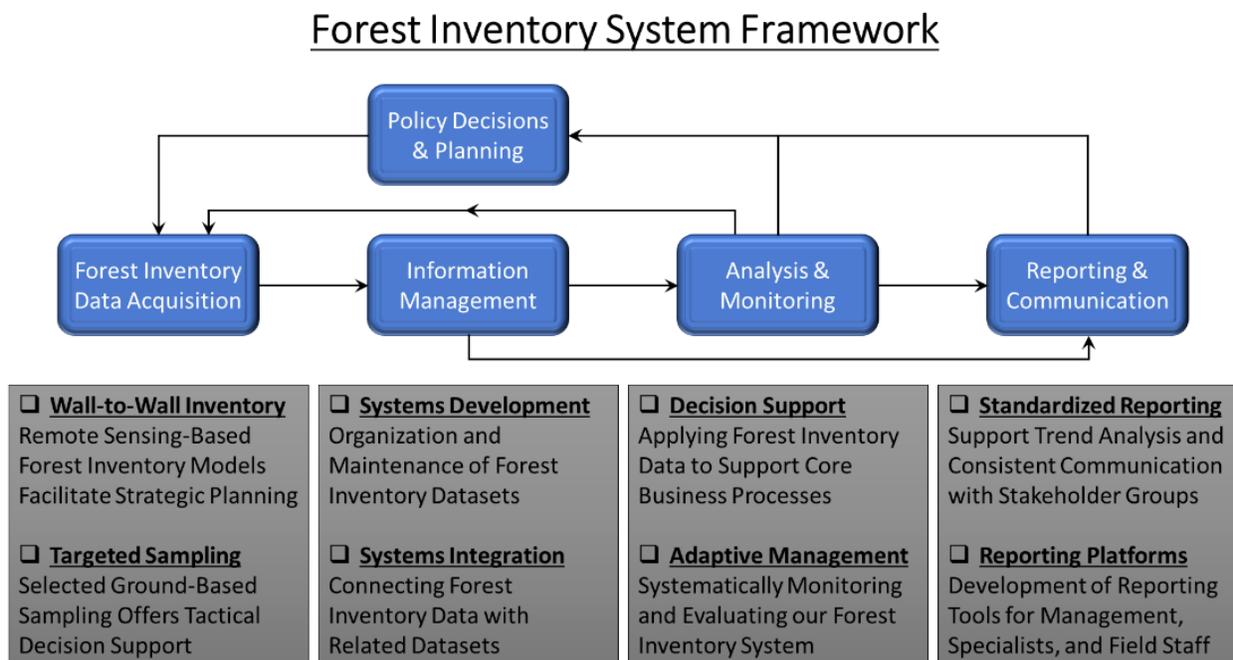


Figure 1: Framework developed by Forest Inventory Needs Assessment (2017-2019) showing how the State Forests Inventory Program interacts with other business needs and areas in which improvements are being made.

While a core concern is increasing the accuracy of the inventory, acknowledging its uncertainty appropriately will improve decision making that depends on inventory models. The preliminary lidar-based estimates for volume (Figure 2) have a prediction uncertainty associated with each 20x20-meter pixel, which is a resolution selected to match the ground monitoring plots. Staff are

currently working to translate these results into estimates with confidence intervals for different spatial scales (e.g., stands, watersheds, districts). Uncertainty in the estimates is comprised of two types of statistical “error,” or the difference between the predicted estimates and the observed values. Both the variability in ground measurements and variability in the model predictions are quantified to project the upper and lower bounds of the true value, whereas the legacy inventory relied on single estimates. It is critical that uncertainty in the inventory be quantified and acknowledged in planning and performance measures. For example, inventory scenarios higher and lower than the mean estimates could give alternative better- and worse-case harvest model results that could inform decision making by testing how sensitive harvest targets are to inventory uncertainty.

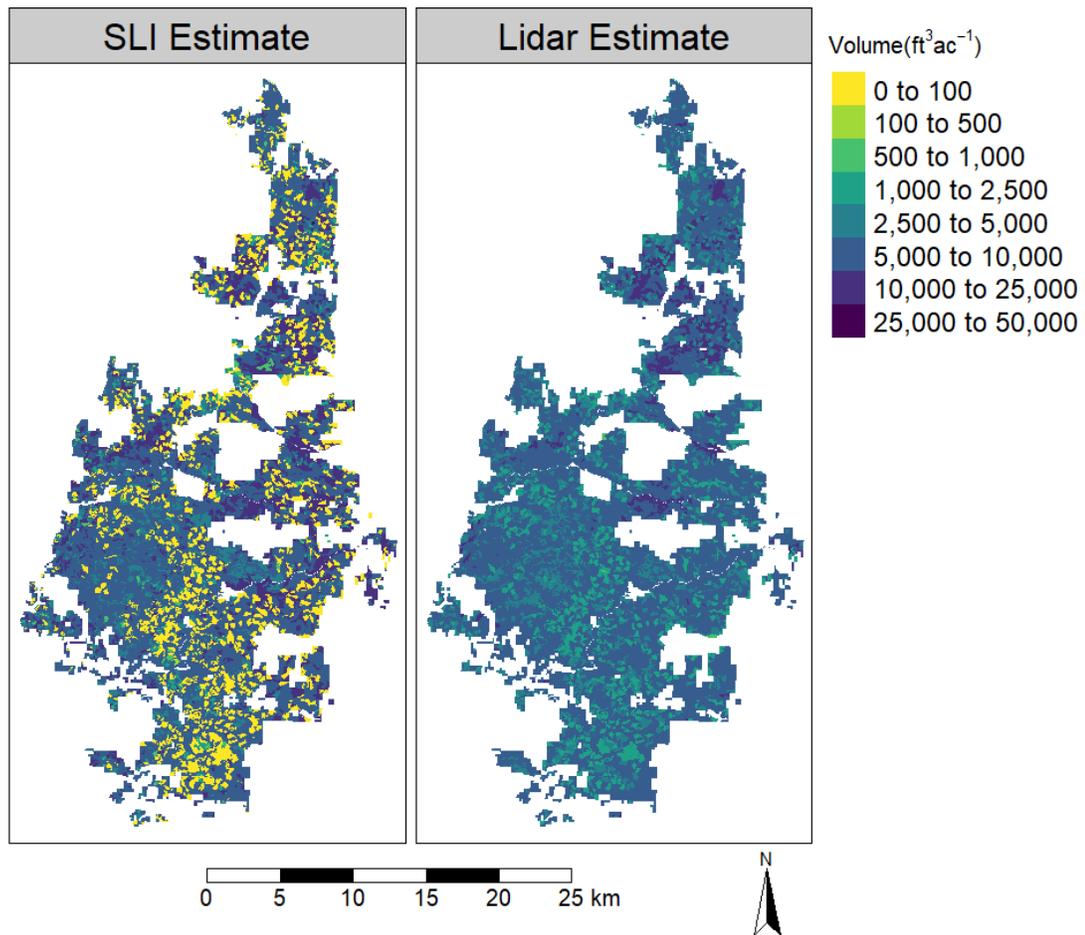


Figure 2: Spatial comparison of aboveground live tree volume (cubic feet per acre) estimated by stand in the legacy SLI (left) or with a lidar-based model in the new EFI (right). The mapped area covers most of the three North Coast districts. Note that SLI assigned clearcut stands a value of zero for years after harvest regardless of unharvested buffers or leave trees, while lidar-based models account for these.

Carbon trends

Division staff have analyzed multiple monitoring data sources and engaged outside experts to improve our understanding of inventory status and trends for both future harvest planning and carbon storage metrics. We present comparisons across datasets and analyze key questions about aboveground live tree carbon trends on State Forests.

Ground data: Forest Inventory and Analysis

The ground-truthing dataset comes from the Forest Inventory and Analysis (FIA) program, the USDA Forest Service's national forest inventory. The FIA "base grid" includes 124 permanent plots measured on a 10-year rotation since 2001 on ODF-managed lands. Volume can be measured as a 10-year stock (average of all plots sampled once) or as an increment/flux (average change in volume on plots remeasured 10 years apart). These data allow for estimates over large areas with a systematic sample. However, the 10-year sampling rotation makes it slow to detect changes in trends. For its EFI, State Forests contracted with the Forest Service to densify the plot network on ODF-managed lands, with 306 additional permanent plots measured in 2020 that will subsequently be added to the 10-year rotation. The densified FIA grid will reduce uncertainty in the estimates of aboveground live tree carbon on State Forests as the grid is remeasured.

The *Oregon Forest Ecosystem Carbon Inventory Report: 2001-2016* (FECIR) completed in 2019, for which the Board received an update at the June 8, 2022 meeting, uses the FIA base grid as its data for calculating carbon flux, or the change in carbon pools when plots are remeasured after 10 years. In the Coast Range, the reported change in aboveground live tree carbon was indistinguishable from zero on aggregated State and Local lands. For that report, ODF-managed lands were not analyzed separately. Here, we used FIA data through 2019 to give estimates of carbon stocks and carbon flux based on ground data on ODF-managed lands.

The FIA program evaluates its sample compared to the total forested landscape and adjusts the weighting of each site in a manner that makes 10-year stock estimates more accurate ("post-stratification"). Using the available post-stratified 10-year stock estimates, the FIA base grid estimates increasing carbon between 2010 and 2019 on Federal, ODF-managed land, and private forests in the Oregon Coast Range (Figure 3).

FIA 10-year stocks of aboveground live tree carbon in the Oregon Coast Range

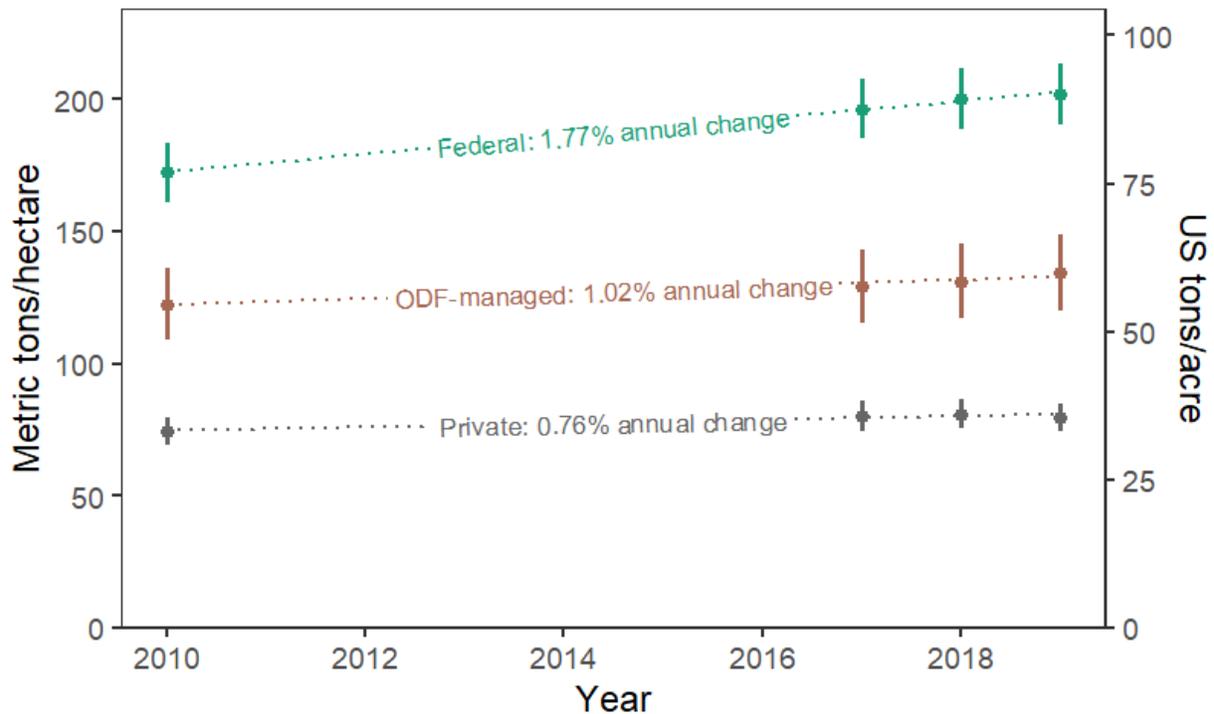


Figure 3: 10-year stocks estimated with 95% confidence intervals using the “Temporally Indifferent” estimator to match eVALIDator results using the *rFIA* R package (Stanke et al. 2020) with public FIA data within the Oregon Coast Range. We filtered the State/Local ownership to include only plots on ODF-managed lands. Annotated changes in aboveground carbon in live woody biomass represent the annual rate of change in the FIA estimate between 2010 and 2019.

Carbon flux from remeasured FIA base grid plots also is generally increasing as estimated by the Periodic Annual Increment (Figure 4). There is substantial variability between FIA plots due to management, stand age, and forest composition, which we summarize as an estimate for each district across plots. The estimates of Periodic Annual Increment are more precise on districts with more ground measurements.

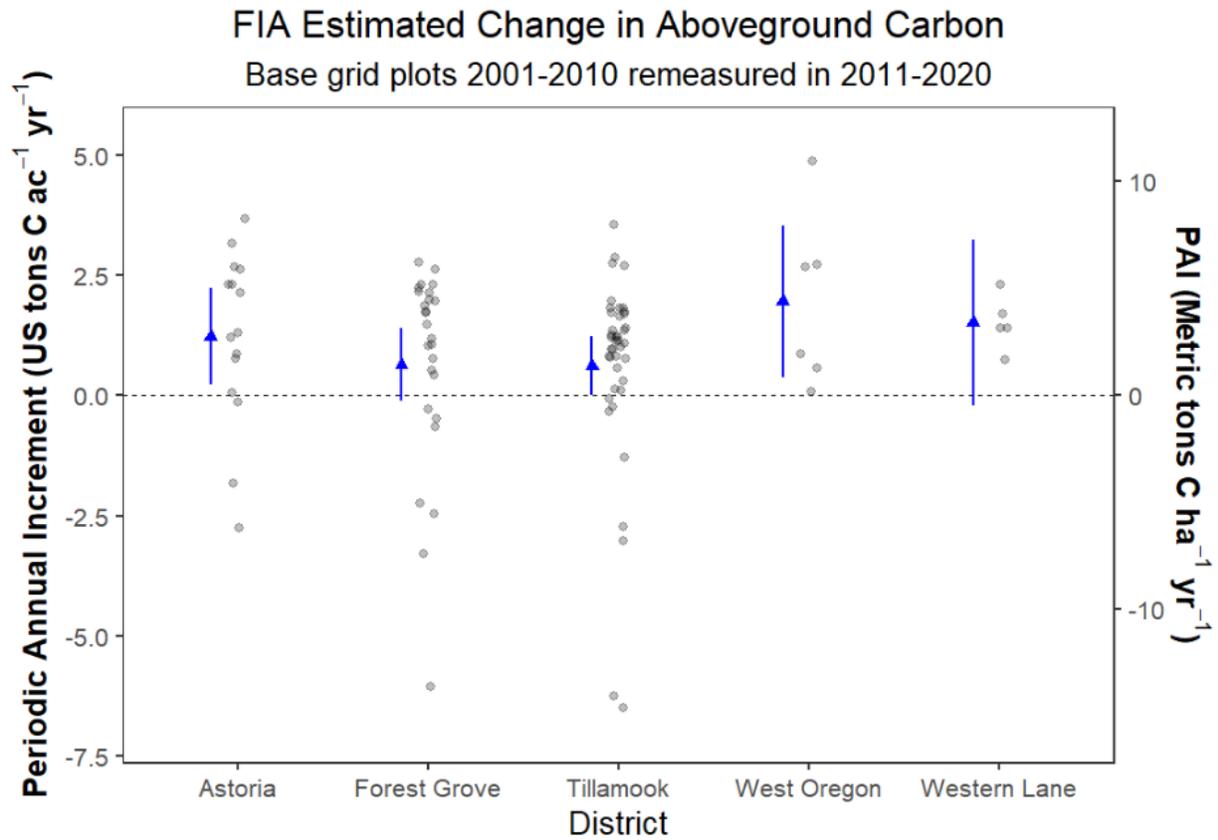


Figure 4: Remeasured FIA base grid plots show increasing carbon. Blue triangles and lines show the mean Periodic Annual Increments and 95% confidence intervals in live tree aboveground carbon estimated by district. Gray data points show the carbon flux over 10 years at each plot.

Remote sensing products

Three published datasets (Table 1) use the FIA network as training data for models of forest biometrics predicted with 30x30-meter resolution Landsat imagery. The Landsat program measures multiple spectra of visible and infrared light across the Earth at 16-day intervals. Models based on this satellite imagery can make wall-to-wall predictions across the landscape and enable rapid detection of temporal changes. While not as precise or accurate as lidar, these products use the decades of Landsat imagery for long-term model predictions of past forest change. However, they are generally better at detecting large disturbances such as clearcuts and may not adequately track growth in aboveground carbon after canopy closure.

Table 1: Remote-sensing data products with biomass models.

Product abbreviation (Years modeled)	Reference <Data URL>
LEMMA (1986-2017)	Landscape Ecology Modeling, Mapping, and Analysis (LEMMA) Team. 2020. Gradient Nearest Neighbor (GNN) raster dataset (version 2020.01). Modeled forest vegetation data using direct gradient analysis and nearest neighbor imputation. < https://lemma.forestry.oregonstate.edu/data >
eMapR (1990-2017)	Kennedy, R. E., J. Ohmann, M. Gregory, H. Roberts, Z. Yang, D. M. Bell, V. Kane, M. J. Hughes, W. B. Cohen, S. Powell, N. Neeti, T. Larrue, S. Hooper, J. Kane, D. L. Miller, J. Perkins, J. Braaten, and R. Seidl. 2018. An empirical, integrated forest biomass monitoring system. Environmental Research Letters 13:025004. < http://emapr.ceoas.oregonstate.edu/pages/data/viz/index.html >
CMS (2000-2016)	Hudak, A. T., P. A. Fekety, V. R. Kane, R. E. Kennedy, S. K. Filippelli, M. J. Falkowski, W. T. Tinkham, A. M. S. Smith, N. L. Crookston, G. M. Domke, M. V. Corrao, B. C. Bright, D. J. Churchill, P. J. Gould, R. J. McGaughey, J. T. Kane, and J. Dong. 2020. A carbon monitoring system for mapping regional, annual aboveground biomass across the northwestern USA. Environ. Res. Lett.:18. < https://doi.org/10.3334/ORNLDAAAC/1719 >

At the November 3, 2021 Board meeting, only LEMMA data were presented. Here, we compare trends across the three products by ownership, which show differences even though all are based on the same ground data (Figure 5). Different magnitudes of carbon estimated is in part due to choices of which land is mapped as forest or non-forest. One product (eMapR) notably includes more marginal forestland in its mapped estimates, which lowers its mean estimate compared to the other two products.

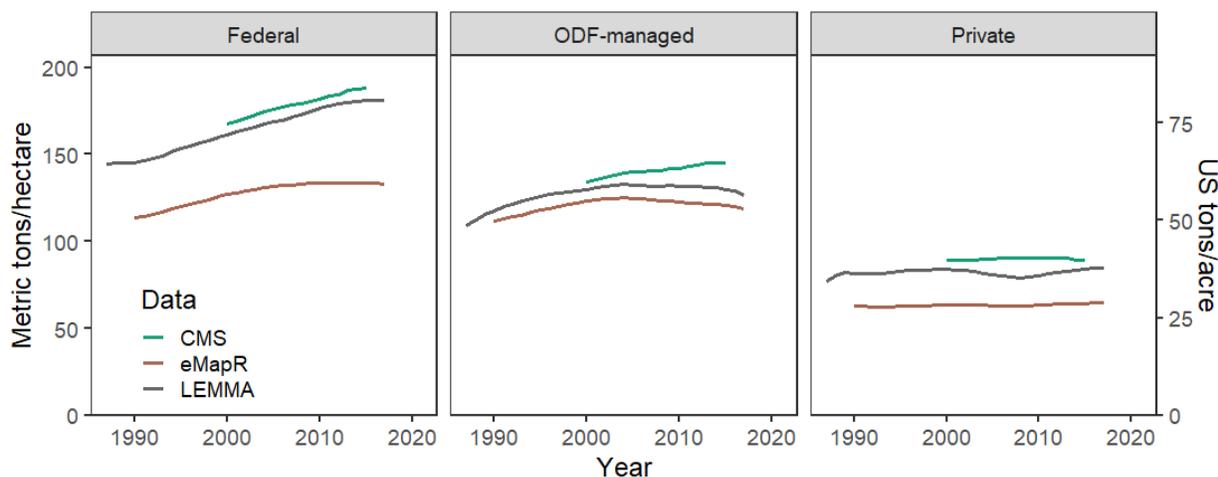


Figure 5: Remote-sensing estimates of average aboveground live tree carbon over time in the Oregon Coast Range by forest land ownership. The three remote-sensing products are detailed in Table 1.

One shortcoming in the November 3, 2021 Board of Forestry presentation was not showing uncertainty in the modeled estimates. With gridded products, an approach called small area estimation can account for the variability in the model predictions within a designated area,

although it does not account for potential bias in the model itself (Bell et al. 2022). The LEMMA data reevaluated using small area estimation show that the trend presented in November underestimated the recent carbon estimates but fell within the 95% confidence intervals of the annual estimates (Figure 6).

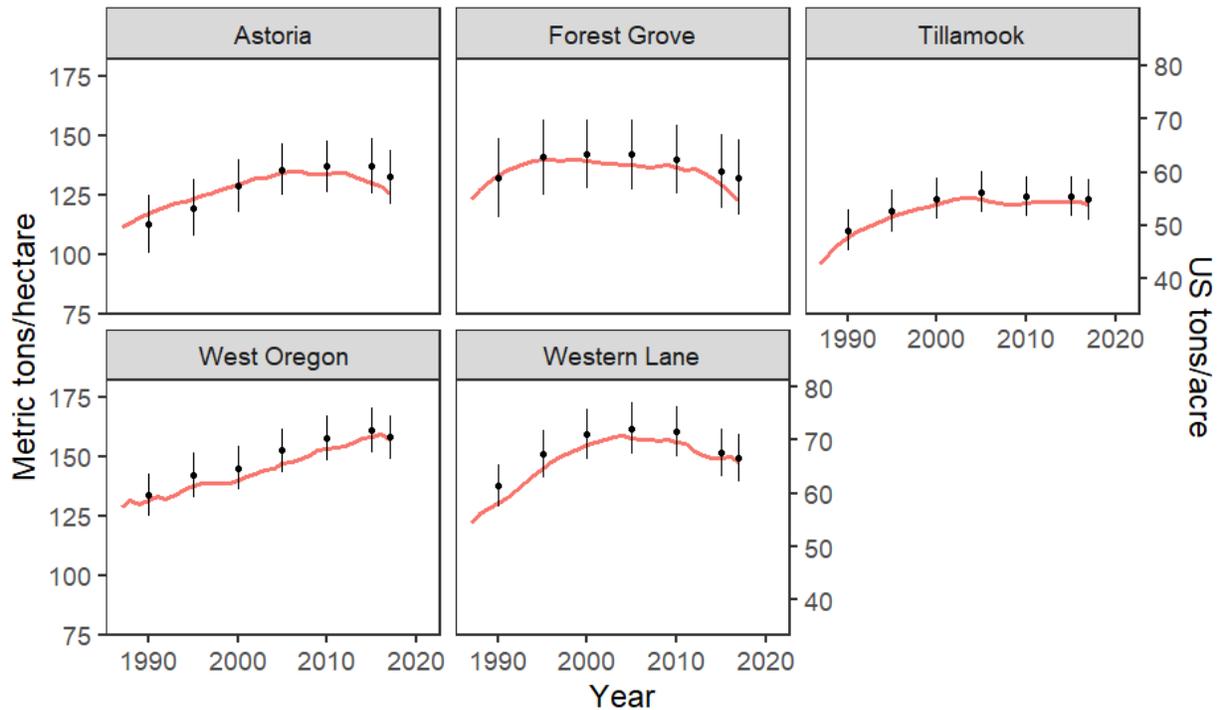


Figure 6: Small area estimation of live tree aboveground carbon by ODF District (black dots with 95% confidence intervals) and trend of LEMMA data averaged by year and district (red line). Note that the y-axis starts at 75 metric tons/hectare to highlight the differences between the trend and the confidence intervals of annual estimates.

Comparing FIA and remote-sensing products

The difference between the steady growth in carbon estimated by FIA and the apparent plateau or downturn presented by remote-sensing products warrants further analysis. Across datasets, it is apparent that State Forests fall between Federal lands and private lands in live tree carbon storage per unit area (Figure 7). Trends estimated by remote-sensing products generally fall within the confidence intervals for FIA base grid estimates at the scale of ownership group in the Coast Range, with the LEMMA product most closely representing the ground data (Figure 7). The densified FIA plots starting in 2020 through the EFI reduce the uncertainty of carbon estimates, even as the point estimates between the base grid and densified grid differ because they sample different plots that vary by chance (Figures 7 and 8). For the three North Coast districts, the LEMMA estimates with confidence intervals for 2017, the latest year available, are within the confidence intervals for FIA base grid estimates in 2017 and within the confidence intervals for the FIA densified grid estimates in 2020 (Figure 8).

Oregon Coast Range live tree carbon trends from remote sensing and 10-year FIA stocks (black), FECIR (blue), and ODF Densified FIA (green)

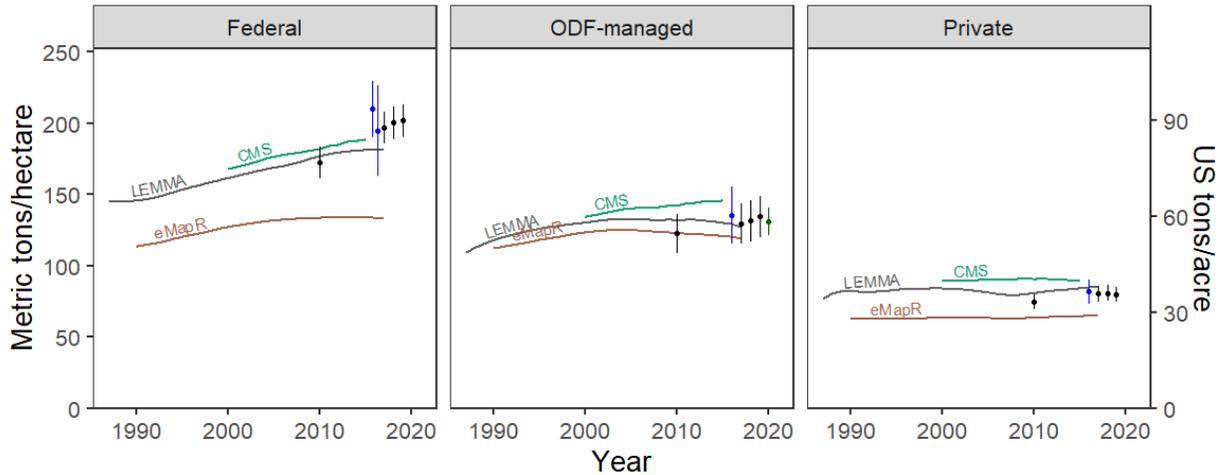


Figure 7: Comparison of aboveground live tree carbon from three remote-sensing products over time (labeled trend lines) and annual estimates with 95% confidence intervals from the FIA base grid (black for years 2010, 2017, 2018, 2019), Forest Ecosystem Carbon Inventory Report (blue for 2016, note the Federal land is divided into USFS and non-USFS estimates), and the FIA densified grid on ODF-managed lands (green for 2020 in center panel).

North Coast live tree carbon trends from LEMMA (blue), 10-year FIA stocks (black), and ODF Densified FIA (brown)

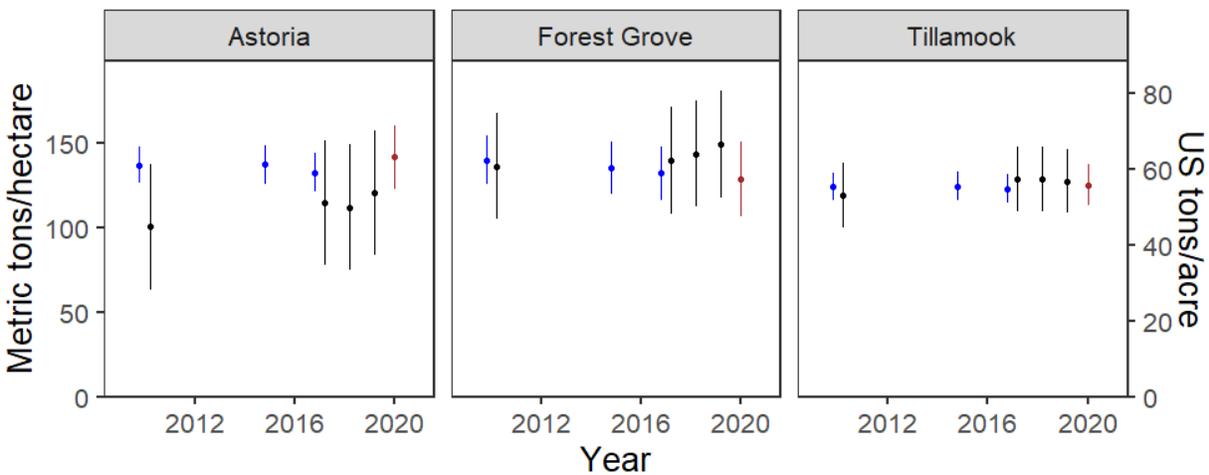


Figure 8: Comparison of aboveground live tree carbon estimates with 95% confidence intervals from the LEMMA product with small area estimation (blue for 2010, 2015, 2017), the FIA base grid (black for years 2010, 2017, 2018, 2019), and the FIA densified grid on ODF-managed lands (brown for 2020). The three North Coast districts are displayed in the panels. Estimates from different data sources in the same year are offset on the graph to prevent overlap.

Reasons for trend disagreement between datasets

Carbon trends are comprised of gains through tree growth and losses through mortality, natural disturbances, and harvest. With input from expert reviewers, the two following tests were performed to identify likely reasons for why trends were not aligning.

1. Unrepresentative sampling of losses

If FIA monitoring were less frequently located in harvested areas by chance, then they would be biased towards more positive carbon trends than wall-to-wall monitoring that tracks disturbance across all areas. We compared GIS data for past harvest operations across districts and selected the FIA base grid and densified plots contained within stands that were either clearcut, thinned, or unmanaged over the last 20 years (N.B.: data quality and the year these data started being recorded varies by district in the 2000s).

Generally, the proportion of the district in clearcuts differs between the base grid, densified plots, and GIS records (Figure 9). In some districts, the increase in number of plots in the densified grid improved the representativeness of the sample to align better with GIS records (Astoria, West Oregon). In other districts, the ground plots are underestimating areas of management (Western Lane). Tillamook GIS records are not available until 2007, which is why GIS underestimates management areas compared to FIA (top right panel in Figure 9).

The impact of the sampling variability is difficult to quantify in a dynamic landscape but could explain part of the reason why the FIA base grid for 2019 and densified carbon estimates for 2020 vary (Figure 8). When all Coast Range districts are combined, the percent of area in clearcuts in GIS records (16.0%) is less than the percent of FIA plots within clearcuts (base 17.2%, densified 19.8%). This would suggest that FIA is not underestimating harvest by their sampling locations.

Forest Management Representation by GIS Records (2001-2020) and FIA base grid (2001-2020) and FIA densified grid (2020)

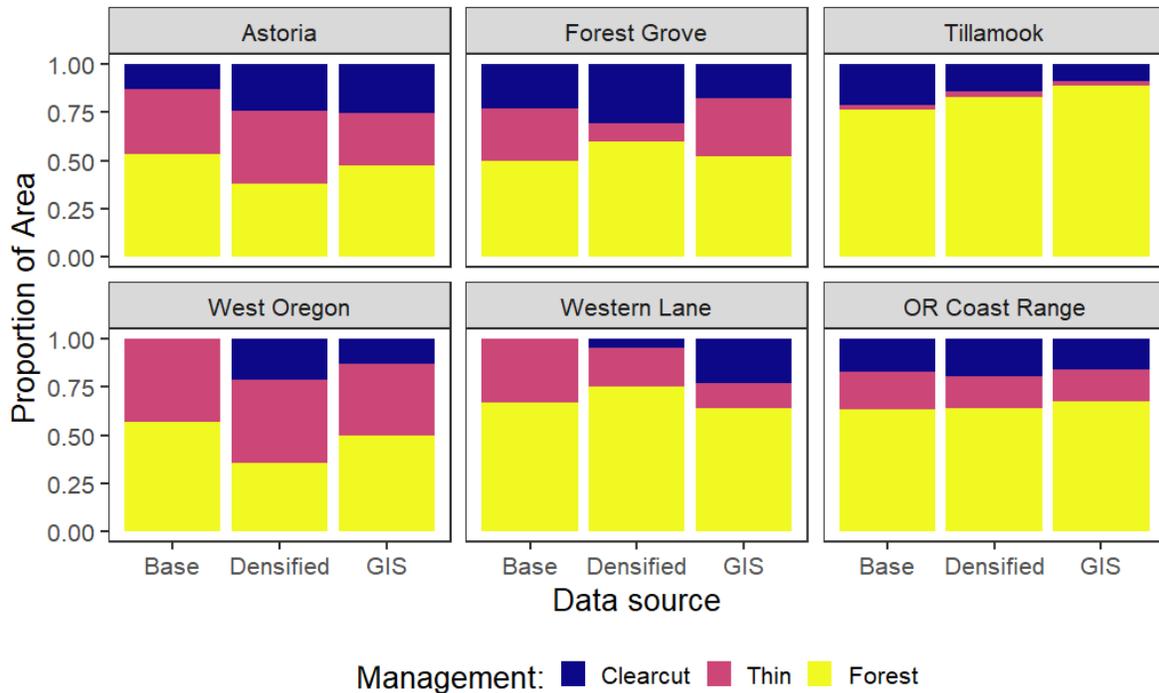


Figure 9: The proportion of district area with different management in the last 20 years represented by internal GIS records and FIA base grid and densified grid sampling. Management categories aggregate different types of management for simplicity (e.g., “Clearcut” includes modified clearcuts and salvage harvests and “Forest” includes no-harvest buffers within sale areas).

2. Remote-sensing imagery saturation minimizing growth

If remote-sensing products cannot track growth accurately once the canopy closes, then unmanaged areas would show greater growth in the FIA remeasurements than in the remote-sensing products. In an analysis similar to the Periodic Annual Increment (Figure 4), we calculated the 10-year change in LEMMA estimates (2007-2017) and FIA remeasured plots (2001-2020) within areas receiving no management according to internal GIS data. Growth estimated by LEMMA consistently underestimated growth compared with FIA mean growth estimates, although it was within the 95% confidence intervals of the FIA estimates (Figure 10). For the three North Coast districts, ground-measured growth was two to three times that of LEMMA modeled growth. It is likely that remote-sensing products systematically underestimate growth in mature forests and the total amount of carbon in larger biomass stands.

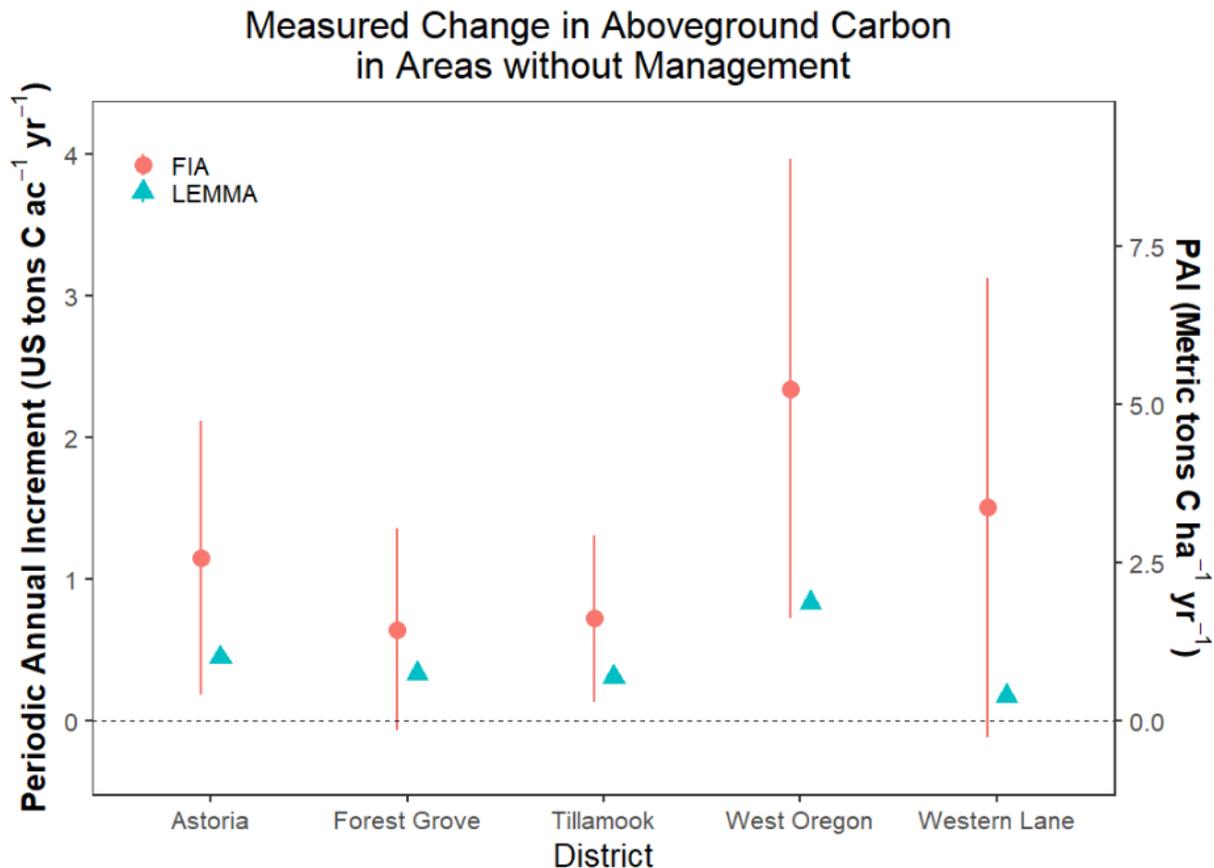


Figure 10: In areas without recent management, 10-year changes in LEMMA carbon estimates (blue triangles) underestimate the FIA plot estimates for re-measured plots (red circles and 95% confidence intervals) by district.

Underestimating high-biomass stands is not a problem unique to LEMMA. The remote sensing literature documents radiometric saturation¹ of Landsat band 3, corresponding to the green region of the electromagnetic spectrum (530 – 590 nm), upon canopy closure. We demonstrate the effect of saturation by comparing carbon estimates at the stand level (mean 86 acres) from SLI cruises from 2014-2018 and the three remote-sensing products. If radiometric saturation were not a source of bias, then the predicted aboveground carbon from a remotely-sensed dataset should match those from SLI ground measurements (visualized as data points following the diagonal black line in Figure 11). However, these remotely-sensed products generally overestimate carbon in low-biomass stands and underestimate carbon in high-biomass stands (blue line in Figure 11). We have not analyzed how underestimation of aboveground carbon, in stands above approximately 50-60 US tons/acre, could change the reported historical carbon trends in remote-sensing products (Figures 5 and 6).

¹ Radiometric saturation occurs when a radiometric detection instruments' maximum measurable signal is exceeded by the input signal.

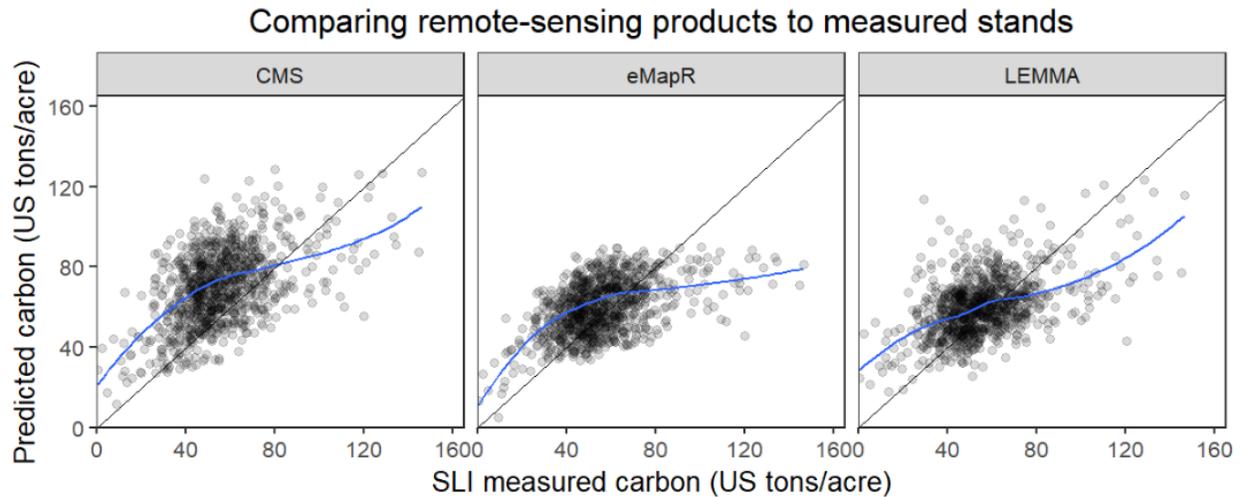


Figure 11: Three remote-sensing products overestimate carbon in low biomass stands and underestimate carbon in high biomass stands when compared to SLI ground measurements from the legacy inventory. Each data point is a stand measured between 2014-2018 (mean: 86 acres, range: 9-529 acres). Blue lines track the observed versus predicted carbon relationship with a locally weighted scatter plot smooth.

Carbon conclusions

Even though FIA monitoring and remote-sensing products have indicated different carbon trends, there is close alignment on the recent estimates of aboveground carbon on ODF-managed lands at the scale of management districts among LEMMA, base FIA, and densified FIA data (Figure 8). The differences among data sources for carbon estimates on ODF-managed lands are relatively minor compared to the differences noted across ownerships in the Coast Range (Figure 7). It is plausible that Landsat-based products do not adequately capture growth on higher-biomass stands, but we have not tested how this would shift carbon trends on ODF-managed lands compared to trends on other ownerships. External data sources will play an important role in verifying carbon trends reported by the EFI, especially as model products improve with technology such as spaceborne lidar. Rather than relying on a single data source for carbon or inventory trends, we will improve precision in estimates on ODF-managed lands by integrating the densified FIA monitoring with periodic lidar and other remote sensing products (“model-assisted estimation”). Ongoing work on the EFI ground data and modeling this year will improve our confidence in inventory data and will be used to forecast carbon and volume trends under different management scenarios.

RECOMMENDATIONS

Information only.

NEXT STEPS

The Inventory Program continues to integrate the EFI into Division needs and improve it through new ground monitoring, model development, and integration with external data sources. Volume and carbon status and trends will have improved estimates with quantified uncertainty once the EFI is fully operational. We have identified areas in which remotely-sensed biomass models align with FIA-based estimates and reasons why they may show different long-term trends. This analysis will inform Board-adopted Performance Measures for inventory or carbon and how to structure the reporting of Performance Measures with acceptable ranges and thresholds for action given their associated uncertainty.

STAFF REPORT

Agenda Item No.:	8
Work Plan:	State Forests
Topic:	State Forests Management
Presentation Title:	State Forests HCP Update: Draft HCP Public Comment Summary and Timeline Update
Date of Presentation:	September 7, 2022
Contact Information:	Mike Wilson, State Forests Division Chief (503) 945-7374 Michael.Wilson@odf.Oregon.gov Cindy Kolomechuk, HCP Project Lead (503) 502-5599 Cindy.Kolomechuk@Oregon.gov

CONTEXT

The Public Draft Habitat Conservation Plan (HCP) is a continuation of work at the direction of the Board to pursue programmatic solutions to Endangered Species Act (ESA) compliance and stability of harvest levels over a long-term planning horizon. The State Forests Division (Division) has had a Strategic Initiative for improvements to ESA compliance beginning in 2015, and the work to develop an HCP began in earnest with the application of a grant to support development of the HCP in March 2017. The Board directed the Division to move forward with the HCP project in November 2017. The Division has successfully implemented two programmatic ESA compliance approaches to-date.

- Safe Harbor Agreement for northern spotted owls on the Western Lane District associated with barred owl removal experiments, and
- Candidate Conservation Agreement with Assurances for Pacific fisher.

The HCP represents the largest effort yet, designed to provide long-term certainty associated with 17 species of fish and wildlife across all the lands that the Division manages west of the crest of the Cascades.

In October 2020, the Board of Forestry (Board) directed the Division to complete the National Environmental Policy Act (NEPA) process for a possible HCP for Western Oregon State Forests as a method to comply with the ESA, while allowing for operational certainty over a 70-year permit term. NOAA Fisheries – the NEPA Lead Agency – in coordination with the US Fish and Wildlife Service (USFWS) completed the first phase of the NEPA process (Public Scoping) in spring 2021. NOAA Fisheries and USFWS (Services) launched the second phase by publishing the Notice of Availability of the Draft Environmental Impact Statement (DEIS) and the Public Draft HCP in the *Federal Register*, dated March 18, 2022. It was anticipated that the NEPA process would be completed by March 2023 in order to comply with NOAA’s requirement to complete the NEPA process in two years. However, NOAA requested, and was granted, an extension to accommodate their internal review process (Attachment 1). This extension is solely for review of the Final Environmental Impact Statement (FEIS) based on the HCP as written, so any further modifications to the HCP would further extend the timeline.

The federal NEPA process and associated EIS (including any changes to the due to public comment or modifications to the HCP) are the responsibility of the federal agencies. ODF provides support in this process to help clarify current practices and the commitments in the HCP, and provide data requested by the federal agencies; however, ODF may not make changes to the EIS. As the applicant, ODF is responsible for producing an HCP that meets Greatest Permanent Value and has a high probability of meeting incidental take permit issuance criteria.

In May 2022, the Board held a special meeting to receive more information on the DEIS and work directly with the Services to get clarity on the intent, methodology, and outcomes of the analysis. The meeting also included a facilitated discussion between the Forest Trust Land Advisory Committee (FTLAC) and the Board of Forestry. The Division invited the public to provide written testimony to the Board of Forestry on this topic. Please note that this testimony is separate from the NEPA public comment process.

BACKGROUND AND ANALYSIS

The National Environmental Policy Act requires that federal agencies consider the potential effects of their actions on the human environment. The DEIS evaluates the broad environmental consequences of the Services' potential issuance of incidental take permits (ITPs) associated with the Western Oregon State Forests HCP. The permits, if issued, would authorize take of the covered species that may occur incidental to ODF's otherwise legal forest management activities. The DEIS presents effects of the proposed HCP and four alternatives on geology and soils, water resources, vegetation, fish and wildlife, air quality, aesthetics, recreation, cultural resources, Tribal resources, socioeconomics and environmental justice, and greenhouse gas emissions and carbon storage.

Public Comment Summary

The DEIS is a federal action that launched a 60-day public comment period (March 18 to May 17, 2022) for the DEIS and the Public Draft HCP. An extension to the comment period was requested and approved by the Services with a final deadline of June 1, 2022. A public hearing was held on April 6, 2022, to provide an overview of the HCP and the DEIS, and to receive public comment. All public comment on the DEIS and the Public Draft HCP was accepted on [NOAA Fisheries website](#) and is available for public viewing. The Services and the NEPA consulting team are responsible for responding to all public comment on the DEIS, which can come in the form of updates to the document itself as well as direct responses to the comments to be included in the FEIS.

The Services are also working with ODF to provide responses to public comment on the Public Draft HCP. The majority of comments stated that more detail was needed on components of the terrestrial and aquatic conservation actions, monitoring plans, and potential impacts from covered activities (Attachment 2; N.B.: the summary contains a sampling of only the most relevant comments). Comments also included landscape resiliency and potential impacts from climate change and wildfire. ODF is working with the Scoping Team to integrate more detailed language into the final draft HCP in response to these comments. The Final Draft HCP will also include more references linking conservation actions to the science, methodology, and data used to support them.

Some comments articulate the concern that harvest levels with an HCP would be significantly different than projected harvest levels associated with the current Forest Management Plan. We estimate the Draft HCP would result in an average harvest of 225 million board feet per year for 70 years. This is similar to ODF's current planned annual harvest objective overall for districts within the HCP permit area, although it will be distributed differently. This, coupled with the certainty in harvest levels over time ensures that State Forests will continue to provide the economic, social and conservation benefits articulated in GPV.

NEPA FEIS

The FEIS will include a description of the public review and comment period and a summary of updates between draft and FEIS. The Notice of Availability of the FEIS and final HCP will be published in the *Federal Register*. Publication launches a 30-day waiting period during which comments may be submitted on the FEIS. These comments will be reviewed by the Services, but no response is required. The agency decision document (Record of Decision or ROD) will be published after this 30-day period and prior to the permit decision. The Division will request Board direction to implement the HCP and Incidental Take Permits in September 2023.

The Division has worked collaboratively with the Services and State agencies (Department of Fish and Wildlife, Department of Environmental Quality, and Department of State Lands) for over five years to integrate a diversity of technical and policy expertise to develop the HCP conservation actions designed to protect covered species. In addition to this collaborative process, the Division has implemented a transparent and inclusive public engagement process to integrate a diversity of perspectives in the HCP. Because of this rigorous and inclusive process, the Division is confident that the HCP is a sound approach to ESA compliance, and provides an appropriate blend of the environmental, economic, and social outcomes articulated in the Greatest Permanent Value mandate. The HCP provides high-quality habitat and durable conservation commitments for the covered species and ensures operational certainty and stability for management activities over the 70-year permit term.

RECOMMENDATION

Information only.

NEXT STEPS

Over the next several months, the Division will:

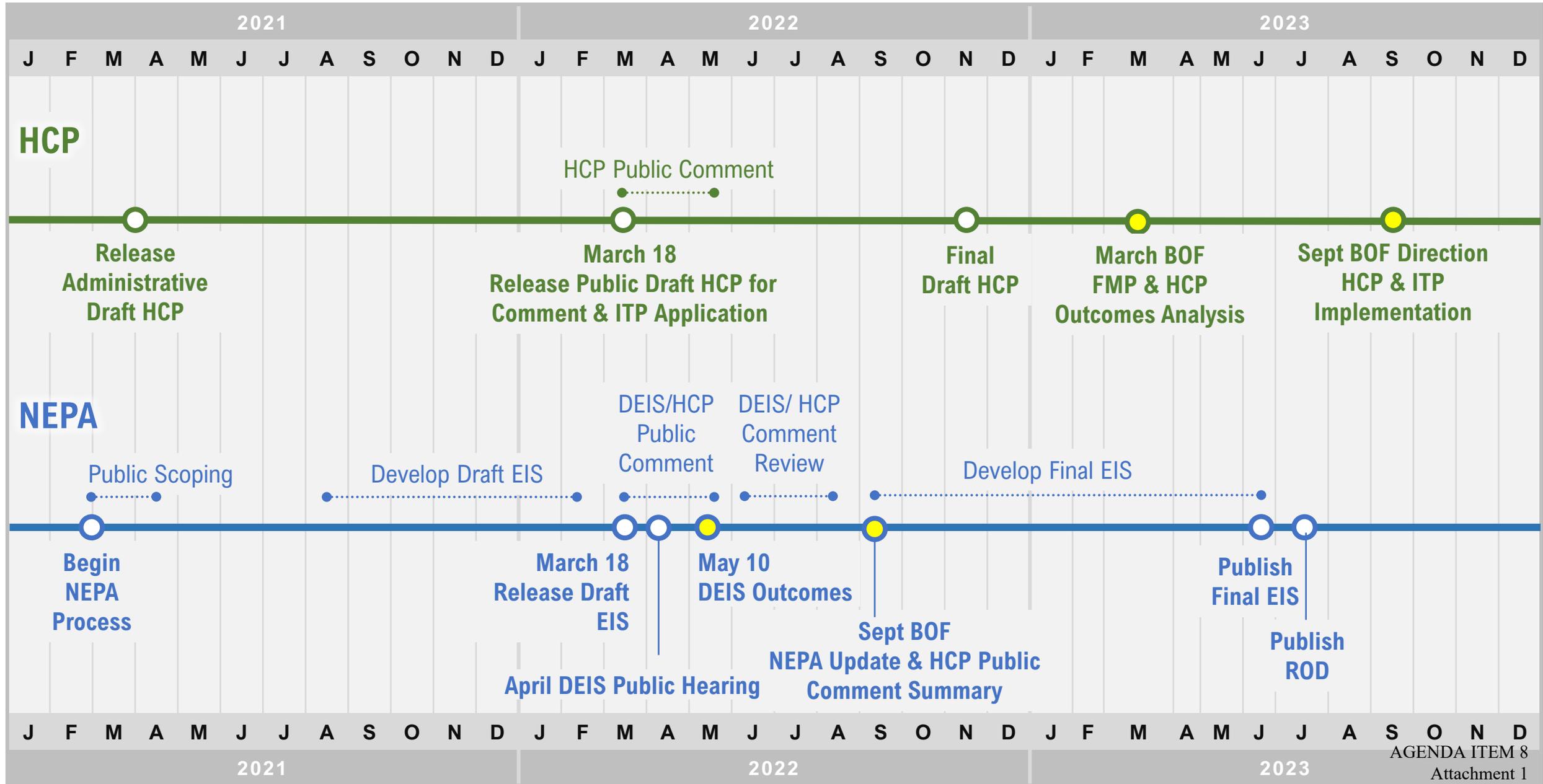
- Provide the Draft FMP and the anticipated modeled outcomes from FMP and HCP implementation to the Board in March 2023.
- Complete the NEPA process in July 2023.
- Receive Board direction on whether to implement the HCP and the terms of the Incidental Take Permits in September 2023.
- Continue engaging with our state and federal partner agencies, as well as, the county partners, Tribes, interested stakeholders and members of the public on the HCP and draft FMP and Implementation Plan development projects.

ATTACHMENTS

1. Working FMP – HCP – NEPA Timeline
2. Summary of HCP Public Comments

Working HCP – NEPA Timeline

● BOF Presentation / Decision



Western Oregon State Forests HCP Summary of Public Comments and Responses

Category	Comment	Response
Process	Input from local communities, cities, taxing districts, and counties was not adequately considered during HCP development.	During the development of the HCP, ODF hosted public informational meetings prior to each BOF meeting to provide an opportunity for the counties, Tribes, public, stakeholders, department staff, and consultants to share feedback, provide information regarding HCP development, and explore ideas for improvement. Follow-up meetings with these entities were also scheduled upon request to further discuss the information presented during the meetings open to the public and to provide more detail on the components of the HCP. See Appendix B, Stakeholder Engagement, for a summary of stakeholder and public engagement efforts, including the stakeholder and public engagement approach, goals, and activities.
Process	Comments stated that the permit term was too long due to the number of uncertainties, including climate change.	As described on page 1-7 of the Public Draft HCP, the 70-year term was selected to allow enough time to achieve habitat commitments, while having confidence in the modeled data to support projected habitat and harvest outcomes. Seventy years also provides certainty in our harvest levels and stability for local economies. Chapter 6, Monitoring and Adaptive Management, is being updated to provide greater detail describing how the permittee will work with the Services to respond to new information or changing conditions.
Process	Comments included questions about the rationale used to select covered species for inclusion in the HCP.	The Scoping Team used species selection criteria that included the likelihood of species listing, range of the species on State Forests, and data adequate to support conservation actions, as described on page 1-8 of the Public Draft HCP.
Content	Comments included questions regarding RCAs, including allowed management activities, adequacy of proposed conservation strategy to avoid potential temperature increases, and alignment with the Private Forest Accord (PFA).	No harvest or thinning will occur within the RCAs (Public Draft HCP, page 4-36). An analysis of scientific literature that supports the RCA buffer widths is included in Appendix E 'Riparian Conservation Area and Temperature Protection'. Chapter 7, Section 7.3.3, includes measures that will be implemented in response to stream temperature changes to maintain habitat quality for the covered species. The PFA legislation recognizes that non-federal lands that have their own HCP are exempt from the PFA standards.
Content	Some comments requested additional information regarding how existing northern spotted owl and marbled murrelet habitat will be protected and effects mitigated, including barred owl management. Other comments requested that surveys be conducted to ensure all suitable habitat is included in HCAs.	Clarifying language has been added to Chapter 4 to better articulate barred owl management commitments. As described in Chapter 5 of the Public Draft HCP, take was avoided and minimized by assigning the best contiguous habitat to protections within HCAs. The HCP is intended to obtain incidental take authorization under ESA, and some take was allowed for northern spotted owl, marbled murrelet, and other terrestrial species, where such take was deemed appropriate and practicable for achieving the greatest permanent value of state forest lands.
Content	Comments requested that pre-disturbance surveys be added to the HCP to document red tree vole distribution and habitat occupancy. Information was inadequate to quantify effects to red tree voles from habitat fragmentation.	Chapter 4 describes HCP commitments (Conservation Action 6: <i>Establish Habitat Conservation Areas</i> and Conservation Action 7: <i>Manage Habitat Conservation Areas</i>) that are projected to result in habitat growth and improvement that will outpace losses, with total habitat increasing over time (Public Draft HCP page 5-93). As described on page 6-38 of the Public Draft HCP, red tree vole impacts will be identified and tracked during HCP implementation primarily through established habitat suitability modeling and associated LiDAR and stand data. Habitat Validation Monitoring will not occur until later in the permit term – beginning in year 20 -- to assess red tree vole nesting activity in the permit area.
Content	Comments included concerns about the extent of future road networks and recreation infrastructure and associated maintenance costs.	ODF has worked with the Scoping Team to better characterize future road and recreation trail development over the course of the permit term. Chapter 3 of the Final HCP will include updated values for the average miles of roads and trails to be constructed over the course of the permit term. The miles of roads decreased from 25.5 to 19.5 miles. The scope of funding considerations in an HCP is limited to assurances required for HCPs and associated incidental take permits. Funding assurances for the HCP is addressed in Public Draft HCP, Section 9.4.2, Funding Assurances
Content	Comments included concerns regarding wildfire and whether the HCP adequately addresses the future fire environment within the permit area.	Chapter 7.3.3.2 addresses wildfire as a changed circumstance and on how the HCP will be responsive to that could occur over the permit term.
Outcomes	Comments included concerns about significant reduction in harvest levels and associated economic impacts to local communities, as well as ODF's fiscal capabilities to implement the HCP.	The HCP is intended to improve operational certainty and associated economic outcomes over time. We estimate the Draft HCP would result in an average harvest of 225 million board feet per year for 70 years. This is similar to ODF's current planned annual harvest objective overall for districts within the HCP permit area, although it will be distributed differently.
Outcomes	Comments included requests to add carbon sequestration and storage to the Climate Change and Carbon plan for added protections to listed species and HCA and RCAs.	The HCP is a Section 10 process to address compliance with the ESA. Carbon sequestration and storage may occur as a result of HCP implementation. Carbon sequestration and storage are included as part of the Forest Management Plan.

Agenda Item No.:	9
Work Plan:	Overarching and Emerging Issues
Topic:	Forest Carbon Implementation and Policy Discussion
Date of Presentation:	September 7, 2022
Contact Information:	Ryan Gordon, Planning Branch Director 503-945-7393, Ryan.P.Gordon@odf.oregon.gov John Tokarczyk, Resources Planning 503-745-7414, John.A.Tokarczyk@odf.oregon.gov Danny Norlander, Forestry Climate, Carbon, and Health Analyst 503-508-3797, danny.norlander@odf.oregon.gov

SUMMARY

The purpose of this agenda item is to provide the Board of Forestry (Board) with information about national and regional interests related to forest carbon and its applicability for natural climate solutions. Outside speakers will be presenting and conversing with the board about forest carbon through various lenses. This is an information item.

Board Closing Comments and Meeting Wrap Up