ESTERSON Sarah * ODOE

From: Sarah.ESTERSON@energy.oregon.gov
Subject: Contested Case Requests Submitted on behalf of Stop B2H, public interest and myself as an individual
Attachments: Contested Case Request Document Inforation Required for all Requests.pdf; Attachment I CURRENT Bond Contested Case Request w_Matt edits.pdf; Contested Case 3 Failure to provide opportunity to comment on site certificate changes from original order two.pdf; Exhibits 2 3 4 5 7 for notice.pdf; Bond Documentation Merged.pdf

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From: Irene Gilbert <ott.irene@frontier.com>
Sent: Friday, September 8, 2023 2:49 PM
To: TARDAEWETHER Kellen * ODOE <kellen.tardaewether@energy.oregon.gov>; CORNETT Todd * ODOE <todd.cornett@oregon.gov>
Cc: Fuji Kreider <fkreider@campblackdog.org>; Jim Kreider <jkreider@campblackdog.org>; Lois Barry <loisbarry31@gmail.com>; Charlie Gillis <charlie@gillis-law.com>; Matt Cooper <mcooperpiano@gmail.com>
Subject: Contested Case Requests Submitted on behalf of Stop B2H, public interest and myself as an individual

Please accept the attached documents in support of two contested cases: I did not merge all the Exhibits since they are not required to submit these requests. They will be provided during the formal Contested Case Process.

1. The first attached document contains the general information required for all three contested cases included here.
2, The second document is the request for contested case on the Bond amount. being submitted on behalf of Stop B2H, the public interest and me as an individual.
3. The third document iis the request for Contested Case on the issue of failure to inform the public. (Stop B2H did not comment on this issue, so it is only provided under the public interest and Irene Gilbert)
4. The fourth document is exhibits supporting the lack of informing public of opportunity to participate. The file lacks the Original notice of the public Comment on the Draft Proposed Order and site Certificate.. The EFSC web page no longer will allow me to access the Notice of opportunity to comment on the Draft Proposed Oder and Site Certificate. This dcument will be made available during the contested case process. (Stop B2H did not comment on this issue, so it is only provided under the public interest and Irene Gilbert)
5. The fifth document contains Exhibits related to the Bond Contested Case.

I will submit an additional Contested Case Request in another email to keep the issues and documentation separate.

ATTACHMENT ONE: CONTESTED CASE REQUEST REGARDING BOND ALONG WITH DOCUMENTATION SUPPORTING THE STATEMENTS AND NEED FOR THIS CONTESTED CASE REQUEST

The general information required to request a contested case is contained in the document entitled: "Requests for Contested Cases on Amendment I, B2H Transmission Line Site Certificate". This Document is referenced in this submission as Attachment I.

THE BOND AMOUNT AND FLEXIBILITY CURRENTLY INCLUDED FAILS TO PROVIDE FOR THE PROTECTION OF LANDOWNERS, CITIZENS AND PUBLIC AGENCIES FROM BEING REQUIRED TO ASSUME THE COSTS OF SITE RESTORATION IN THE EVENT THE DEVELOPER ABANDONS THE TRANSMISSION LINE, REFUSES TO DO SO, DECLAIRS BANKRUPTCY OR FOR SOME OTHER REASON FAILS TO RESTORE THE SITE.

The analysis of the bond amount contained in the original Site Certificate is no longer relevant due to the following:

--It can now be documented that PacifiCorp is the primary owner of the transmission line and will be able to control decisions during construction and operation of the transmission line.

--Previous decisions by EFSC did not include consideration of all risk factors which increase the likelihood that the bond will have to be drawn on, but which can now be documented.

For example:

A finding that the risk of having to draw on the bond is nearly zero is not consistent with documentation showing previous liability for wildfires and monitory awards which could result in the developer declaring bankruptcy.

The Bond amount is not consistent with the plain language of the Administrative Rules, past practices or practices after the Original Site Certificate for B2H was issued. (Exhibit 19, page 2 lists the Site Certificates under EFSC as of April 1, 2021 and documents that all are being required to provide a bond or letter of credit)

Adjusting the bond amount will not protect utility customers, Oregon citizens or government agencies from the risk of having to restore the site. (Exhibit 19, Surity Bond Template Update, Page 1 Background states the intent of OAR 345-025-0006(8) is to "provide assurance that the people of Oregon will not be burdened with the costs of restoring the site…", Site Certificate Condition 5 requiring that the developer report information every five years or as requested by council does not provide information regarding unforeseen or unreported events which by their nature EFSC will be unaware of and thus does not provide the assurance required by OAR 345-025-0006(8).

Idaho Power's Response to Comments indicating that they could obtain a bond for the amount required to restore the site does not address the issue which is that they must be required to obtain a bond or letter of credit for the cost of site restoration. It also does not document that they will have funding available to restore the site should that be required. (Exhibit 17, Page 16),

There is no documentation that the developer has the insurance they claim to have which would protect the electric users, citizens, and agencies from having to pay for site restoration. Documented in Item 16 of this document.

(c) Description of why the council should find that the requestor properly raised each issue, as described in section (7) of OAR 345-027-0371, including a specific reference to the person's prior comments to demonstrate that the person raised the specific issue or issues on the record of the public hearing:

This issue was raised in the written comments submitted by STOP B2H on July 18, Pages 9-11, which is included here as reference supporting the need for this contested case. Also, Idaho Power's Responses to Comments on the Draft Proposed Order for Request for Amendment #1, July 19, 2023 responds to both STOP B2H as well as my additional comments regarding the need for this contested case. Comments I submitted personally and comments submitted under STOP B2H regarding this topic demonstrate that I raised this issue. I drafted the B2H comments references above. Idaho Power provided responses to both the STOP B2H submission and my personal comments in Exhibit 17, Pages 16 and 17 supporting the fact that the comments met the requirements for specificity.

(d) Statement that describes why the Council should determine that this issue justifies a contested case due to raising a significant issue of fact or law that is reasonably likely to affect their determination that the facility, meets the applicable laws and Council standards:

OAR 345-027-0375 requires a full review of the requirements of the bond requirements under OAR 345- 022-0050 including whether the bond is adequate to "restore the site." The council must determine whether there is a risk to those being protected by the bond from having to pay for site restoration. The record of the parties with ownership of the transmission line will impact any decision regarding whether there is a risk of future bankruptcy or financial impacts that could result in a

failure to retore the site in addition to the risks associated with unforeseen, unpredictable or unreported future events.

This contested case is in regards to the fact that Council failed to follow the plain language of their rule which does not state the Council will determine the amount of the bond. It says the Council will approve a bond in an amount necessary to restore the site. The Amendment 1 site certificate failed to consistently apply the rule; failed to require documentation regarding compliance with the rule by simply accepting the applicant's statements; failed to provide mitigation to address risks associated with the changes they allowed; and failed to assure that the public would be provided protection required by the rule to assure they will not be required to pay for site restoration. This issue requires a change to Site Certificate Conditions regarding Site Restoration Requirements in order to support a finding that the development complies with EFSC standards.

(e) A statement of the reasons why others who commented on the record of the public hearing cannot adequately represent the interest identified in this section.'

I am making this request on behalf of STOP B2H, the public interest and myself as an individual citizen. No one else is bringing forward this issue.

(f) This request raises a significant issue of fact and law that is reasonably likely to affect the Council's determination regarding whether the facility meets the applicable laws and council standards identified in the remainder of this document. Following is a list of Rules, Statutes and Documents supporting the need for this contested case due to the failure of the Site Certificate for Amendment I to document facts in support of a finding that the Site Certificate shows the developer to be in compliance with council standards.

Rules and Statutes Supporting this Request for a Contested Case:

OAR 345-021-0010 (l)(w)

OAR 345-022-0050 council to determine the cost of restoring the Site

OAR 345-025-0006(8)

OAR 345-025-0006(16) allows Council to draw on bond to restore site.

OAR 345-027-0351(5) The council must review all proposed changes through the process with the more procedural steps applicable to any one of the proposed changes.

OAR 345-027-0375: Requires a full review of bond amount.

469.401 (1) The duration of the site certificate or amended site certificate shall be the life of the facility.

Other Documentation and references cited:

Recording from Day 3, 2023 Council meeting, Tape 4.

Exhibit 1: (First Amended Site Certificate OPR-RT-01,September 2023)

Exhibit 2: "Jury finds PacifiCorp at fault for Santiam Canyon, labor Day Fires" by Zach Urness, Salem Statesman Journal, June 12, 2023,

Exhibit 3: PacifiCorp -2023 IRP

Exhibit 4: "Pacific Power potentially wants its customers to pay $90 million in wildfire liability," Ryan Haas, June 16, 2023)

(Exhibit 5" "US Attorney's Office Dist of Or., Pacificorp to pay $3.4

Million in Civil Settlement for Ramsey Canyon Fire (June 9, 2020))

Exhibit 6: Stop B2H Coalition, McAllister, Gilbert v. Oregon Dept. of Energy, Oregon Facility Siting Council and Idaho Power Co. 370 Or. 792, 525 P. 3d 864 (2023)

Exhibit 7: “Siting of Energy Developments in Oregon, EFSC standards in Administrative Rule”

Exhibit 8: Terms Sheet Agreement between PacifiCorp and Idaho Power Contract No. 22TX17207.

Exhibit 9: “Electric Utility PacifiCorp sued, accused of causing deadly McKinley Fire in Siskiyou County”

Exhibit 10: “FERC Orders PacifiCorp to Respond to Allegations of Reliability Violations” April 15, 2021, Docket No. IN21-6-000, Item E-10.

Exhibit 11: Oregon PUC Order on Certificate of Public Convenience and Necessity.

Exhibit 12: Bakeoven Solar Project – Final Order on Application for Site Certificate, April 24, 2020, Pages 139

Exhibit 13: Feds Blame PacifiCorp for Oregon Wildfire, Karina Brown, July 22, 2015, Courthouse News

Exhibit 14: “As Labor Day Fires exploded, Pacific Power employees worried power lines were at fault”, Zach Urness, , Feb. 28, 2023, Salem Statesman Journal.

Exhibit 15: Hawaiian Electric shares drop further as S&P downgrades Utility to Junk, Carline Valenkkevitch and Herbert Lash, August 15, 2023, Thompson Reuters Trust.

Exhibit 16, Reply Testimony of Lindsay Barretto, Idaho Power Exhibit 400 provided to the Oregon Public Utilities Commission

Exhibit 17: Idaho Power’s Responses to Comments on the Draft Proposed Order for Request for Amendment #1, July 19, 2023

Exhibit 18: Sarah Esterson, September 10. 2021 Memo to Council Overview of the Energy Facility Siting Council’s Retirement and Financial Assurance standard for the September 24, 2023 EFSC Meeting.

Exhibit 19: Christopher Clark, August 13, 2023 memo to EFSC regarding the Surety Bond Template Update for the August 27, 2023 EFSC Meeting.

Exhibit 20 : (Oregon Public Utilities Order No. 20-393, Docket No, UF 4118)

Request that council and ALJ also take notice of the following:

Christopher v. SmithKline Beecham Corp, stating that deference is not available when the decision does not reflect fair and considered judgement which is absent if the interpretation is contrary to an earlier construction or interpretation merely seems to represent a “convenient litigation position”.

Gonzales v Oregon 546 U.S. 243 (2006) which references Auer v Robbons, 519 U.S. 461, 117 S. Ct. 905 137L Ed. 2 stating that an agency interpretation of their own rules is only supported when the rules are ambiguous.

Williams v Invenergy, LLC, 20l6/qk 172990 at 18 (UDSC, Oregon, Portland)

Facts which support the need for this contested case:

1. Council determined that the cost to restore the site of the Transmission line and supporting structures would be $140,779,000. item a. of the first amended site certificate, Item a., last sentence states the bond will be $140,779,000 “or another amount **deemed by the Council to be satisfactory to decommission the facility and restore the site to a useful, nonhazardous condition**.” Item e, page 66 confirms that the estimated total decommissioning cost for the facility I $140,779.000 (Exhibit 1: First Amended Site Certificate OPR-RT-01, Page 65& 66.) (OAR 345-021-0010)

2. The Plain Language of OAR 345-022-0050(2) and OAR 345-025-0006(8) require the bond or letter of credit to be in an amount that will restore the site to a useful, non-hazardous condition. The context of related rule, OAR 345-025-0006(16) establishes the fact that council can draw upon the bond to restore the site. A bond amount of less than the amount required to restore the site is not consistent with either the language of the bond requirement or the use of the bond amount in site restoration.

   OAR 345-022-0050(2) states, "The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a form and amount satisfactory to the Council **to restore the site to a useful, non-hazardous condition."**

   OAR 345-025-0006(8) requires the certificate holder to submit the bond prior to construction and maintain the bond until the facility is retired. (Exhibit 18, Page 2, Paragraph 3)

   OAR 345-025-0006(16) indicates the bond is used to restore the site if Council needs to draw on it.

3. The subjective evaluation regarding a developer's risk of bankruptcy or other unforeseen events is not consistent with the language of the rule. There is no reference to this in the rule; however, if council is going to consider risk in their decision regarding the bond amount, they must consider all factors which could increase the risk. According to the memo, Exhibit 18, pages 4-5 from Sarah Esterson, the only adjustments to the bond or letter of credit amount allowed are an inflation adjustment and built facility adjustment.

4. Reducing the bond below the amount Council identified to restore the site once a development is operational has not been done in previous site certificates, nor has it been done after the B2H Site Certificate was issued.
    a. Exhibit 12: Page 141, Bakeoven Solar "Summary of Review of Applicant's Request for Phased Decommissioning Surety Approach"
    b. Exhibit 18, Page 2 documents Bond and LOC required amounts for Energy Facility Security Deposits.
    c. Council previously concluded that variations in the bond amount or letter of credit amount necessary to meet the standard for decommissioning should be evaluated through rulemaking using subject matter experts rather than relying on information from the applicant. (Exhibit 18, Page 6, last paragraph)
5. Oregon Department of Energy hired a consultant to review this issue and he recommended that the bond amounts not be reduced.
    a. Exhibit 12: Bakeoven Solar Project – Final Order on Application for Site Certificate, Page 139, Paragraph 3 and Page 141, "Summary of Review of Applicant's Request for Phased Decommissioning Surety Approach"
6. Oregon Department of Energy publication states that the Council recognizes the risk that a development could stop before it is completed or that the developer could shut down the development without restoring the site. (Exhibit 7)
7. The reduced bond amount is not consistent with the plain language of the rule or related rule language identifying the bond as available for the council to access for site restoration. The Council only has the authority to reinterpret their rules when they are ambiguous. The Council is requested to take notice of the following Court Orders which are at play in this Contested Case:

a. Gonzales v Oregon 546 U.S. 243 (2006) which references Auer v Rpbboms, 519 U.S. 452, 461,117 S. Ct. 905, 137L Ed. 2 stating that an agency interpretation of their own rules is only supported when the rules are ambiguous.
b. Christopher v. SmithKline Beecham Corp, decision that deference is not available when the interpretation is "plainly erroneous or inconsistent with the regulation," or does not reflect fair and considered judgement on the matter in question." It is stated that "fair and considered judgement" may be absent if the interpretation is contrary to an earlier construction or the interpretation merely seems to represent a "convenient litigation position."

8. The ODOE and EFSC review of the original B2H Site Certificate included extensive review of the risk associated with Idaho Power and whether or not that increased the risk that the site would not be restored by the developer. This same level of scrutiny needs to be done based upon the documented role of PacifiCorp in developing this facility now that documentation is being provided showing them as majority partner. ODOE and EFSC have failed to complete this review as part of Amendment I.
9. Pacificorp's active participation in both costs and decisions based upon their majority ownership of the project is documented in the following items:
    a. Exhibit 3 PacifiCorp 2023 IRP, Chapter 1, Page 28 States the PacifiCorp will support the project under conditions of the Joint Funding Agreement, participate in the development and negotiations of the construction agreement, participate in "pre-construction" activities. and continue negotiations for plan of service post B2H for parties to the permitting agreement.

b. Exhibit 3, Page 98 of the 2023 IRP for PacificCorp includes the B2H transmission line and Page 99 outlines the fact that PacifiCorp will retain a 55% interest in the line.

c. Exhibit 3, Vol. I, Ch. 9 identifies the B2H transmission line as required to bring needed resources into PacifiCorp's system.

d. The contract between Idaho Power and PacifiCorp Page 24, documents and defines "IPC's and PAC's capacity and property ownership, and their roles and responsibilities for operating and maintaining the B2H project." PAC will have a 54.55% ownership and Idaho Power will have a 45.45% ownership. in the costs and use of the transmission line. (Exhibit 8, Page 24)

   This contract outlines the shared responsibilities for the permitting, construction, ownership, costs, and use of the B2H line including but not limited to the following:

   1. Both IPC and PAC will be collaborating with the Construction Manager to complete the BLM Construction Plan of Development and the EFSC's Site Certificate amendments. Exhibit 8: Contract No. 22TX17207, Page 24 and top of Page 25, Sections c) and d)
   2. PAC could take responsibility for all or selected tasks associated with the B2H Project if delegated by Construction Funding Committee to do so. (Exhibit 8, Page 25, section 4)
   3. "IPC and PAC will jointly own as tenants in common the transmission line and all associated facilities, and equipment, ……" (Exhibit 8, Page 26, Item 8)

4. PAC will have an ownership interest of 54.55%, of the Construction Funding Committee which is to be consistent with the ownership interests of IPC and PAC. (Exhibit 8, Page 27, Item 10, second paragraph)

Multiple instances in this agreement require concurrence or approval of the Construction Funding Committee to take action. This committee will have ultimate authority to approve or deny all requests which means that PacifiCorp with the majority control of this Committee giving them ultimate authority to assume all tasks associated with the construction of the transmission line.

e. Marcia Grail recused herself from all decisions regarding the B2H transmission line to be a council member because she worked for Pacificorp/Pacific Power. (Recording of July 19, 2023 council meeting, Tape 4, at 2:06).

f. Oregon Public Utilities Committee obtained and reviewed substantiative criteria regarding PacifiCorp as co-owner of B2H. They obtained the substantiative information they needed through PacifiCorp's participation as a party in the docket, through their submitted testimony and briefs and the IRP processes. Exhibit 11, Pages 14 and 15 of the Oregon PUC order includes the information that they considered in making their decision.

g. OPUC Certificate of Public Convenience includes a review of the basis for agreeing that PacifiCorp requires the B2H transmission line in support of the issuance of the CPCN. (Exhibit 8, Certificate of Public Convenience and Exhibit Necessity page 14 -15)

10. PacifiCorp's involvement as owner of the B2H transmission line incorporates a significant risk that the transmission line may be abandoned or there could be a bankruptcy due to their history regarding a failure to avoid liability for wildfires, their significant debt load, the failure to follow their mitigation plans, the current and pending future civil awards related to their responsibility for wildfires, and the impact of these issues on stakeholder willingness to continue financial support.

    The costs associated with these decisions in combination with other financial risks the company has makes their financial stability questionable and creates a significant risk that the company could declare bankruptcy or abandon the B2H transmission line project.

    a. The company has judgements against them for the 2020 fires for economic and non-economic damages of $70 million not including punitive damages. The jury's determination that PacifiCorp was negligent on all major counts meaning that all parties damaged by the fire could get financial relief without having to independently prove PacifiCorp failed to proactively shut down power or the fact that their failure to maintain vegetation control around power lines caused the fires.

        (Exhibit 2 "Jury finds PacifiCorp at fault for Santiam Canyon, Labor Day Fires" by Zach Urness, Salem Statesman Journal, June 12, 2023, Page 1 and first Paragraph Page 2)

    b. PacifiCorp estimated the punitive damages from potentially thousands of Oregonians could reach into the billions of dollars since the order for liability states that the company is liable for damages in the potentially thousands of additional damage cases that may occur.

(Exhibit 4: “Pacific Power potentially wants its customers to pay $90 million in wildfire liability,” Ryan Haas, June 16, 2023)

c. PacifiCorp stated that the judgements against them for the 2020 wildfires could place the company in financial jeopardy.
d. The documentation of existing orders for damages and agreements that did not go to court is the fact that PacifiCorp will continue to be required to pay for damages from fires they cause. (Exhibit 5: “US Attorney’s Office, District of Oregon, PacifiCorp to pay $3.4 Million in Civil Settlement for Ramsey Canyon Fire (June 9, 2020) (Exhibit 9 "Electric Pacificorp sued accused of starting deadly McKinley Fire In Siskiyou County”).

11. Rather than directing their resources toward tree trimming, burying power lines and sometimes turning off power, Pacificorp is focused on cashing in on the guaranteed profits of building large transmission lines. This focus on expanding their ownership of transmission lines rather than maintaining current ones is an ongoing issue as reflected in FERC requiring them to respond to allegations that included a failure to maintain vegetation management requirements along their transmission lines. There is reason to believe that employees were aware of the failure to do this maintenance and that the problem continues to exist as noted in Exhibit 14.
    a. (Exhibit 10, Starting at paragraph 3)
    b. (Exhibit 14, First 5 paragraphs)
12. The financial risk that PacifiCorp adds to the likelihood of abandonment of the site without completing restoration exists due to the fact that PacifiCorp obtained an order allowing them to assume an additional $3 billion dollars in

debt added to their current debt placing even more pressure on the financial stability of the company.

Exhibit 20: (Oregon Public Utilities Order No. 20-393, Docket No, UF 4118)

13. A predictable reduction in financial support from stakeholders occurs when a companies record shows they are not performing actions to avoid wildfires. PacifiCorp is at risk of an erosion of stakeholder support, just as other electric utilities are with the kind of public documented liabilities they create.

(Exhibit 15: Hawaiian Electric shares drop further as S&P downgrades Utility to Junk, Carline Valenkkevitch and Herbert Lash, August 15, 2023, Thompson Reuters Trust.)

14. PacifiCorp has resorted to requesting extension of debts related to wildfire liability indicating there may currently be concerns regarding cash flow problems and efforts to delay or avoid paying for their liabilities.

    a. Exhibit Exhibit 4 "Pacific Power may want customers to pay fire liability" by: Jashayla Pettigrew Posted: Jun 17, 2023 / 03:46 PM PDT

15. Idaho Power's fiscal situation does not document that there is "virtually no possibility" that they will default on their responsibilities to restore the site as a result of bankruptcy or other unplanned events including such things as fires, floods, changes in the energy markets, inflation, etc. Absent the bond amount, there is no documentation that Idaho Power has the resources to pay for all restoration costs should PacifiCorp fail to meet their obligation to provide their portion of site restoration costs. One example: (Aug. 25, the US Dept of Justice

issued “Idaho Power to Pay $1.5 million in civil Settlement for Powerline and Lime Hill Fires.”)

(Williams v. Invenergy, LLC, 2016 /qk 1725990 at 18 (USDC, Or., Portland)

Review of the numbers and costs of the wildfire events and judgements make it clear that they pose a credible threat that the developers of this transmission line may face financial issues that require them to abandon the project.

16. The file contains no documentation that will guarantee that utility customers, Oregon citizens or the state will not be required to pay for restoration of the site in the future should either developer declare bankruptcy or abandon the site.
    a. In response to a question from Council member Beier regarding whether Idaho Power has insurance or other means to deal with the financial assurance requirements, Mr. Stipple of Idaho Power stated at approximately 2:47 that they did. During the review of the Draft Proposed Order on July 19, 2023, Tape 4 at 3:29 it was again stated that Idaho Power has insurance policies to pay for site restoration that will mean the public and the state will be protected. (Exhibit 17) The developer was not required to provide any documentation of this and there is no documentation in the original site certificate application indicating there is any insurance that will protect the public and ratepayers from having to pay for site restoration in the event the developer fails to do so. I can find no indication that any developer has such a policy. A search of the internet indicates no such insurance exists in Oregon.

b. The Oregon Department of Energy has stated in their arguments that the ratepayers would be responsible for restoration of the site should the developer fail to do so.

c. Pacific Power appears to be attempting to transfer costs of fire liability to the utility customers. The bond is intended to protect customers and citizens from having to pay for damages caused by utilities. Since catastrophic fires could result in abandoning the transmission line without restoring the site, this action should be viewed as identifying how PacifiCorp is inclined to deal with their debts. In fact, they have stated that they would be able to request that the Oregon PUC require electricity users to pay for site restoration if they were unable to do so.

(Exhibit 4 "Pacific Power may want customers to pay fire liability" by: Jashayla Pettigrew Posted: Jun 17, 2023 / 03:46 PM PDT
Updated: Jun 17, 2023 / 08:23 PM PDT)

Rather than directing their resources toward tree trimming, burying power lines and sometimes turning off power, Idaho Power and PacifiCorp are focused on cashing in on the guaranteed profits of building large transmission lines. They are currently proposing at least one additional 500 KV line which will add to their financial instability. The costs of planned transmission lines, debt load of developers, current and predicted future liability costs for wildfires, and potential losses of financial support resulting from wildfires support a finding that there is a need to require the full bond amount identified by the council as required to restore the site for the life of the development consistent with OAR 345-022-0050.

PacifiCorp is also owner of Rocky Mountain Power which has assumed a significant amount of additional costs associated with construction of transmission infrastructure. They have requested that customer bills be increased by approximately 30% to address these expenses.

Idaho Power's fiscal situation is also deteriorating as noted by the fact that they agreed to pay $1.5 million dollars to the U.S Forest Service for fires. The current decision also must include costs and liability for Idaho Power based upon new documentation provided in this hearing. (Aug. 25, the US Dept of Justice issued "Idaho Power to Pay $1.5 million in civil Settlement for Powerline and Lime Hill Fires.")

(Williams v. Invenergy, LLC, 2016 /qk 1725990 at 18 (USDC, Oregon, Portland)

CONCLUSION :

A CONTESTED CASE IS NECESSARY DUE TO THE FACT THAT THE BOND ISSUE INCLUDES MULTIPLE ISSUES OF FACT AND LAW AS OUTLINED ABOVE WHICH ARE REASONABLY LIKELY TO AFFECT THEIR DETERMINATION THAT THE FACILITY MEETS THE REQUIREMENTS OF THE APPLICABLE LAWS AND COUNCIL STANDARDS.:

Any bond amount of less than the amount the council found would be required to restore the site represents a cost and risk that is being placed on the public rather than the developer of the project. A bond that is at times as low as $1.00 fails to pass the sniff test in terms of providing the necessary protection for citizens and the state from site restoration costs should the developer fail to do so. Parties with ownership interest in the transmission line will either increase or decrease the risk that the site will not be restored.

Council lacks the authority to circumvent their rules for the Boardman to Hemingway Transmission line while requiring other developers to continue to comply with them. This is not an issue of whether or not the council and ODOE are allowed to interpret their own rules. The rules are clear on their face and Council continues to apply the plain language of the rules to all developments with the exception of this one. The council needs to follow past practices and require the developers of the B2H Transmission line to maintain a bond that equals the costs the council determined was necessary to restore the site of this development.

This condition was intended for review by the Oregon Supreme Court, but was not taken forward to an error on my part and objections from Idaho Power. It has not been reviewed by the court, and the additional risks presented by PacifiCorp increase the necessity of the Council completing the full review required by EFSC rules in this Amendment I of the B2H site certificate. Costs of restoration following facility abandonment which would remain after use of the adjusted bond amounts are not consistent with the Council determination of the amount required to restore the site.

Docket No. PCN 5
Exhibit PAC/201
Witness: Rick T. Link

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

PACIFICORP

Exhibit Accompanying Rebuttal Testimony of Rick T. Link

B2H Term Sheet Dated January 18, 2022

March 2023

Contract No. 22TX-17207

TERM SHEET

THIS TERM SHEET IS INTENDED SOLELY TO FACILITATE DISCUSSIONS AMONG IDAHO POWER COMPANY ("***IDAHO POWER***" or "***IPC***"), PACIFICORP ("***PACIFICORP***" or "***PAC***"), AND THE BONNEVILLE POWER ADMINISTRATION ("***BPA***") (EACH REFERRED TO HEREIN AS A "***PARTY***" AND COLLECTIVELY REFERRED TO HEREIN AS THE "***PARTIES***") RELATED TO THE CONSTRUCTION, OWNERSHIP, OPERATION, ASSET EXCHANGES, AND SERVICE AGREEMENTS REGARDING THE BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT ("***B2H PROJECT***" OR "***PROJECT***") AND OTHER TRANSMISSION FACILITIES. EXCEPT FOR SECTION 5 OF THIS TERM SHEET WHICH SHALL BE LEGALLY BINDING UPON THE PARTIES UPON THE EXECUTION AND DELIVERY OF THIS TERM SHEET BY ALL OF THE PARTIES (THE "***EFFECTIVE DATE***"), (I) THIS TERM SHEET IS NOT INTENDED TO CREATE, NOR SHALL IT BE DEEMED TO CREATE, A LEGALLY BINDING OR ENFORCEABLE AGREEMENT OR OFFER, AND (II) NO PARTY SHALL HAVE ANY LEGAL OBLIGATION WHATSOEVER PURSUANT TO THIS TERM SHEET.

1. **BPA Requirements.** The Parties acknowledge and agree that in order to negotiate the Agreements (as defined below) and before BPA can make a definitive final decision regarding whether to enter into the Agreements, BPA must (1) engage in customer and stakeholder outreach, share information about this Term Sheet during the outreach, and solicit feedback; (2) fulfill all requirements under the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA) and other applicable environmental laws, and (3) make a definitive decision in an Administrator's final record of decision. Nothing in this Term Sheet shall be construed as indicating that BPA has engaged in customer and stakeholder outreach; completed its NEPA and other environmental review processes or made a decision regarding how to proceed.

2. **Term.** This Term Sheet shall terminate the earlier of (a) energization of the B2H Project, or (b) execution of all agreements identified in the Term Sheet, or (c) mutual written agreement of all Parties. This Term Sheet may be extended by mutual written agreement of all Parties.

3. **Agreements.** Upon execution of this Term Sheet, the Parties intend to negotiate in good faith toward the execution of the definitive, binding agreements and amendments between or among the Parties described below consistent with the terms and conditions described below ("***Agreements***"). Each of the Parties intends to prepare and deliver to the other Parties initial drafts of the Agreements it is designated as responsible for below by no later than the date identified for each agreement. The Parties further intend, subject

to the BPA requirements in Section 1, that they will endeavor to complete negotiation of and execute the Agreements by no later than the date identified for each agreement*;* provided, however, that the effectiveness of any such Agreement may be subject to one or more conditions precedent, including state or federal regulatory approvals.

a) Asset Exchanges, Transmission Service Agreements, and Amended and Restated Existing and Future Agreements: The table below defines the transactions contingent on completion of the B2H Project including, without limitation, regulatory approval associated with IPC's acquisition of BPA's interest in the Amended and Restated Boardman to Hemingway Transmission Project Joint Permit Funding Agreement ("Joint Permitting Agreement"), asset exchanges, transmission service agreements, and amended and restated existing and future agreements. Each of the Parties will prepare an initial draft of the Agreements and Amendments below for which it is designated as the Primary Drafter, consistent with the following terms:

	Parties / Agreement / Action / Primary Drafter	***General Terms / Details***
1.	***PAC, BPA*** ***Agreement on Principles and Timelines*** ***Prepare First Draft – BPA: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 3 of Calendar Year 2022***	PAC and BPA are parties to the Amended and Restated Midpoint-Meridian Agreement, originally executed June 1, 1994 (the "Midpoint-Meridian Agreement"), which provides PAC with 340 MW of bidirectional scheduling rights over the Buckley-Summer Lake 500kV line (the "Buckley-Summer Lake Line"). In connection with the Goshen Area Asset Exchange (as referenced in Section 3(a)(7) of this table) and the B2H Midline Series Capacitor Project (as referenced in Section 3(a)(12) of this table), PAC and BPA are discussing options to allow PAC the ability to schedule 340 MW from the Buckley substation to the 500kV side of the Ponderosa Transformer Bank 500/230 kV #1 ("Ponderosa 500") and to concurrently schedule 340 MW from the Summer Lake substation to Ponderosa 500 upon energization of the B2H line and the B2H Midline Series Capacitor Project. I. Contingent upon the conditions set forth below, PAC and BPA desire for the concurrent bidirectional scheduling rights over the Buckley-Summer Lake line to be provided as firm point-to-point transmission service ("PTP service") pursuant to the terms and conditions in BPA's Tariff and rate schedules upon energization of the B2H line

		and the B2H Midline Series Capacitor Project. As of the Effective Date, the PAC and BPA understand that such PTP service remains subject to further BPA evaluation. a. BPA's offer of PTP service may include conditions if such conditions are identified during BPA's evaluation. Conditions for PTP service are at BPA's sole discretion and, if required, will be developed consistent with the principles set forth in Section 3(a)(1)(II)(b) so that flows associated with the PTP service over the Buckley-Summer Lake line do not exceed 340 MW in the north-to-south direction and concurrently does not exceed 340 MW in the south-to-north direction during all lines in service. b. As part of the PTP service evaluation, PAC and BPA will also explore options to combine an offer of PTP service with the modification to points of receipt and points of delivery in PAC's existing PTP service tables ("redirect") within the Long Term Firm Point-to-Point Service Agreement (No. 04TX-11722) between PAC and BPA, subject to BPA's Tariff and related business practices including available transfer capability ("ATC"), with a goal to optimize PAC's transmission service over the Federal transmission system to serve its central Oregon loads (*e.g.*, using a single wheel from a network point of receipt to PAC's load at Ponderosa 230 or Pilot Butte 230). BPA will apply its long-standing practice to evaluate the ATC impacts of the new PTP service against the ATC impacts of existing service, to include the bidirectional scheduling rights and redirected service. c. BPA may request additional information from PAC. PAC will make good faith efforts to provide such information within 30 days of BPA's request. d. PAC will submit applicable transmission service request(s) ("TSR") within 30 days

		of BPA's notice to PAC that such requests should be submitted. e. If BPA determines, in its sole discretion, that BPA can convert the bidirectional scheduling rights to PTP service, BPA agrees to offer PTP service pursuant to BPA's Tariff and rate schedules. i. The PTP service will be contingent upon and will not be effective before (A) the energization of the B2H line and the installation of the B2H Midline Series Capacitor Project; (B) approval by the Federal Energy Regulatory Commission ("FERC") of the proposed amendments to the Midpoint-Meridian Agreement discussed in this Section 3(a)(1), per subpart (iii below; and (C) the Goshen Area Asset Exchange set forth in Section 3(a)(7) of this table is completed and all associated agreements are in effect. ii. PAC and BPA will adhere to the applicable requirements set forth in BPA's Tariff and related business practices, including timelines for execution or amendment of a service agreement. iii. Concurrent with the execution of the PTP service agreements contemplated in this Section 3(a)(1)(I), PAC and BPA will amend Section 4(a) of the Midpoint-Meridian Agreement to remove and otherwise terminate PAC's bidirectional scheduling rights over the Buckley-Summer Lake Line. f. If BPA offers PTP service that satisfies PAC's objectives as expressed in this Term Sheet, PAC intends to accept such service subject to the condition regarding FERC approval described below. If following FERC acceptance without material conditions of the arrangements negotiated between BPA and PAC in this Section 3(a)(1)(I), PAC nonetheless fails to submit applicable TSRs or otherwise

declines to accept the PTP service or execute a PTP service agreement, then BPA will have no further obligations to provide PAC with the PTP service described in this Section 3(a)(1)(I) or the scheduling rights described in Section 3(a)(1)(II) below.

g. PAC and BPA will negotiate in good faith to complete and enter into agreements needed to complete the other conditions set forth in Sections 3(a)(2) through (14) and 3(c) of this Term Sheet, as such conditions are applicable to either Party.

h. PAC will seek FERC guidance as necessary and file the proposed amendment to the Midpoint-Meridian Agreement with FERC for acceptance. BPA will reasonably coordinate with PAC to prepare for FERC meetings and submissions. FERC's unconditioned acceptance shall be a condition to PAC's obligations as contemplated under this Term Sheet.

II. Following either (1) BPA's determination that it is unable to provide the PTP service to PAC consistent with Section 3(a)(1)(I) above, or (2) FERC's failure to accept without material conditions the arrangements negotiated between PAC and BPA under Section 3(a)(1)(I) above, BPA will, effective upon energization of the B2H line and the B2H Midline Series Capacitor Project provided that all conditions described below are met, provide PAC with bidirectional scheduling rights over the Buckley-Summer Lake line which give PAC the ability to (A) schedule 340 MW from the Buckley substation to Ponderosa 500 ("North to South schedules") and (B) concurrently schedule 340 MW from the Summer Lake substation to Ponderosa 500 ("South to North schedules") (collectively referred to as "scheduling limits"). The concurrent, bidirectional scheduling rights described in the immediately preceding sentence will be

provided pursuant to an amendment to the Midpoint-Meridian Agreement and one or more separately negotiated agreements, that will be effective upon acceptance by FERC and after all conditions set forth in this Section 3(a)(1)(II) are met and will remain in effect until BPA offers PTP service as set forth in Section 3(a)(1)(I). PAC and BPA will work in good faith to satisfy all such conditions consistent with the principles articulated in Section 3(a)(1)(II)(b) below by energization of the B2H line.

a. Transmission service to move from the Ponderosa 500 substation. The utilization of the concurrent bidirectional scheduling rights at the Ponderosa substation described in this Section 3(a)(1)(II) is limited to Ponderosa 500. PAC must reserve PTP service from BPA pursuant to BPA's Open Access Transmission Tariff ("OATT"), business practices, and rate schedules in effect at the time of such reservation to move from Ponderosa 500 to the 230 kV side of Ponderosa transformer bank #1 for delivery to PAC load in central Oregon.

b. Principles to guide satisfaction of conditions.

   i. North to South schedules, South to North schedules, and the associated directional power flows may not exceed the scheduling limits (*e.g.*, 340 MW North to South and, concurrently, 340 MW South to North, under all lines in service). A Power Transfer Distribution Factor ("PTDF") based methodology ("PTDF algorithm") and calculator will be used to determine directional power flow. The PTDF algorithm will sum positive flows in the North to South and South to North directions (*i.e.*, schedules and flows are not netted).

   ii. If, at any time, North to South schedules, South to North schedules, or the associated directional power

		flows exceed the scheduling limits, PAC shall reduce the schedules so that the schedules and directional power flows are within the scheduling limits. BPA can, at BPA's sole discretion, curtail the schedules in whole or in part to maintain the scheduling limits and to mitigate congestion, such as during outages. iii. Schedules (E-Tags) must contain a single granular source and sink. Sources and sinks (1) cannot be consolidated on a single E-Tag; and (2) must be granular enough to determine the PTDF impact. Sources and sinks that are scheduling points, hubs, or nodes are not sufficiently granular to determine the PTDF impact. iv. PAC may not schedule from sources and sinks for which the PTDF impact has not been determined. PAC will provide BPA with advance notice of sources and sinks with sufficient time for BPA to determine the PTDF impact and, if necessary, to accommodate modifications to tools, systems, and contracts. v. The terms, tools, and protocols associated with the concurrent bidirectional scheduling rights will be structured to minimize to the maximum extent possible any impacts exceeding the scheduling limits (*e.g.*, 340 MW North to South and, concurrently, 340 MW South to North, under all lines in service) that the physical flows associated with the concurrent bidirectional scheduling rights have on the Pacific Northwest AC Intertie (as such transmission facilities are defined in the various PNW AC Intertie-related agreements among PAC, BPA and the other PNW AC Intertie owners, the "NW AC Intertie") or the Federal transmission

		system, as reasonably determined by BPA. c. Conditions to Effectiveness of 3(a)(1)(II) Scheduling Rights i. PTDF calculator. BPA will develop a PTDF algorithm to calculate the directional power flow associated with each source and sink that PAC intends to schedule. PAC and BPA will coordinate to develop, at PAC's expense, a PTDF calculator that uses the PTDF algorithm and related communication equipment. ii. Agreement on operational terms. After the PTDF calculator is developed, PAC and BPA will work in good faith to develop operational terms, to include the protocols and requirements for monitoring, dispatch, curtailment, reduction of scheduling limits due to outages, and future modifications to stay current with reliability standards, automation, and technological abilities. The operational terms will remain in effect for the duration of the concurrent bidirectional scheduling rights described in this Section 3(a)(1)(II) and will be incorporated into the proposed amendments to the Midpoint-Meridian Agreement or such other agreement as mutually agreed by PAC and BPA. iii. Energization of the B2H Project, including the B2H Midline Series Capacitor Project. iv. The agreements set forth in Section 3(a)(1)(III) below are, to the extent required, accepted for filing at FERC without material conditions. v. The Goshen Area Asset Exchange set forth in Section 3(a)(7) of this table is completed and all associated agreements are in effect. III. Agreements.

		a. Agreement on Principles and Timelines. Following execution of the Term Sheet, PAC and BPA will negotiate and execute an agreement to reflect the objectives, commitments, principles, conditions, and timelines, including negotiation of applicable follow-on agreements for the PTP service described in Section 3(a)(1)(I), and the concurrent, bidirectional scheduling rights described in Section 3(a)(1)(II). With regard to the concurrent, bidirectional scheduling rights described in Section 3(a)(1)(II), the Agreement on Principles and Timelines would include the principles and conditions set forth in Section 3(a)(1)(II) above, and the timelines for development of the PTDF calculator and negotiation of operational terms and protocols. b. Follow-on Agreements. Before energization of B2H and subject to the conditions described above in this Section 3(a)(1) being met, PAC and BPA will negotiate and execute (1) the agreements and amendments referenced in Section 3(a)(1)(I) above, or (2) if BPA is not yet providing PTP service upon B2H energization consistent with Section 3(a)(1)(I) above, then an amendment to the Midpoint-Meridian Agreement to reflect the addition of the concurrent bidirectional scheduling rights, including term, scheduling and directional power flow requirements, usage of the PTDF calculator, and operational terms, all as consistent with Section 3(a)(1)(II) above. PAC and BPA understand that PAC may be required to file amendments to the Midpoint-Meridian Agreement with FERC for acceptance and that the effective date for the agreements referenced above will be upon FERC acceptance without material conditions. IV. Consistent with the "Phase II Joint Study Report (2020-2021), Boardman to

		Hemingway (B2H) and Incremental Central Oregon Load" completed on March 23, 2021, upon notice from BPA, PAC will upgrade the existing Meridian Series Capacitor on the 500 kilovolt bus or install an electrically equivalent series capacitor on the PAC section of the Dixonville-Meridian-Klamath Falls-Captain Jack lines in southern Oregon within a reasonable time after receiving the notice. PAC shall be responsible for all costs associated with the upgrade. V. PAC and BPA agree that the proposed modifications to the Midpoint-Meridian Agreement described above are limited in scope to PAC's bidirectional scheduling rights over the Buckley-Summer Lake line under Section 4 of the Midpoint-Meridian Agreement and do not include BPA's bidirectional scheduling rights over the Summer-Lake Malin line under Section 4 of the Midpoint-Meridian Agreement. PAC and BPA do not intend to modify, change, alter, or terminate BPA's bidirectional scheduling rights over the Summer Lake-Malin line set forth in Section 4 of the Midpoint-Meridian Agreement or the General Transfer Agreement between PAC and BPA, originally executed May 4, 1982, as amended.
2.	***IPC & PAC & BPA*** ***New operational agreement between IPC, PAC & BPA*** ***Prepare First Draft – BPA: Quarter 3 of Calendar Year 2022*** ***Target Execution Date: Quarter 4 of Calendar Year 2022***	IPC, PAC and BPA agree to negotiate in good faith and draft a tri-party operational agreement that will: a. Consider Midpoint-Meridian Agreement Section 5(f); and b. Define the curtailment procedures between NW AC Intertie, Western Electricity Coordinating Council (WECC) Path 14 (Idaho to Northwest), and WECC Path 75 (Hemingway – Summer Lake); and c. Identify conditions for revising the tri-party operational agreement including, but not limited to: i. Engagement with NW AC Intertie partners;

		ii. In the event the B2H Project and the B2H Midline Series Capacitor Project are not complete and energized by 2027. The Parties will make best efforts to negotiate and target execution of the tri-party operational agreement within one year of the Effective Date of this Term Sheet, with an effective date for the tri-party operational agreement a reasonable time thereafter.
3.	***PAC & BPA*** ***Termination of Existing NITSAs:*** ***PAC Trans – BPA Merchant NITSAs (SA Nos. 746, 747)*** ***Incorporate into Agreement on Principles and Timelines under 3(a)(1)***	BPA Network Integration Transmission Service Agreements ("NITSAs") (PacifiCorp Service Agreement No. 746 and No. 747): BPA and PAC agree to terminate the aforementioned NITSAs upon (1) the completion of the asset purchase and sale between IPC and PAC as detailed in Section 3(a)(5) through Section 3(a)(7) of this table – the Goshen Area Asset Exchange, and (2) the commencement of network service as described in Section 3(b)(1).
4.	***IPC & BPA & PAC*** ***New Agreement:*** ***Longhorn Substation Agreements*** ***Prepare First Draft – BPA: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 3 of Calendar Year 2022***	IPC and PAC will fund a portion of the proposed Longhorn substation near Boardman, Oregon, if B2H interconnects at Longhorn. This funding will occur as specified in one or more negotiated Longhorn Substation Agreements between the Parties that is consistent with BPA's Line and Load Interconnection Business practices and allows for recovery of the network portion of these funds through incremental transmission wheeling revenue. The agreement will: a. include provisions for IPC and PAC to pay a use of facilities charge or other charge pursuant to BPA's OATT and applicable rate schedules to transact across the Longhorn bus in the future; b. include provisions for IPC and PAC to potentially own, operate and maintain B2H equipment, which shall include: the

		B2H series capacitor at Longhorn, the B2H shunt line reactors at Longhorn, any ancillary equipment required to support those devices, such as switches, bypass breakers (series cap), and insertion breakers (shunt reactor); and c. be contingent upon BPA completing its obligations and responsibilities under NEPA, NHPA, and other requisite environmental compliance laws and making a decision regarding how to proceed (including provisions for IPC and PAC funding upfront at a prorated amount based on cost allocation of Longhorn, BPA's NEPA, NHPA, and environmental compliance costs). Non-binding cost estimates identified for the potential Longhorn aspects of the B2H Project as of the Effective Date of this Term Sheet are as follows, which all Parties acknowledge and agree are preliminary and may be modified and revised prior to and upon B2H energization: *These are estimated costs, charges to be trued up with actual costs.* a. Longhorn (base substation) network costs ~$59M. Costs subject to transmission credit. i. IPC 21% ~ $12M (BPA to cover up to $14M of IPC cost) ii. PAC 55% ~ $33M iii. BPA 24% ~ $14M (plus IPC ~ $12M, for total ~ $26M) b. B2H connection to Longhorn Network Bay~$11M. Constructed/Owned/Maintained by BPA. Develop bay 3 with (2) 500kV circuit breakers & (5) 500kV disconnects. Costs subject to transmission credits. i. IPC & PAC 100% c. Customer built (not subject to transmission credits). Including civil work with the reactor and cap costs.

5.	***IPC & PAC*** ***New Agreement:*** ***Purchase and Sale Agreement for Asset Exchange -potentially utilize the previously developed Joint Purchase and Sale Agreement*** ***Prepare First Draft – IPC: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 4 of Calendar Year 2022***	PAC and IPC would purchase and sell to each other various assets to achieve the objectives identified in Section 3(a)(6) and Section 3(a)(7) of this table. PAC and IPC will seek to first balance the purchase and sale of the transferred assets through the depreciated net book value of such assets and allocation of upgrade costs and, finally, if necessary, will be balanced between IPC and PAC through cash considerations. <u>Details related to Populus – Four Corners assets</u>: These assets will provide IPC ownership on the existing PAC transmission system from Four Corners substation in New Mexico to Populus substation in Idaho. This will include 345 kV transmission lines between the following substations and assets to create a path through each substation: Four Corners, Pinto, Huntington, Camp Williams, Mona, Terminal, 90th South, Ben Lomond and Populus. Consistent with federal processes, IPC and PAC will complete required studies to determine if recent system upgrades result in a possible increase in existing transmission capacity between Borah and Populus to facilitate IPC's incremental transfer needs associated with this exchange. If determined necessary, IPC and PAC will identify revisions to the JOOA (as defined in Section 3(a)(6) of this table), upgrades, modifications, or other options to meet each party's commercial needs between Borah and Populus. <u>Details related to Borah/Kinport to Hemingway and Midpoint to Borah/Kinport assets</u>: These assets will provide PAC ownership on the existing IPC transmission system from Borah/Kinport to Hemingway and from Midpoint 500 to Borah/Kinport. This will include 500 kV and 345 kV transmission lines between the following substations and assets to create a path through each substation: Borah, Kinport, Adelaide, Midpoint and Hemingway. Upgrades are required across the Borah West and Midpoint West paths to facilitate this portion of the

		proposed asset exchange transaction. The cost of these upgrades will be determined in the course of negotiating the proposed asset exchange transaction described in this Section 3(a)(5). Details related to Goshen Area assets: As described in more detail in Section 3(a)(7) of this table, PAC will transfer to IPC certain to-be-determined Goshen areas transmission assets that would allow IPC to provide transmission service to all BPA customers in southeast Idaho currently served by PAC. These assets are being transferred to IPC, from PAC, as part of the negotiations between PAC and BPA as described in Section 3(a)(1) of this table, with the consideration for these assets being the transmission service provided by BPA to PAC as detailed in Section 3(a)(1) of this table. IPC and PAC intend for these Goshen assets to be incorporated into the broader purchase and sale agreement described in this Section 3(a)(5) with a goal of minimizing changes to each company's transmission rate base. This goal is intended to be facilitated through the allocation of the costs associated with the Borah West and Midpoint West upgrades.
6.	***IPC & PAC*** ***Amendment to Existing Agreement:*** ***IPC – PAC Joint Ownership and Operating Agreement ("JOOA")*** ***Prepare First Draft – IPC: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 4 of Calendar Year 2022***	As part of a transaction transferring assets described in Section 3(a)(5) of this table, IPC and PAC may expand their existing Joint Ownership and Operating Agreement, as amended and restated August 22, 2019 ("JOOA"), to include the following: I. PAC owning 300 MW of west-to-east transmission assets between Midpoint 500 and Borah (transferred from IPC); and II. PAC owning an additional 600 MW of east-to-west transmission assets between Borah and Hemingway (transferred from IPC) - total increases from the current 1,090 MW to 1,690 MW; and III. IPC owning 200 MW of bi-directional transmission assets between Populus, Mona and Four Corners (transferred from PAC); and IV. Other revisions as necessary to facilitate other asset exchanges (*e.g.*, for Goshen area, as

		described in Section 3(a)(5) and Section 3(a)(7) of this table).
7.	***IPC & PAC*** ***Goshen Area Asset Exchange*** ***Part of 3(a)(5)***	As referenced in Section 3(a)(5) and Section 3(a)(6) of this table, IPC and PAC would negotiate an asset exchange to be effective no later than (i) energization of the B2H line and (ii) commencement of the NITSA between BPA and IPC, as referenced in Section 3(b)(1), that enables BPA to to serve its loads currently in PAC's East transmission system (Lower Valley Elec., Idaho Falls, Fall River Rural Elec., Lost River Electric, Salmon River Electric, Soda Springs,) ("Southeast Idaho Load Service (SILS) Customers") with one leg of firm IPC network transmission service. As referenced in Section 3(a)(6) of this table, the Goshen area asset exchange may be wrapped into the existing JOOA framework. IPC, PAC, and BPA agree to make best efforts to plan for service to Idaho Falls that requires only one leg of network transmission from the BPA transmission system, provided such best efforts among the Parties must (1) respect and retain the existing services arranged for Idaho Falls load service between BPA and Utah Associated Municipal Power Systems (UAMPS); and (2) be in line with FERC orders in similar circumstances and accepted by FERC.
8.	***IPC & BPA*** ***New Agreement:*** ***Point to Point TSA*** ***Prepare First Draft – BPA: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 3 of Calendar Year 2022***	IPC will acquire up to 500 MW of PTP transmission service from Mid-C to Longhorn subject to the terms of BPA's OATT, business practices and applicable rate schedules. The duration of the new service must be for an initial service duration of at least 5 years, and sufficient to compensate BPA for BPA's revenue requirement associated with BPA capital investments to facilitate the transmission service, with the right to rollover service in accordance with the BPA's OATT and business practices in effect at the conclusion of the initial term.

9.	***IPC & PAC***	Upon energization of the B2H Project, PAC would not renew its current 510 MW of east-to-west rights on the IPC system (which rights are found in IPC 1st Revised Service Agreement (SA) Nos. SAs 344-346 and 383-384). Consistent with and pursuant to IPC's OATT, PAC and IPC will coordinate to extend any remaining IPC SAs, enter into new SAs, or take other action as necessary to bridge any SA expiration dates until such time as the B2H project is in-service.
10.	***IPC & PAC*** ***B2H Construction Funding Agreement-related Commitments***	The B2H Construction Funding Agreement, between IPC and PAC as referenced in Section 3(d) below, and any additional agreements as the Parties determine necessary, will include terms necessary to implement the Agreement to Reimburse BPA's Removal and Replacement Related Transaction Costs, among IPC, PAC and BPA, dated March 18, 2020 (BPA Contract No. 20TX-16835). IPC, on behalf of the B2H Project, will assure that it coordinates construction of the B2H Project with BPA in a manner consistent with the terms of BPA's Use Agreement, as amended by Amendment Two (2) to NF(R)-9617, including Exhibits A, B and C, between the United States of America, Dept. of the Navy and the United States of America, Bonneville Power Administration Ptn Secs 13, 23 and 24-T2N-R25E, W.M. IPC and PAC acknowledge that the Removal and Replacement Related Transactions described in Contract No. 20TX-16835 are contingent upon (1) BPA obtaining acceptable service from Umatilla Electric so that BPA may continue to serve Columbia Basin Electric's load; (2) BPA completing its obligations and responsibilities under NEPA, NHPA, or other requisite environmental compliance laws and making a decision regarding how to proceed; and (3) IPC and PAC moving forward with construction of the B2H Project.
11.	***IPC & PAC & BPA***	In conjunction with the termination of the NITSAs identified in Section 3(a)(3) of this table (*i.e.*, PAC

	BPA Redirect and Assignment of existing PTP transmission service ***Incorporate into Agreement on Principles and Timelines under 3(a)(1)***	SAs 746 & 747), following the energization of B2H, BPA will redirect its two 100 MW PTP transmission service agreements (91629850 and 91629500, or any applicable AREFs that supersede or replace them) that it takes from IPC (*i.e.*, IPC 1st Revised SAs 324 & 342) such that the new POR of each SA will be Walla Walla and the new POD for each SA will be Borah. Consistent with and pursuant to IPC OATT, following approval of such redirects by IPC as described above, BPA will assign those redirected reservations to PAC. This redirect and assignment will be delayed by BPA if B2H energization is delayed past 07/01/2026. PAC shall be responsible to pay for all costs associated with 91629850 and 91629500, or any applicable AREFs that supersede or replace them, upon approval of such redirect by IPC and assignment by BPA.
12.	***IPC & PAC & BPA, with respect to B2H Plus Facilities Expectations*** ***IPC & PAC, with respect to B2H Construction Funding Agreement***	The B2H Project will include the installation of the B2H Midline Series Capacitor Project and development of a remedial action scheme ("RAS"). When considering BPA's study methodology, the B2H midline series capacitor reduces simultaneous interactions between the NW AC Intertie, central and southern Oregon load service, and WECC Path 14 (Idaho to Northwest). The Parties agree to funding of the B2H Midline Series Capacitor Project as follows: a. IPC: funding 45% of the cost. b. PAC: funding 55% of the cost c. BPA: funding 0% of the cost The Parties will work in good faith to have the B2H Midline Series Capacitor Project in-service when the B2H Project is energized and to document expectations of operation, maintenance, and future reinforcements and upgrades.
13.	***IPC & PAC*** ***B2H Grant or Additional Funding***	Under IPC and PAC's existing OATT rate procedures, IPC and PAC will include any United States Department of Energy ("DOE") grant or additional funding received for the B2H project in the appropriate FERC account provided such account is allocated 100% to Transmission. Nothing in this Term Sheet limits or waives any party's right to participate, review, comment, or challenge the other

		party's rate case or formula rate inputs through their respective update processes.
14.	***IPC & PAC & BPA*** ***Permit Funding Agreement Amendment***	Upon transfer of BPA's Permitting Interest to IPC identified in 3(b)(3) below, the Permit Funding Agreement will be amended to recognize the re-allocation of the Parties' Permiting Interests and related funding obligations.

b) NITSA Terms and Conditions, NITSA Security Agreement, NITSA Backstop

1.	***IPC & BPA*** ***New Agreements:*** ***Network Integration Transmission Service Agreement to serve BPA customers at Goshen*** ***Network Integration Transmission Service Agreement to service BPA's customer at Burley*** ***Amendment to currently effective Network Integration Transmission Service Agreements*** ***Prepare First Draft – IPC: Quarter 2 of Calendar Year 2022***	IPC and BPA will enter into two NITSAs for IPC to provide firm network transmission service to BPA. One NITSA will serve BPA customers at Goshen (replacing what is, as of the Effective Date of this Term Sheet, provided under PAC Service Agreement 746) and one NITSA will serve Idaho Falls (replacing what is, as of the Effective Date of this Term Sheet, provided under PAC Service Agreement 747) ("New NITSAs"). The New NITSAs will be in addition to the existing NITSAs BPA currently holds with IPC for service to BPA's customers located on IPC's system ("Existing NITSAs"). The term of BPA's New NITSAs will be 20-years from energization of the B2H Project, with a renewal or rollover option at BPA's discretion as required and permitted by FERC a. The NITSA Security Agreement (as referenced in Section 3(b)(2) of this table), and any related other agreements necessary, between BPA and IPC will be updated once the energization of B2H has occurred to document the term and the repayment periods with the actual energization date. b. The New NITSAs, NITSA Security Agreement, and any related other agreements necessary, are conditioned on the Goshen Area Asset Exchange set forth in Section 3(a)(7) being completed and all associated agreements being in effect by the energization of the B2H line.

	Target Execution Date: Quarter 3 of Calendar Year 2022	The New NITSAs and the Existing NITSAs will be updated to include three Points of Receipt (PORs) over which BPA can deliver energy to its customers located on IPC's system. The three PORs are as follows: AMPS POR, LaGrande POR, and Longhorn POR. The New NITSAs shall reflect the following provisions: a. Under the New NITSAs, IPC will plan for and reserve transmission capacity for the continued network service to BPA's SILS Customers' loads and ensure that it can reliably serve the load for the term of the contract prior to BPA assigning the PTP service agreements to PAC pursuant to Section 3(a)(11) above. b. The New NITSAs between BPA and IPC will permit BPA to assign service to specific Points of Delivery (PODs) to BPA's wholesale customers who take service at those PODs. Such assigned PODs will be served by a separate NITSA agreement between BPA's wholesale customer and IPC. The New NITSA between BPA and IPC will state that the customer requesting a separate NITSA for its POD must meet credit rating standards consistent with IPC's OATT. Notwithstanding assignment of the NITS service, BPA would remain entitled to all outstanding credits associated with the Funded Amounts (as defined in Section 3(b)(2) below) as long as BPA continues to be a NITS customer. c. IPC will maintain the current practice of letting BPA choose through the annual delivery allocation process the PODs where BPA will deliver power to serve its loads. The current PODs include LaGrande and AMPS. Once B2H is in service, the PODs will include LaGrande, Longhorn, and AMPS. d. BPA would pay the NT rate as established by IPC's OATT transmission formula rate. There shall be no adders or segmentation

		like actions which result in a rate above the NT rate and the amount BPA pays to IPC under the NT service agreement will be reduced as discussed in the NITSA Security Agreement. e. IPC will not charge BPA IPC's system losses for energy from BPA's Palisades resource used to serve load behind Goshen.
2.	***IPC & BPA*** ***New Agreement:*** ***NITSA Security and Risk Backstop Agreement*** ***Prepare First Draft – IPC: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 3 of Calendar Year 2022***	IPC and BPA will enter into an NITSA security and risk backstop agreement ("NITSA Security Agreement"), concurrently with the New NITSA and the purchase and sale agreement referenced in Section 3(b)(3) of this table. <u>Reimbursement If IPC Receives all Permits and Certificates of Public Convenience and Necessity (CPCN) for Construction of B2H</u> IPC will reimburse BPA for the transfer of BPA's Permitting Interest under the Joint Permitting Agreement in an amount consisting of BPA's investment in B2H prior to the transfer date (~$25m). BPA will also pay to IPC an additional $10 million upon execution of the New NITSAs and the NITSA Security Agreement with the intent of offsetting overall B2H project costs in IPC's rate base. The additional $10 million plus BPA's investment in B2H will be collectively referred to as the "Funded Amount." IPC will retain the Funded Amount as follows: If and when IPC obtains all necessary CPCNs and permits for the B2H Project (and all appeals, if any, have been resolved), IPC shall have until January 1, 2026 ("Commencement Date") to commence construction of B2H or to inform BPA of its intent to not pursue construction of B2H. (1) If IPC commences construction of B2H by or before the Commencement Date, then: a. Interest on the Funded Amount (~$35m) payable by IPC to BPA will accrue from the date of energization of B2H at the rate

		established in the applicable IPC tariff for customer funded projects; b. The Funded Amount and all accrued interest will be repaid to BPA starting year 11 following the energization date (the "Refund Commencement Date"), with repayment amortized over the remaining 10 years of the New NITSAs. i. IPC and BPA will incorporate the interest schedule and payment amortization as an exhibit to the NITSA Security Agreement; ii. If during the term of the New NITSAs BPA defaults on its payment obligations under the New NITSAs, IPC will be entitled to retain for its own account an amount equal to the defaulted payment obligation not to exceed the amount not reimbursed to BPA as of the default date; iii. BPA will not be considered in default for any amount not paid subject to a billing dispute; and iv. IPC may prepay the Funded Amount and interest thereon at any time without penalty. (2) If IPC does not commence construction of B2H by or before the Commencement Date or if IPC informs BPA before the Commencement Date of its intent to not proceed with B2H, then: a. IPC shall have 180 days from the Commencement Date (or notice to BPA of its intent to not proceed, whichever is earlier) to sell its Permitting Interests in the B2H Project; b. No later than the close of the above mentioned 180 days, IPC shall i. pay to BPA BPA's proportional share of any proceeds received from the sale of its Permitting Interest in the B2H Project (if any), and

		ii. Pay to BPA the $10 million BPA provided to IPC upon execution of the New NITSAs. <u>Risk Backstop if IPC does not Receive all Permits or CPCNs Necessary for constructing B2H.</u> If IPC does not obtain all necessary CPCNs and permits for the B2H Project, or any such CPCNs or permits are overturned on appeal, then (a) IPC will return to BPA the $10 million BPA provided to IPC upon execution of the New NITSAs; and (b) BPA will reimburse IPC for funding the additional 24.24% share of all B2H Permitting and Preconstruction Costs incurred after BPA transfers its 24.24% Permitting Interest to IPC. The reimbursement obligation will not include any costs related to Right of Way option acquisition or exercising Right of Way Options. The risk backstop commitment will remain in place until IPC obtains all necessary CPCNs and permits for the Project (and all appeals, if any, have been resolved). The intent of the backstop is only to assist IPC in mitigating the risk associated with receiving the approvals for the B2H Project; not to assist in mitigating business risk. The risk backstop commitment will be as follows: a. IPC will not compensate or reimburse BPA for costs expended by BPA on B2H prior to the transfer of the Permitting Interest to IPC (*i.e.*, ~$25m BPA has expended to date); b. BPA will reimburse 24.24% of actual B2H Project Permitting Costs incurred after IPC takes over funding 45% of the project. (Current estimates for 2021-2024 – Total B2H Project estimated at $9,125,466 with 24.24% of these costs estimated at $2,212,234); and c. BPA will reimburse 24.24% of actual B2H Project Pre-Construction Costs incurred after IPC assumes funding 45% of the project. (Current estimates for

		2021-2024 – Total B2H Project estimated at $9,403,564 with 24.24% of these costs estimated at $2,279,652). Collectively, these amounts set forth in a. through c. above will be the "Risk Backstop Amount." The Risk Backstop Amount will be adjusted, as necessary, to the extent that IPC receives grants or forms of other financial assistance from sources other than BPA or PAC. For example, if IPC received a government grant that defrayed the pre-construction costs of B2H, BPA's 24.24 % share of the pre-construction costs would be reduced accordingly.
3.	***Transfer of Interest in Joint Permitting Agreement:*** ***Prepare First Draft – IPC: Quarter 2 of Calendar Year 2022*** ***Target Execution Date: Quarter 3 of Calendar Year 2022***	IPC and BPA will execute a purchase and sale agreement, assignment, and other applicable transfer documents, concurrently with the New NITSAs, NITSA Security Agreement, and any related other agreements necessary, to transfer all of BPA's Permitting Interest under the Joint Permitting Agreement (and all of BPA's interest in the assets associated therewith) to IPC in exchange for IPC's agreement for repayment to BPA of BPA's investment in B2H through the Joint Permitting Agreement through the effective date of the definitive purchase and sale agreement contemplated in this Section 3(b) (or other date specified therein). The proposed purchase and sale agreement contemplated in this Section 3(b)(3) will contain representations, warranties, and covenants typical of a transaction of the nature contemplated by these proposed terms. The definitive agreements transferring BPA's Permitting Interest under the Joint Permitting Agreement and related assets will be executed prior to any activities BPA has indicated could impact federal environmental regulatory requirements under NEPA, so as to prevent additional delay in the development of B2H. Following the transfer of BPA's Permitting Interest (and associated assets) under the Joint Permitting Agreement to IPC, IPC will be solely responsible for funding an additional 24.24% share of all B2H Project Costs thereafter under Joint Permitting Agreement

		(which includes permitting and preconstruction costs), and IPC will be entitled to all rights, title, and interests and assets that BPA would otherwise obtain under the Joint Permitting Agreement if it were a remaining funding party thereto.

c) Ownership, Operation, and Maintenance Agreement: Defines IPC's and PAC's capacity and property ownership, and their roles and responsibilities for operating and maintaining the B2H Project ("***Ownership and Operation Agreement***"). IPC will prepare an initial draft of the Ownership and Operation Agreement based on the ownership interests below and otherwise consistent with the terms of the JOOA between IPC and PAC. Alternatively, in lieu of a new agreement, IPC and PAC may decide to amend the existing JOOA to cover the B2H Project assets.

Idaho Power	**PacifiCorp**	**BPA**
Project ownership: 45.45%	Project ownership: 54.55%	Project ownership: 0%

d) Construction Funding Agreement: Defines IPC's and PAC's roles and responsibilities in construction of the B2H Project ("***Construction Funding Agreement***"). IPC will prepare an initial draft of the Construction Funding Agreement consistent with the following terms:

1. Project In-Service Date	June 1, 2026
2. Scope	The Construction Funding Agreement covers all work necessary to construct the B2H Project by the Project In-Service Date, including any associated residual work after the Project In-Service Date, but excluding any work already covered by the Joint Permitting Agreement.
3. Project Delivery System	A competitive process is being completed to hire a Construction Manager / Constructability Consultant ("CM") for the B2H Project in 2022 to: (1) provide constructability feedback to the design engineer; and (2) collaborate with PAC and IPC to complete the BLM Construction Plan of Development and the Oregon Energy Facility Siting Council's Site Certificate amendments. The hiring process of the CM will be structured such that the CM may be retained to construct the B2H Project.

	IPC and PAC may mutually agree to modify the CM's role through the Construction Funding Committee (as defined in Section 10 below -***Project Funding and Committee***) without amending the Construction Funding Agreement.
4. Project Manager	IPC is the overall Project Manager for all B2H Project permitting, design, procurement, construction, except that BPA will be responsible for designing, procuring, and constructing the Longhorn substation as described in Section 3(a)(4) and relocating and replacing the BPA 69 kV line off Navy property as described in Section 3(a)(10). Although IPC is the Project Manager, PAC is not precluded from taking project management responsibilities for all or selected tasks associated with the B2H Project; provided that these delegations must be made by the Construction Funding Committee.
5. Construction Project Manager	IPC's role as Construction Project Manager will be generally consistent with the roles and responsibilities of the Permitting Project Manager set forth in Article IV of the Joint Permitting Agreement, provided that the permitting responsibilities not relevant to construction will be removed. IPC, as the Construction Project Manager, will provide monthly project updates, including updates on project activities, financials, forecasts, and invoices detailing costs incurred with breakdowns demonstrating all Parties' cost responsibilities based on their percentage shares. To provide the necessary flexibility to avoid delay/additional costs, the Construction Project Manager will administer and oversee all work necessary to construct the B2H Project within the approved budget, schedule and scope, and also have authority to approve any non-material changes to the B2H Project resulting in a price difference of less than $500k, so long as the overall B2H Project costs remain within the approved budget with the price change. All changes to the B2H Project resulting in a change in the approved budget, will require approval of the Construction Funding Committee.

6. Component Specifications	All B2H Project construction specifications shall meet or exceed all applicable state and federal design requirements and standards; provided that, such specifications may be modified by the Construction Funding Committee so long as the project complies with all applicable state and federal design requirements and standards.
7. Real Property Ownership	B2H real property, except Longhorn substation: IPC will acquire rights of way, grants, easements, or other interests in real property necessary to construct, operate and maintain the B2H transmission line and grant to PAC perpetual and sufficient rights of access, to be set forth in the Ownership and Operation Agreement. Longhorn Substation: Upon completion of BPA's obligations and responsibilities under NEPA, NHPA, and other requisite environmental compliance laws and if BPA decides to proceed with construction of Longhorn substation, BPA will continue to own all real property associated with the Longhorn substation, and in relation to the B2H Project equipment BPA shall grant to IPC and PAC perpetual and sufficient rights of access, to be set forth in one or more Longhorn Substation Agreements as described in Section 3(a)(4).
8. Equipment and Facilities Ownership	Equipment and facilities ownership will be consistent with the Ownership and Operation Agreement. B2H equipment/facilities, except Longhorn substation: IPC and PAC will jointly own as tenants in common the transmission line and all associated facilities and equipment, including all associated facilities located in Hemingway Substation as well as supporting communication facilities and B2H Project substation equipment. Longhorn Substation: Upon completion of BPA's obligations and responsibilities under NEPA, NHPA, and other requisite environmental compliance laws and if BPA decides to proceed with construction of Longhorn substation, BPA will own all equipment and facilities in the Longhorn substation, except the B2H specific equipment and facilities which will be jointly owned by IPC and PAC as tenants in common. BPA will grant IPC and PAC access rights to the equipment

	and facilities in Longhorn substation that are constructed as part of and necessary to the operation of the B2H transmission line facilities, to be set forth in one or more Longhorn Substation Agreements as described in Section 3(a)(4).
9. Material Procurement	All material specifications shall be in accordance with IPC's procurement policies and standards, unless otherwise agreed by the Construction Funding Committee to exceed the same.
10. Project Funding and Committee	Funding: IPC and PAC will fund the B2H Project consistent with their respective ownership shares. Construction Funding Committee: The Construction Funding Agreement shall create a Construction Funding Committee consistent with IPC and PAC's ownership interests in the B2H Project, and generally consistent with the Permit Funding Committee created by the Joint Permitting Agreement (Article III). The Project Manager's reporting requirements set forth in the above Section 5 (***Construction Project Manager)*** will be delivered to all members of the Construction Funding Committee prior to, and discussed during, each of the Committee's regularly-scheduled monthly meetings. Obligations, disputed amounts, and audit rights will be generally consistent with Article III of the Joint Permitting Agreement. The Project Manager will have flexibility to make day-to-day decisions associated with construction of the Project but will be required to seek resolution/approval from the Construction Funding Committee on larger dollar/impact decisions, consistent with that set forth in the above Section 5 (***Construction Project Manager***). BPA will be responsible for designing, procuring, and constructing the Longhorn substation as described in Section 3(a)(4) and relocating and replacing the BPA 69 kV line off Navy property, as described in Section 3(a)(10).
11. Payment Schedule	Costs Accrued Prior to Agreement Execution: Prior to executing the Construction Funding Agreement, IPC

	and PAC will have the opportunity to audit all accrued construction-related expenses included therein that have not otherwise been funded under the Joint Permitting Agreement. IPC and PAC will align on ownership shares prior to execution of the Construction Funding Agreement and pay their respective portions of accrued expenses within 30 days of the effective date of the Construction Funding Agreement. Until which time BPA fully divests its ownership interest in the B2H Project, the Parties acknowledge that the B2H Project is bound to compliance with NEPA, NHPA, and other environmental laws associated with federal agency action. Costs Incurred After Execution: Following execution of the Construction Funding Agreement, the Project Manager will invoice the Construction Funding Agreement participants monthly, requiring payment within 30 days of the invoice date.
12. Transfer/Assignment of Rights/Interests *(Some or all of these terms may be instead placed in the Ownership Agreement)*	IPC and PAC may sell some or all of their respective ownership interests in the B2H Project, together with associated capacity, subject to the Construction Funding Committee's agreement and approval of the terms of any such transaction; provided that, such approval will not be unreasonably withheld. IPC will not transfer or assign rights or interests in the B2H Project that would materially impact the BPA load service commitments set forth in Section 3(b) of this Term Sheet.
13. Term ***Early Termination*** ***Withdrawal***	Term: The term of the Construction Funding Agreement will extend through completion of B2H Project construction, as well as final billing and any reconciliation or mitigation associated with the final expenses, unless otherwise agreed by the Construction Funding Committee. Early Termination/Withdrawal: Absent approval of the Construction Funding Committee, no Party shall have a right to withdraw from the Construction Funding Agreement following the earlier of (1) awarding the B2H Project construction contract, or (2) commencing procurement of long-lead items and equipment.

	Assignments of IPC's or PAC's rights and obligations under the Construction Funding Agreement shall be managed pursuant to the above Section 12 (***Transfer/Assignment of Rights/Interests***).
14. Event of Default	Generally consistent with Article VIII of the Joint Permitting Agreement.
15. Force Majeure	Generally consistent with Article IX of the Joint Permitting Agreement.
16. Reps and Warranties	Generally consistent with Article X of the Joint Permitting Agreement.
17. Common Defense & Limitation of Liability	Generally consistent with Article XI of the Joint Permitting Agreement, except that the Article will be expanded to address construction claims.
18. Proprietary Information/Confidentiality	Generally consistent with Article XII of the Joint Permitting Agreement, except that the Article will provide IPC the ability to share information as necessary to work with potential and selected engineers and contractors.
19. Dispute Resolution	Generally consistent with Article XIII of the Joint Permitting Agreement.
20. Miscellaneous	Generally consistent with Article XIV of the Joint Permitting Agreement and including any standard terms that are necessary for PAC agreements (e.g. assignment and jury trial waiver provisions).

4. Additional Agreements. The Parties agree that they may consolidate any or all of the above-described Agreements and are not precluded from pursuing additional agreements, or amending existing agreements as needed, related to the B2H Project besides those discussed herein.

5. Expenses. Each Party will bear its own expenses (including attorneys' fees) incurred in connection with preparation, negotiation, and execution of this Term Sheet, including preparation, negotiation and execution of the Agreements described herein.

ACKNOWLEDGED AND AGREED TO BY THE PARTIES:

IDAHO POWER COMPANY

Signature: _____

Printed Name: Ryan N Adelman

Title: VP, Power Supply

Date: 1/18/22

PACIFICORP

Signature: Rick Link Digitally signed by Rick Link Date: 2022.01.18 11:11:21 -08'00'

Printed Name: Rick Link

Title: Senior Vice President, Resource Planning, Procurement and Optimization

Date: 01/18/2022

Signature: Rick Vail Digitally signed by Rick Vail Date: 2022.01.18 11:59:50 -08'00'

Printed Name: Rick Vail

Title: Vice President, Transmission

Date: 01/18/2022

BONNEVILLE POWER ADMINISTRATION

Signature: TINA KO Digitally signed by TINA KO Date: 2022.01.18 04:25:04 -08'00'

Printed Name: Tina Ko

Title: Vice President, Transmission Marketing a

Date: 1/18/2022

Signature: Digitally signed by KIM THOMPSON Date: 2022.01.18 07:32:28 -08'00'

Printed Name: Kim Thompson

Title: Vice President, Requirements Mark

Date: 1/18/2022

Greg Larkin/1112
Greg Larkin/1

FERC Orders PacifiCorp to Respond to Allegations of Reliability Violations

April 15, 2021
Docket No. IN21-6-000
Item E-10

The Federal Energy Regulatory Commission (FERC) today ordered PacifiCorp to explain why the company should not be assessed a proposed civil penalty of $42 million for violating FERC reliability standards on its bulk electric system.

In the Staff Report attached to today's order, FERC Office of Enforcement (OE) staff allege that PacifiCorp violated the Federal Power Act and regulations by failing to comply with a Commission-approved reliability standard developed by the North American Electric Reliability Corporation (NERC), the Commission-certified Electric Reliability Organization, involving transmission line facility ratings methodology.

Specifically, PacifiCorp adopted a facility ratings methodology that required the consideration of clearance measurements consistent with the National Electric Safety Code (NESC). FERC Enforcement Staff found that clearance measurements on a majority of PacifiCorp's bulk electric system transmission lines were incorrect under the NESC. As these clearance measurements were used to calculate PacifiCorp's facility ratings, PacifiCorp's facility ratings were thus inconsistent with its facility ratings methodology.

Moreover, Enforcement staff alleges that PacifiCorp was generally aware of incorrect clearances on its bulk electric system since at least 2007, when FERC's reliability standards became mandatory, but failed to specifically identify all of the clearance problems and remedy them in a timely manner.

Enforcement Staff alleges that PacifiCorp's violations began on August 31, 2009, when the company implemented its facility ratings methodology policy, and that at least some of the violations continued until August 2017, when PacifiCorp completed remediation of all of its incorrect clearances to make them consistent with its facility ratings methodology.

Enforcement Staff's investigation into PacifiCorp's incorrect clearances began in 2012 after learning of the Wood Hollow wildfire that lasted from June 23 to July 1, 2012 in Sanpete County, Utah. Enforcement Staff alleges that the inadequate clearance involved in the fire was just one example of clearance violations prevalent on PacifiCorp's bulk electric system.

Today's order makes clear that issuance of the order does not indicate Commission adoption or endorsement of the Staff Report. PacifiCorp has 30 days to respond to the Commission's order.

R21-32

(30)

Contact Information

Benjamin Williams

Acting Director, Office of External Affairs

Email: benjamin.williams@ferc.gov

This page was last updated on April 15, 2021

Located in Oregon, USA

Greg Larkin/1111
Greg Larkin/1

Feds Blame PacifiCorp for Oregon Wildfire

KARINA BROWN / July 22, 2015

EUGENE, Ore. (CN) - PacifiCorp should pay for a wildfire caused by its power lines from a hydroelectric dam, the federal government claims in court.

The United States sued PacifiCorp and Mountain Power Construction Company in Federal Court on Tuesday, accusing the companies of breach of contract, strict liability and trespass by fire and demanding reimbursement for fire damage done by the 2009 Williams Creek Fire in the Umpqua National Forest.

Federal agencies granted a 35-year license to operate the North Umpqua Hydroelectric Project and its transmission lines in 2003 - on the condition that PacifiCorp and Mountain Power implement a fire suppression and vegetation management plan, according to the complaint.

The companies were supposed to clear brush and trees away from the Dixonville-to-Soda Spring power lines moving hydroelectric power to the grid and check the area annually for fire hazards, the government says.

But six years later, the Williams Creek Fire ignited in that very spot, the government claims. A fire investigation allegedly concluded that the fire was caused by the power lines.

The government says it paid a pretty penny to squelch the fire, which burned more than 8,000 acres of the Umpqua National Forest over 19 days. The fire destroyed wildlife habitat, trees that protected the watersheds and prevented erosion, areas valuable for scenic and environmental reasons and assorted structures, the lawsuit states.

PacifiCorp and Mountain Power must cover the cost of damages from the fire, which the government says will be determined at trial.

Acting U.S. Attorney for the District of Oregon Billy J. Williams filed the suit on behalf of the government.

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February 6, 2023



Colorado bill to fund AI-equipped cameras to detect and fight wildfires advances

January 26, 2023

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ESTERSON Sarah * ODOE

From: Sarah.ESTERSON@energy.oregon.gov
Subject: Second submission Contested Case regarding failure to comply with requirements of the Forest Practies Act.
Attachments: Contested Case Request Document Inforation Required for all Requests.pdf; Contested Case FPA.pdf

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From: Irene Gilbert <ott.irene@frontier.com>
Sent: Friday, September 8, 2023 3:48 PM
To: TARDAEWETHER Kellen * ODOE <kellen.tardaewether@energy.oregon.gov>; CORNETT Todd * ODOE <todd.cornett@oregon.gov>
Cc: Fuji Kreider <fkreider@campblackdog.org>; Jim Kreider <jkreider@campblackdog.org>; Lois Barry <loisbarry31@gmail.com>; Charlie Gillis <charlie@gillis-law.com>; Matt Cooper <mcooperpiano@gmail.com>; Susan Geer <susanmgeer@gmail.com>; Greg Larkin <larkingreg34@gmail.com>; Jon White <jondwhite418@gmail.com>; Anne Morrison <amorrison@eoni.com>
Subject: Second submission Contested Case regarding failure to comply with requirements of the Forest Practies Act.

https://www.dropbox.com/scl/fi/mzfam1op1d7584ic43rav/Merge-Result-fpa-exhibits.pdf?rlkey=epypngv6ogs5frddaqnamvpmf&dl=0
https://www.dropbox.com/scl/fi/mzfam1op1d7584ic43rav/Merge-Result-fpa-exhibits.pdf?rlkey=epypngv6ogs5frddaqnamvpmf&dl=0
Please accept this contested casefiled on behalf of the Stop B2H Coalition, the public interest and me as an individual

1. The first document contains the generic information require torequest a contested case.
2. The second is the language of the request as well as references to exhibits.
3. The third document contains several of the referenced exhibits. This is a large file and I had to attempt to get it submitted by using a drop box. Hope it worked. The remaining exhibits will be submitted with testimony during my opening if I am allowed a Contested Case.

To: Energy Facility Siting Council

From: Irene Gilbert, Co Chair STOP BTH

Subject: "Requests for Contested Cases on Amendment I, B2H Transmission Line Site Certificate". Required Information to request a Contested Case

(a) The person's name, mailing address and email address and any organization the person represents;

a. Irene Gilbert/2310 Adams Ave./La Grande, Oregon 97850

b. Email: ott.irene@frontier.com

c. Organization I represent and my qualifications to do so:

STOP B2H—Co-Chair : I am co-chair of STOP B2H and a member of the board of directors for the coalition. I am actively involved with planning, research and development of issues the non-profit organization is addressing related to this development. I drafted the comments for the issues I am representing the organization on. I have donated thousands of hours and hundreds of dollars to support the organization. The board of directors has determined that I am best qualified to address the issues being brought forth in this Contested Case Request.

2. The Public Interest:

I have been addressing issues with energy siting for a dozen years including participation in both state and county

advisory boards regarding energy development including the B2H transmission line. I served as Legal Research Analyst for the Friends of the Grande Ronde Valley and am a member of the Blue Mountain Alliance, the Rocky Mountain Elk Foundation, own and manage a small timber site as well as agricultural land, and have previously appeared in contested cases as a representative of the public interests regarding this project. I have also appeared as the representative of an individual landowner in the Contested Case Proceedings before the Oregon Public Utilities Commission.

3. Myself as an individual.

Personal Interest: I live in La Grande and my activities involve hunting, fishing, hiking, biking and am an avid user of the recreational areas of the state and this county. The quality of my life including the recreational activities, the culture and visual benefits that resulted in me living here will be degraded as a result of this transmission line. In addition, I experience a significant amount of empathy for the landowners whos property and livelihood is being damaged by this development. In addition, I have a financial interest in the impacts of this development. My

partner and I hold the contract for a Sporting business in La Grande. This contract is part of our financial security. Project negative impacts to the local economy will impact the income to the business and could result in the new owner being unable to meet his commitments under his purchase agreement.

b) Attorney representation:

I am representing the contested case on behalf of STOP B2H, the public interest and myself as an individual. We reserve the right to obtain attorney representation later in the proceeding.

c) A statement of whether the person's request to participate in a contested case is as a party or a limited party, and if as a limited party, the precise area or areas in which participation is sought;

I am requesting participation as a full party to this contested case. During the initial Contested Case hearing for this project, none of the organizations or members of the public were provided full party status. Only the developer and the Oregon Department of Energy were allowed to participate as full parties. Following are examples of things that occurred as a result of limiting all public petitioners to items they commented on during the public comment period of the Contested Case regarding the Site Certificate for the B2H Transmission line:

1. The developer was able to request Summary Determinations for issues they wanted removed from the site certificate and none of the public participants were able to argue against their requests. The Hearings Officer approved the requests including removing pre-construction surveys for bats and species specific surveys for other wildlife. The public participants and the public being represented by STOP B2H and myself were denied the opportunity to submit opposing testimony even though there was strong disagreement with the removal of these site certificate conditions.
2. Allowing only Idaho Power and the Oregon Department of Energy full party status provided them both opportunity to testify in support of one another. The Hearings Officer used their agreement as supporting findings against the public. The petitioners were unable to submit similar comments supporting one another's comments. ODOE did not support the public's contested cases, and consistently argued in support of the developer, or in a few cases, remained silent. Allowing the developer and ODOE to work together against the public's Contested Cases provides an unfair advantage to the developer and fails to provide an unbiased review of the issues.

No other person is able to present these contested cases. I drafted the comments on these issues, and no one else submitted comments on these issues to allow them to request a Contested Case.

SPECIFIC ISSUES I AM REQUESTING CONTESTED CASES ON FOR STOP B2H, THE PUBLIC AT LARGE AND MYSELF AS AN INDIVIDIUAL ARE ADDRESSED IN:

1. ATTACHMENT 1: Contested Case Request Regarding Bond Along with Documentation Supporting the Statements and Need for this Contested Case Request
2. ATTACHMENT 2: Failure to Comply with Forest Practices Act
3. ATTACHMENT 3: Failure to Provide public Notice of Right to Participate in Contested Cases" Presented in behalf of the public interest and myself as an individual.

All three of these issues will require changes to the Conditions and Site Certificate to comply with the ODOE standards.

I believe this document provides the general information requested to participate in the Contested Case process. In the event that I have overlooked a requirement, please provide me an opportunity to provide the missing information.

Irene Gilbert, Co-Chair, Stop B2H

2310 Adams Ave.\

La Grande, Oregon 97850

ATTACHMENT TWO REFERENCED IN GENERAL REQUEST FOR CONTESTED CASES

This contested case is being requested and presented by Irene Gilbert on behalf of STOP B2H, the Public Interest and Irene as an individual.

Irene Gilbert is the person most qualified to present this case which was commented on by STOP B2H, and Irene Gilbert in behalf of all three entities as documented within this request.

Irene is the Co-chair of STOP B2H. To our knowledge, no other entity is requesting a contested case on this topic. Irene has extensive experience with the FPA requirements including studying the rules, and personally complying with compliance with the rules on her property including the harvest and reforestation of forest land under a Timber Management Plan and FPA requirements. Exhibit 14 attached is a request for purchase of her property or to obtain rights to harvest timber which includes references to the changes to FPA impacting private forestland owner requirements of the FPA revisions.

Rule References and Exhibits supporting this contested case are included in separate document attached at the end of this document.

CONTESTED CASE REQUEST BOARDMAN TO HEMINGWAY AMENDMENT I REGARDING FOREST PRACTICES ACT NON-COMPLIANCE

THE SITE CERTIFICATE AND ORDER FOR THE BOARDMAN TO HEMINGWAY AMENDMENT I FAILS TO COMPLY WITH AND OFTEN CONFLICTS WITH THE FOREST PRACTICES ACT. AREAS OF NON-COMPLIANCE INCLUDE BUT ARE NOT LIMITED TO THE LIST OF FINDINGS INCLUDED WITH THIS REQUEST. THE

FPA REQUIREMENTS MUST BE INCORPORATED INTO EFSC APPROVED SITE CERTIFGICATES DUE TO THEM BEING REQUIRED TO FOLLOW STATE LAW AND THE FACT THAT THE FPA TAKES PRECIDENCE OVER ALL OTHER STATUTES AND RULES WHEN ACTIVITIES ARE OCCURRING IN FOREST AREAS. THE PRIORITY PLACED ON THE FPA STATUTE AND RULES IS DOCUMENTED BY THE GOVERNOR, STAKEHOLDERS WHO DEVELOPED THE "PRIVATE FOREST ACCORD" AND SENATE AND HOUSE BILLS PASSED BY BOTH HOUSES IN SUPPORT OF THE FPA REQUIREMENTS.

This issue was commented on by STOP B2H in writing on July 18, 2023. Their comments are included in this document as Exhibit 1 providing documentation that the issue was presented during the public hearing on the Draft Proposed Order. Idaho Power made written responses to those comments on July 19, 2023. (Exhibit 11, Pages 1 through the top of Page 6) In addition, they made written responses to verbal comments from Irene Gilbert (Exhibit 11, Top of page 6 through top of Page 8)indicating the comments contained the specificity required by council rules.

INTRODUCTION TO THIS CONTESTED CASE TOPIC

The treatment of forest land has been a source of concern for several years due to the fact that the B2H Site Certificate fails to provide required protections for landowners, wildlife, forest and water resources.

Oregon statutes establishing The Forest Practices Act (FPA) includes specific language identifying this act as providing the overriding law regarding forest activities and activities occurring in forest lands. The

FPA applies even when the forest activity is a peripheral component of the project. The forest practice rules are intended to provide resource protection and to set standards for planning forestry practices including harvesting, road construction and maintenance, protecting water quality in waters of the state, limiting effects on specified resource sites, providing for public safety down slope of high landslide hazards, and determining reforestation or land conversion requirements. (Exhibit 3, Page 1, Paragraph 4) The statutes provide the State Board of Forestry authority to establish rules for implementing ORS 527.710 to ORS 527.770. These statutes include establishing rules to protect wildlife species, (ORS 527.710) establish forest practices to prevent or reduce pollution of state waters (ORS 527.765), establish wildfire rules, establish requirements for road construction, etc.

The FPA statute and rules are applicable to the B2H development and site certificate under OAR 345-025-0006(3)(b) due to the fact that actions occurring and authorized by the site certificate include activities which under Oregon Statutes fall under the exclusive control of the Oregon Department of Forestry and the FPA. ODOE advised Council that the Draft Proposed Order on Amendment 1 complied with all other state statutes and administrative rules which is not the case (Exhibit 13, page 16, Item 4)

There are concerns that STOP B2H and/or Irene Gilbert may be denied access to a contested case on this issue due to the history of contested cases on amendments being denied contested cases. This request contains documentation that support allowing a contested case on the issue as well as documentation that will support an appeal absent a fully developed contested case file.

This Contested Case request applies to Amendment I, which adds multiple roads and developments in and adjacent to resources protected by the FPA in forested regions in Umatilla County, Union County and Baker County. The planned developments as well as clearing related to construction in forest areas must comply with FPA requirements as noted in OAR 629-625-0000(5) and (Exhibit 9, Page 42 Table 9), The Amended Site Certificate for B2H removes the review process under OAR 345-025-0016 which provides the counties, state and federal agencies the opportunity to review and participate in finalization and implementation of the Right of Way Clearing Assessment. (See Draft Plan or Future Plan Amendments to Right of Way Clearing Assessment, Pages 1and 2 describing the Agency Review Process Attachment to Site Certificate) This plan must include requirements of the Forest Practices Act regarding fire safety, wildlife and water protections, criteria for road construction in forest lands. This Contested Case Request includes just some of the issues that need to be consideredThe number of local, state and

federal agencies who should be able to have input into this plan is extensive and removing the Agency Review Process means that the plan can be developed with only he developer and the Oregon Department of Energy.

Issuing a site certificate with conditions which conflict with the FPA effectively waive the requirements of the act. EFSC is required by ORS 469.401 and ORS 469.503 to follow State Law which includes the FPA requirements.

FACTS AND ARGUMENTS SUPPORTING THE NEED TO HAVE THIS CONTESTED CASE HEARD:

I am unable to identify specific locations where the site certificate represents a waiver of the FPA due to the lack of documentation provided by the Applicant or included in. the Site Certificate Order and Site Certificte. The Proposed Order for Amendment I of the site certificate fails to include locations of wildlife and nest sites protected under the FPA, fails to complete surveys identifying areas requiring protection due to the presence of specific species listed in the FPA, fails to provide maps which allow the reviewer to determine if setbacks from water resources infringe upon locations protected by the FPA. What is clear is that the Site Certificate contains conditions including setbacks and other conditions documenting that the Site Certificate and Order on Amendment I fails to comply with Forest Practices Act mandates.

Following are findings of fact which document that EFSC decisions supporting the inclusion of these site certificate conditions will result in a failure to comply with the FPA.

1. EFSC included conditions in the Site Certificate and Order for the B2H Amendment l which conflict with the Forest Practices Act requirements for all forest practices conducted on or pertaining to forest land. (OAR 629-600-0100 (26) and (27) as documented in these finding of fact. EFSC conditions effectively waived Oregon Statutes in resolving conflicts between council administrative rules and Oregon Statutes regarding the FPA, since the FPA is the overriding statute in addressing forest practices under OAR 345-025-0006(3).
2. The Site Certificate defines Forest Land in Union County in a manner that is not consistent with the FPA. For example:
    a. The site certificate uses Union County Ordinance rather than FPA to define forest land. (Exhibit 9, Page 81, middle paragraph including final order on Application and attachment 2022-09-27, page 203 document that forest land is identified based upon Union County Zoning Rules. Forest land is defined in OAR 629-600-0100(26) as that used for growing or harvesting trees regardless of statutes or applications of statutes and rules, and OAR 629-610-0010 as capable of producing timber growth of 20 cubic feet peer acre per year.

Note: Use of a definition that is not used in the FPA increases the potential that the developer will fail to comply with the FPA rules.

It is virtually impossible to identify specific locations where setbacks from water resources are not being complied with due to the scale of the maps provided by the developer.. What is clear is that there are roads and developments such as multiple use areas that appear to be right up against streams and wetlands. And the current site certificate fails to require setbacks consistent with the FPA. Following are some examples:

3. Setbacks from Streams are either narrower than FPA requirements or no limits are imposed . The necessity of requirements for water protections being followed is supported by multiple studies and reports including the Integrated Water Resources Strategy, August 2012 indicating that all riparian areas within a watershed with Threatened and Endangered fish is considered Category 1 and the Oregon Department of Environmental Quality 2000 report indicating that fact that the Total Maximum Daily Load (TMDL) for the Upper Grande Ronde Sub-Basin already show that waterways are degraded to the extent that some areas should be avoided entirely. While the Environmental Impact Study did not evaluate actual water impacts due to the lack of a final site location, on page 3-133 it states that setbacks assumed to be applied are 300 feet on either side of fish

bearing streams or further, depending upon the site and the EIS uses this setback when disclosing the effects, the project will have on the area. Information such as that documented above show the importance of complying with the FPA which represents the work of multiple stakeholder groups, the governor's office and the legislature to address impacts to water resources in the state due to forest activities and actions occurring in forestlands.

4. Wetland and water resources surveys are only required for the boundary of the site which does not include wetlands located immediately adjacent to the transmission line route which will be impacted and must be protected under the FPA.
5. The FPA requires most setbacks for Riparian Areas along streams to be 100 feet. The shortest setback is 60 feet and they are stream specific. (Exhibit 12)

The EFSC Site Certificate States the following regarding setbacks from waterways:

i. Union County - Setbacks from Class 1 streams are established at 25-feet or one-half the stream width, whichever is greater (Exhibit 10, Page 29, Gen-LU-06)
ii. Baker County and Malheur County: No setback distances are required. (Exhibit 10, Pages 30-32)
iii. Umatilla County: Requires a 100 foot setback from streams only on Agricultural Land. For forest land the

setback is 25 feet(Exhibit 10, Page 29, Condition Gen-LU-04)

iv. Morrow County: Requires setbacks of 100 feet only for Sand Hollow Creek, Little Butter Creek, Butter Creek, and Little Juniper Creek (Exhibit 10, Page 17, Gen.-LU-02)

6. Written plans are required for operations occurring within 100 feet of streams used by fish or for domestic water or written plans including assessment of factors impacting all water crossings. (OAR 629-600-0100) (OAR 629-625-0100) (OAR 629-625-0320_
7. The Site Certificate states that the Oregon Department of Energy can approve changes to the Right of Way Clearing Assessment. (Page 32 of Exhibit 10, Condition GEN-LU-13) The Right of Way Clearing Assessment is directly related to the Forest Practices Act rules and the Oregon Department of Forestry needs to be the agency approving both the Assessment and any changes to the assessment.
8. Federally listed species are excluded from protection under the Threatened and Endangered Species decisions in the Site Certificate. Their habitat needs are also not specified in the Habitat Mitigation section of the Site Certificate.
9. Nest sites are not identified or protected consistent with the FPA rules. This results in a failure to identify nest sites outside

the site boundaries and provide required setbacks from those nest sites.

a. The analysis area for Fish and Wildlife Habitat is the area within the site boundary additions. (Exhibit 9 Page 152, Line 32) TVES were conducted only within the site boundary
b. `Avian Surveys completed in April, May, June were conducted within ¼ mile of site boundary for only targeted species:; (owls, Goshawk and Three-toed woodpeckers) Exhibit 9, Page 153, second paragraph and bullet 4 on that page..
c. American three-toed woodpecker and Northern Goshawk surveys eztend ½ mile from site boundary. (Exhibit 9 Pages 153-154)
d. Surveys required for Northern Goshawk (1/2) mile fron site), American Three-Toes Woodpecker (1/2 mile from site boundary), great Gray Owl, TVES, wetland and fish. Also WAGS, raptor nests and pygmy rabbits.

10. No species specific surveys were required for the following birds which have specific protections included in the FPA:
    a. Bandtailed Pigeon
    b. Great Blue Herron
    c. Murrelet
    d. Osprey
    e. Peregrine Falcon

Birds Specifically protected under the FPA:

a. Northern Spotted Owl—70 acres of suitable owl habitat surrounding nest site is protected. No forest operations allowed within ¼ mile of nest site Mar. 1 to Sept 30. (Exhibit 2, Page 43)
b. Bald Eagle—300 feet from nest site for a nest site used by bald eagles in past 5 years whether or not nest tree still contains a nest. No forest activities in do not disturb area 600 feet from nest site and 1,000 feet for aircraft Jan. 1 to Aug. 12 (Exhibit 2, Pages 44-45)
c. Bandtailed Pigeon
d. Golden Eagle—
e. Great Blue Heron—No forest operations ¼ mile from active nest tree from Feb. 15 to July 31 (Exhibit 2, Page 48)
f. Marbled Murrelet—
g. Northern Goshawk—
h. Osprey—No forest operations within 600 feet of active nest tree which is one used in the past 5 nesting seasons from Mar. 1 to Sept. 15. Active nest tree is one used in the past 5 nesting seasons (Exhibit 2, Pages 46-47)
i. Peregrine Falcon---

11. Protected area for birds, setbacks and timeframes for restricted activities around nest sites of protected birds as noted above are not being honored. The areas identified when construction activities can occur do not comply with the protected timeframes in the FPA.

12. The Site Certificate allows removal of unoccupied nests that are protected by the FPA for bald eagles and ospreys.

Forest practices in all counties in Oregon must comply with the Forest Practices Act requirements:

1. Road Construction Failure to Comply with the FPA requiring road construction and maintenance rules to be applied to all forest practices regions unless otherwise indicated: (OAR 629-625-0000.)
2. OAR 629-625-0100(2) and OAR 629-625-0200 identify areas covered by the FPA including areas at risk from road generated materials entering the waters, roads constructed in riparian areas, constructing or reconstructing any water crossing or roads constructed in critical locations including those within 50 feet of stream channels or lakes, or within significant wetlands. These areas require a written plan.
3. OAR 629-625-0330 requirements for Drainage must be implemented per Forest Practices Technical Guidance regarding road drainage rule compliance.

Intent to obtain, or the issuance of approval of an Alternate Practice does not exempt the developer from complying with the FPA through the removal of the existing timber. The Alternate Practice only addresses the ability of the developer to avoid the reforestation

requirements. They must still comply with the FPA through the removal of trees. (Exhibit 5, Page 20, item (g).)

Site Certificate references regarding riparian impacts, water crossings, road construction which fail to include ODF evaluation er the FPA are misleading and often conflicts with the FPA requirements due to the fact that they only list ODFW requirements and involvement in the decisios.

:

FORESTLANDS SUITABLE FOR REFORESTATION 629-610-0010

(1) Any forestland which is capable of annual wood production of at least 20 cubic feet per acre at culmination of mean annual increment (Cubic Foot Site Class VI or better) shall be subject to the requirements of the reforestation rules. Lands suitable for reforestation requirements would be forestland under the FPA and must comply with FPA requirements.

Forest Practices Act Requirements regarding Roads:

All roads in forested areas must comply with the Forest Practices Act Requirements regarding roads. The rule language was Adopted on October 26, 2022 to implememt Senate Bills 1501, 1502, House Bill 4055 and the Private Forest Accord Report dated February 2, 2022. The changes were promulgated in rule on October 26, 2022 with staggered effective dates, the last having an effective date of January 1, 2024.

The Site Certificate only references ODOE OAR 345-022-0115

Some Requirements in the rules that apply to areas added in this Amendment involving the cutting of trees to develop the site.

1. Condition: Developer will comply with FPA rules and BMP's when developing roads in any areas covered by the FPA including wetlands along streams in agricultural land. The site certificate requires compliance with road requirements of the FPA for only Umatilla County. (Exhibit 9, Page 53 PRE-LU-0l) The Amendment I Site Certificate only references OAR 345-022-0115 which did not become effective until after the original Site Certificate was issued and changes the fire prevention and risk mitigation to accept OPUC's fire protection plan for not only the area added to the site by Amendment I, but also the original site certificate condition. This rule did not become effective until 7/29/22 after the original Site Certificate was issued . It can only be used for the areas added to the site after the effective date of the rule change. In addition, ODOE requested concurrence from ODF that the Original Site Certificate condition complied with the FPA. No such request was made to address the changed condition regarding fire protections.

It is well established through research that application of the existing and revised rules for forest roads will avoid or minimize the delivery of sediment to waters of the state (Luce and Black, 1999).

OAR 629-625-0200 Road Location" (1) The purpose of this rule is to ensure roads are located where potential impacts to waters of the state are minimized and hydrologic connectivity between roads and waters of the state is reduced to the maximum extent practicable. (2) When locating roads, operators shall designate road locations which minimize the risk of materials entering waters of the state and minimize disturbance to channels, lakes, wetlands and floodplains. (3) Critical Locations. Operators shall avoid locating roads in critical locations.

OAR 629-625-0310 Road Prism (1) Operators shall use variable grades and alignments to avoid less suitable terrain so that the road prism is the least disturbing to protected resources, avoids steep sidehill areas, wet areas, and potentially unstable areas as safe, effective vehicle use requirements allow (4) Operators shall design cut and fill slopes to minimize the risk of landslides. (5) Operators shall stabilize road fills as needed to prevent fill failure and subsequent damage to waters of the state using compaction, buttressing, subsurface drainage, rock facing or other effective means.

EFSC previously requested comment from the Oregon Department of Forestry regarding compliance with FPA requirements for Wildfire Mitigation and Management during the initial Site Certificate Process. The current Site Certificate removes the previous requirements and instead accepts any plan approved by the PUC as meeting the EFSC requirements. The Fire Management Plan in areas of forest land impacted by this development must not only comply with the EFSC rules, but must also continue to comply with the requirements of the FPA. The changed Site Certificate accepting the PUC plan no longer demonstrates that it complies

with the requirements of the FPA. EFSC rules allowing acceptance of a Public Utilities Commission approved Fire Protection Plan does not meet the requirements under the FPA for a Fire Protection Plan.

SITE CERTIFICATE CONDITIONS NEEDED TO AVOID CONFLICTING WITH REQUIREMENTS OF THE FPA:

Condition One: The final Right of Way Clearing Assessment referenced in GEN-LU-13 must include requirements of the Forest Practices Act and be approved by the Oregon Department of Forestry to establish compliance with the FPA.

Condition Two: All road construction in critical locations shall be reviewed on site by the Department and the Oregon Department of Forestry with consultation from a qualified professional as appropriate for the site, including but not limited to DEQ, and ODFW

Condition Three: All road construction in critical locations as defined in the FPA must be outlined in a written plan approved by ODF.

Condition Four: Developer removal of timber and road development in all counties being crossed by the transmission line must comply with Forest Practices Act Rules until timber removal is completed and an Alternate Practice is approved by the Oregon Department of Forestry.

Condition Five: All requirements for protection of wildlife species and habitat included in the FPA must be followed in forestland.

Condition Six: The Oregon Department of Forestry must approve all Fire Management and Control plans impacting forest land located in and adjacent to the site boundary.

Note: This condition is necessary to avoid conflicts between EFSC rules and FPA rules. It also will avoid receiving a public request under OAR 345-027-0390 to require compliance with the Forest Practices Act,. Requiring a future amendment to the site certificate would result in unnecessary inconvenience and cost to the developer and ODOE.. Given the politics behind these rules, the Statutes requiring the FPA rules, the stakeholders involved in the development of the rules including the governor, there is a strong likelihood that such a request will be made. (Office of Governor Kate Brown memo regarding Private Forest Accord implementation and the organizations represented in the development of the Private Forest Accord)

The above findings support a decision that the applicant fails to meet the requirements of the FPA. Habitat mitigation and proposed site certificate conditions must be included to comply with requirements of both agencies.



OREGON'S FOREST PROTECTION LAWS

AN ILLUSTRATED MANUAL

REVISED – THIRD EDITION

Oregon Forest Resources Institute

About this book

Who is it for?

- Landowners and operators who manage and work on Oregon forestland
- Foresters who develop management plans for forestland owners
- Anyone interested in learning about the Oregon Forest Practices Act and other protection laws

What is it about?

Protecting forests and meeting the Forest Practices Act requirements when:

- Harvesting trees, especially around streams, lakes or wetlands
- Providing for the needs of wildlife
- Disposing of forest slash
- Building or improving forest roads
- Applying chemicals to forestland
- Protection from fire and use of fire

How it should be used

Use it to plan your forest management objectives while protecting natural resources.

Use it as a quick reference before starting any operation.

Use it to communicate among landowners, operators and Department of Forestry foresters.

Keep it in your vehicle so it's there when you need it.

What it won't do

It won't send in your E-Notification to the Department of Forestry 15 days before starting a forestry operation.

It won't substitute for your responsibility to know the laws and regulations of other agencies that govern forestland operations.

It won't exempt you from knowing the details of the Act.

Will the Forest Practices Act and Rules change?

Yes, because the Forest Practices Act and Rules continue to evolve. They respond to new needs and advances in forest research and experience.



This symbol indicates specific requirements very close to the actual wording in the Act and Rules. Because of potential changes, always verify current requirements and wording.

Since it was first published in 2002, *Forest Protection Laws: An Illustrated Manual* has become a standard reference for those planning and executing timber harvests. It is a visual resource, often found dog-eared and grimy in the vehicles used by those whose work is hands-on forestry. And for good reason, because the publication fosters easy understanding and correct application of the Oregon Forest Practices Act and Rules and the other best management practices, laws and rules that apply to Oregon's forest landowners.

However, this manual is not intended to replace the official version of the rules, which are available from the Oregon Department of Forestry, nor is it intended to replace the advice and resources of an ODF Stewardship Forester. For in the end, it is the two-way communication between the ODF forester and those using this manual that helps the state achieve its goals for best management practices.

This Revised Third Edition was necessary to take into account changes in the Water Protection Rules with the addition of SSBT stream types, changes in the Industrial Fire Precaution Levels, changes in rules to protect sensitive wildlife species with the federal delisting of the bald eagle, and other minor changes.

The Oregon Forest Resources Institute acknowledges and thanks Dr. Paul Adams, formerly with the OSU Forestry and Natural Resources Extension Program, and Rex Storm of the Associated Oregon Loggers for leading the revisions in the second edition of this manual in 2011.

The high quality of the second and third editions would not have been possible without a high-quality first edition. OFRI also thanks and recognizes Robert Logan for his vision in producing the original 2002 edition of *Oregon's Forest Protection Laws: An Illustrated Manual*.

The previous editions have been extremely useful to loggers, private foresters, woodland owners and forestry educators in their efforts to promote the best management practices that keep our forests sustainable. There have been significant changes in the rules since 2011, when the second edition was published, that have been incorporated into this third edition.

One thing that has not changed is the dedication of Oregon's forest landowners, managers and operators to sustainable forest management. We hope this updated edition will be as much of an educational resource to help you manage and protect our valuable forest resources as the first two editions.

Mike Cloughesy
Director of Forestry
Oregon Forest Resources Institute

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INTRODUCTION

Why does Oregon have a forest practices act?

Because forests matter.

Forests provide environmental, social and economic benefits that reach beyond their boundaries. They provide clean water, fish and wildlife habitat, and recreation. They provide jobs, products and tax revenues that result in healthy communities. The Oregon Forest Practices Act helps sustain these values in a socially accountable manner.

Because Oregonians value their forests.

Our forests are key to our quality of life as Oregonians. Forest landowners, operators and foresters are stewards of Oregon's forests. Good stewards accept responsibility for sustaining our forests and for protecting soil, air, fish, wildlife, water quality and other resources valued by the public. The Oregon Forest Practices Act and Rules makes clear the stewardship expectations of the public and ensures that landowners operating under its rules can manage their forests for a variety of objectives.

Because Oregon is a national leader.

The Legislature passed the Act in 1971, creating the first Forest Practices Act in the nation. It was prompted by emerging concerns about multiple forest resources, including findings from pioneering research on forest watersheds. The Act provides a statutory framework for a comprehensive program that includes detailed rules, technical assistance and monitoring.

To set standards for all forest landowners.

The Oregon Forest Practices Act and Rules set standards for any commercial activity involving the establishment, management or harvesting of trees on Oregon's forestlands. They regulate these forest operations on all non-federal lands (private, state-owned and county- or city-owned). Operations on lands managed by the USDA Forest Service and USDI Bureau of Land Management are not directly regulated, but both agencies agree to meet or exceed the Oregon Forest Practices Act and Rules requirements.

Who makes the rule requirements?

Oregon law gives the Oregon Board of Forestry primary responsibility to adopt or revise rules for forest practices. The board uses information and input from regional committees and other diverse advisory groups, including recommendations about potential rules changes. This approach helps keep the requirements current and responsive to evolving knowledge and concerns. Occasionally, the Legislature has amended the Forest Practices Act to include some specific requirements for forest operations, such as those for timber harvests near scenic highways.

Who administers the requirements?

Stewardship Foresters employed by the Oregon Department of Forestry (ODF), work with landowners and operators to help them achieve their objectives while complying with the requirements and avoid problems. This involves a balance of education, technical design, and enforcement. Stewardship Foresters are responsible for reviewing pre-operation plans, inspecting operations, determining reforestation compliance, investigating complaints and where necessary, taking enforcement actions. Sometimes enforcement action may lead to civil or criminal penalties.

How do you stay on top of the Forest Practices Act and Rules?

First, spend time planning. For example, if it's a timber harvest you want to do, ask yourself these questions. Consult with those who can help with answers.

- Do you know the site features, including the slopes, drainage and other natural characteristics?
- What could be the effect of the harvest and road construction on water quality?
- Are there soils with potential for compaction and erosion?
- Are there riparian and wetland areas that require special attention?
- What accommodations need to be made to protect wildlife habitat?
- When reforestation is needed after harvest, what is the plan for that?
- What slash treatment and site preparation will be necessary to establish a new forest?

If trying to answer these questions raises more questions for you, this manual is a place to start. Check it out. It will help.





What is an operation or a forest practice?

An operation or forest practice is any commercial activity relating to the establishment, management or harvest of forest tree species. Most forest practices fall into one of the following general categories: road construction and maintenance, site preparation by treating slash, reforestation, harvesting or use of pesticides or fertilizers. Before conducting an operation or forest practice, landowners and operators will usually need to inform the state by submitting an E-Notification of Operation (see page 6) to ODF. The definition of an operation specifically excludes some activities, to help clarify what is and is not regulated by the Act and Rules. See below.

What operations require a notification?

- road construction
- slash disposal (burning, chipping, biomass processing, etc.)
- precommercial thinning
- harvesting
- applying chemicals and using petroleum products
- quarry site development for rock used in forest operations
- site preparation for reforestation
- converting forestland to non-forest use

What operations do not require a notification?

- tree planting
- routine road maintenance
- personal-use firewood cutting
- collecting tree boughs, cones or similar minor forest products

What activities are specifically not operations?

In some cases a permit to operate power-driven machinery may be required for operations that do not require a notification or for activities listed below that are specifically not included as operations under the Act. Operations that do not require a notification must still be conducted in compliance with any applicable forest practice requirements:

- the establishment, management or harvest of Christmas trees on land used solely for their production
- hardwood plantations harvested on a rotation cycle that is 12 or fewer years after planting and subject to intensive agricultural practices
- agricultural tree crops, including nuts, fruits, seeds and nursery stock
- ornamental, street or park trees within an urbanized area
- juniper species management in a unit of less than 120 contiguous acres within a single ownership
- trees intended to mitigate agricultural practices that are established or managed for windbreaks, riparian filters or shade strips immediately adjacent to actively farmed lands

What other requirements are described in this manual?

- when to provide wildlife trees and down logs while harvesting
- limitations on the size of clearcut harvests
- how to protect bird nesting, roosting and watering sites
- ensuring fish passage through stream crossing structures
- how to operate where rapidly moving landslides might occur
- how to harvest and reforest next to scenic highways
- log landing requirements
- the proper disposal of logging waste
- chemical applications



How to comply with the Oregon Forest Practices Act and Rules

File a Notification of Operation as required.

After you've planned the operation, submit a Notification of Operation via the E-Notification website at least 15 days prior to the start of the operation. Failure to file is a violation under the Forest Practices Act and Rules.

For more information, see E-Notification at www.oregon.gov/odf

E-Notification



How do notifications work?

- The landowner, operator or a party representing them submits a Notification of Operation using the E-Notification website, commonly known as FERNS. The website form will require you to tell ODF what activities you are planning, where they will take place and who will be operating them.

Note: If you're cutting and selling timber from farmland or rural residential land, a Notification of Operation is also required.

- ODF must have your Notification of Operation at least 15 days before you expect to start the operation, so schedule activities accordingly.
- Will your operation use power-driven machinery or fire for slash disposal or site preparation? The notification form is used to apply for a permit to use machinery or burning. Follow fire prevention requirements on page 81.
- When a notification is submitted, FERNS will send you an e-mail with your notification number for your operation. This number is important for harvest tax purposes.
- *A notification is not a permit. It is only information to ODF of your intent. The 15-day waiting period and written plan review simply provide for planning to comply with protection rules.*
- Throughout the operation, the landowner or operator is required to follow all forest practice requirements that apply.
- Anyone can subscribe to receive copies of notifications and submit official comments about written plans for forestry work.

What activities require a written plan?

Operators need to submit a written plan to ODF, along with the notification, before starting some activities. Written plans allow ODF foresters to work with operators to help them meet Forest Practices Act requirements. Written plans are referred to in other parts of this manual, including the Appendix, page 143.

There are three kinds of written plans:

STATUTORY WRITTEN PLANS

ODF foresters may be able to waive the requirement of some statutory written plans, but if they're required, the waiting period may not be waived. ODF foresters review these plans and may comment, but they do not provide a formal approval. Consult your Stewardship Forester or see page 143. The following activities require statutory plans:

- operations within 100 feet of a Type F, SSBT or D stream (even when dry) (see page 8)
- operations within 100 feet of a large lake or within 300 feet of a significant wetland (see pages 36-37)
- operations within 300 feet of areas identified by ODF as important for certain wildlife species

NONSTATUTORY WRITTEN PLANS

These plans are like statutory written plans, except that ODF foresters can waive the requirement or reduce the waiting period. ODF foresters review these plans but do not provide a formal approval or disapproval. A full list of activities requiring this kind of written plan is shown in the Appendix, page 143. Some examples are:

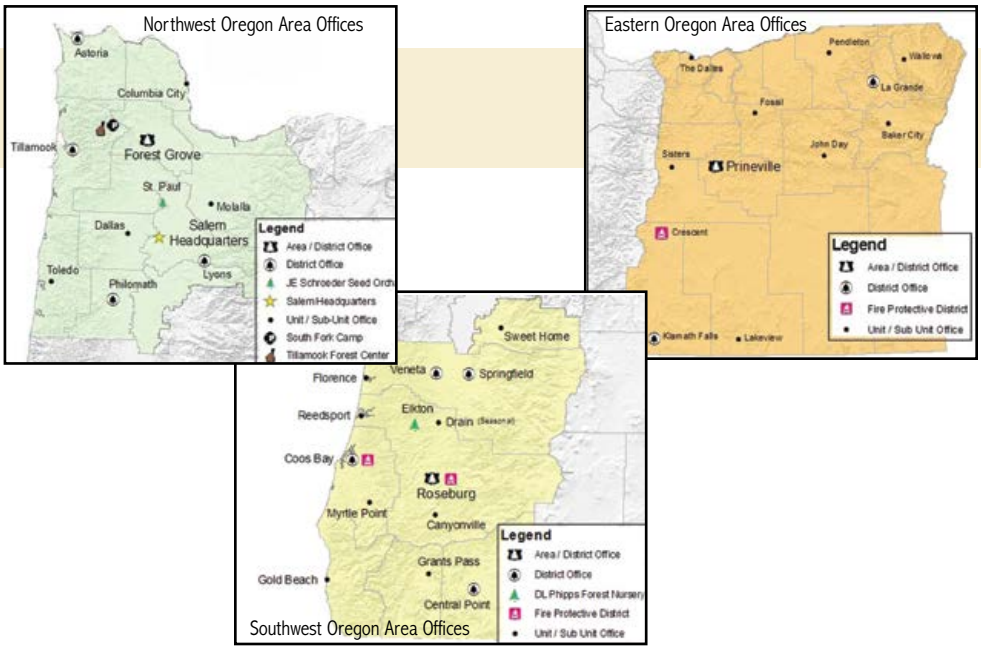
- building road fills deeper than 15 feet
- operations within 100 feet of a large lake

PLAN FOR AN ALTERNATE PRACTICE

Operators can use this type of plan to propose methods that are different than what is spelled out in the rules. If the plan will result in equal or better resource protection, ODF foresters will approve the plan. This kind of plan is meant to encourage good ideas for effective actions, and is the only kind of plan ODF foresters approve or deny approval for. One example of this kind of plan would be for using natural reforestation methods instead of tree planting after harvest. See page 137.

For other information sources, see the Appendix, pages 197-198.

Oregon is divided into three administrative areas. Each area has Forest Protection Districts. Know your local ODF district.



How do I find a local ODF office?

For more information about Oregon's Forest Practices Act or rules, please contact your local ODF district office, or the headquarters office at 2600 State St. Salem, OR 97310; 503-945-7200; Fax 503-945-7212; TTY 800-437-4490

E-mail: **forestryinformation@oregon.gov**
Web: **www.oregon.gov/ODF**

This manual goes a long way toward explaining the requirements, but it may not be enough. The application of forest practices on specific sites can sometimes be complex. Always verify details with ODF. Get a copy of the Act and Rules. Ask ODF your questions before starting. You may also benefit from educational and technical assistance from the OSU Extension Service, consulting foresters and other specialists and organizations.

EASTERN OREGON AREA	3501 E. 3rd St.	Prineville, 97754	541-447-5658
Central Oregon District	3501 E. 3rd St.	Prineville, 97754	541-447-5658
John Day Unit	415 Patterson Brg. Rd.	John Day, 97845	541-575-1139
The Dalles Unit	3701 W. 13th St.	The Dalles, 97058	541-296-4626
Sisters Sub-unit	16721 Pine Tree Ln.	Sisters, 97759	541-549-2731
Fossil Sub-unit	45945 Hwy. 19	Fossil, 97830	541-763-2575
Klamath/Lake District	3200 DeLap Rd.	Klamath Falls, 97601	541-883-5681
Lakeview Unit	2290 N. 4th St.	Lakeview, 97630	541-947-3311
Northeast Oregon District	611 20th St.	La Grande, 97850	541-963-3168
Wallowa Unit	802 W. Hwy. 82	Wallowa, 97885	541-886-2881
Pendleton Unit	1055 Airport Rd.	Pendleton, 97801	541-276-3491
Baker Sub-unit	2995 Hughes Ln.	Baker City, 97814	541-523-5831
NORTHWEST OREGON AREA	801 Gales Creek Rd.	Forest Grove, 97116	503-359-7426
Astoria District	92219 Hwy. 202	Astoria, 97103	503-325-5451
Tillamook District	5005 E. 3rd St.	Tillamook, 97141	503-842-2545
Molalla Unit	14995 S. Hwy. 211	Molalla, 97038	503-829-2216
North Cascade District	22965 N. Fork Rd. SE	Lyons, 97358	503-859-2151
Forest Grove District	801 Gales Creek Rd.	Forest Grove, 97116	503-357-2191
Columbia City Unit	405 E St.	Columbia City, 97018	503-397-2636
West Oregon District	24533 Alsea Hwy.	Philomath, 97370	541-929-3266
Dallas Unit	825 Oak Villa Rd.	Dallas, 97338	503-623-8146
Toledo Unit	763 NW Forestry Rd.	Toledo, 97391	541-336-2273
SOUTHWEST OREGON AREA	1758 NE Airport Rd.	Roseburg, 97470	541-440-3412
Coos Unit	63612 Fifth Rd.	Coos Bay, 97420	541-267-4136
South Cascade District	3150 Main St.	Springfield, 97478	541-726-3588
Sweet Home Unit	4690 Hwy. 20	Sweet Home, 97386	541-367-6108
Southwest Oregon District	5286 Table Rock Rd.	Central Point, 97502	541-664-3328
Roseburg Unit	1758 NE Airport Rd.	Roseburg, 97470	541-440-3412
Grants Pass Unit	5375 Monument Dr.	Grants Pass, 97526	541-474-3152
Western Lane District	87950 Territorial Hwy.	Veneta, 97487	541-935-2283
Florence Unit	2660 Kingwood St.	Florence, 97439	541-997-8713

How waters of the state are classified and protected

The requirements of the Oregon Forest Practices Act are intended to protect fish, wildlife and water quality when forest management activities occur near waters of the state and within riparian management areas. Protection measures are based on how the water body near an operation is classified, as well as the geographic region. Protection measures apply even when the water body is dry.

What are waters of the state?

Lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, canals and the Pacific Ocean within the territorial limits of the State of Oregon are waters of the state.

How are streams identified and classified?

A stream is a channel with a distinct bed or banks scoured by water that serves to confine water and that contains flowing water during some portion of the year. There are four stream types, based on use, and three stream sizes, which results in 12 possible classifications.

Stream types:

- Type F streams have fish and may also be used for domestic water.
- Type SSBT (salmon, steelhead or bull trout) streams are small or medium Type F streams that have salmon, steelhead or bull trout.
- Type D streams are used for domestic water and have no fish (more likely to be small streams).
- Type N streams have neither fish use of domestic water use.

Stream sizes (see illustration):

- Small streams have an average annual flow of 2 cubic feet per second or less, or have a drainage area less than 200 acres — they generally have widths less than 7 feet.
- Medium streams have an average annual flow greater than 2 and less than 10 cubic feet per second — they generally have widths of 7-12 feet.
- Large streams have an average annual flow greater than 10 cubic feet per second — they generally have widths of greater than 12 feet.

The combination of size and use designates each stream. For example, a medium-sized stream with fish would be called a “medium F” stream.

How are wetlands identified and classified?

Wetlands are areas that are often inundated or saturated by surface or ground water, which results in local vegetation that can tolerate or thrive in saturated soils. There are three major categories of wetlands:

SIGNIFICANT WETLANDS, WHICH INCLUDE:

- wetlands larger than 8 acres
- estuaries
- bogs
- important springs in eastern Oregon

STREAM-ASSOCIATED WETLANDS

These are wetlands less than 8 acres that are next to a stream. Protection requirements are based on the classification of the stream with which they are connected.

OTHER WETLANDS (INCLUDING SEEPS AND SPRINGS), WHICH INCLUDE:

- those greater than one-quarter acre
- those less than one-quarter acre

How are lakes identified and classified?

Lakes are bodies of year-round standing open water. They do not include bodies developed for human needs and not part of a stream, such as farm ponds. There are two kinds of lakes:

- large lakes, which are greater than 8 acres
- all other lakes

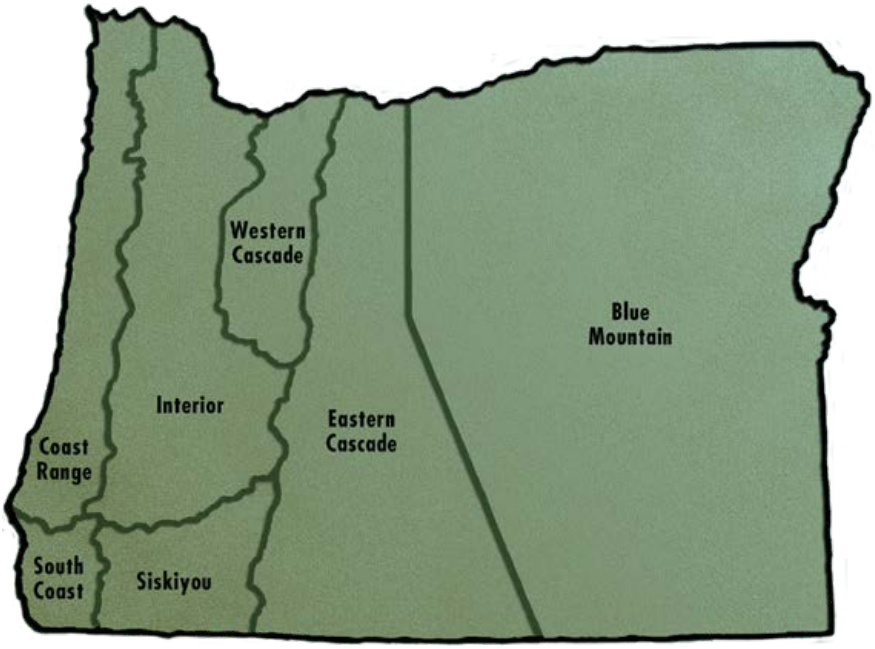

Medium stream
Significant wetland
Stream-associated wetland
Small stream
Stream side channel
Stream-associated wetland
Large stream

There are seven geographic regions for water protection.

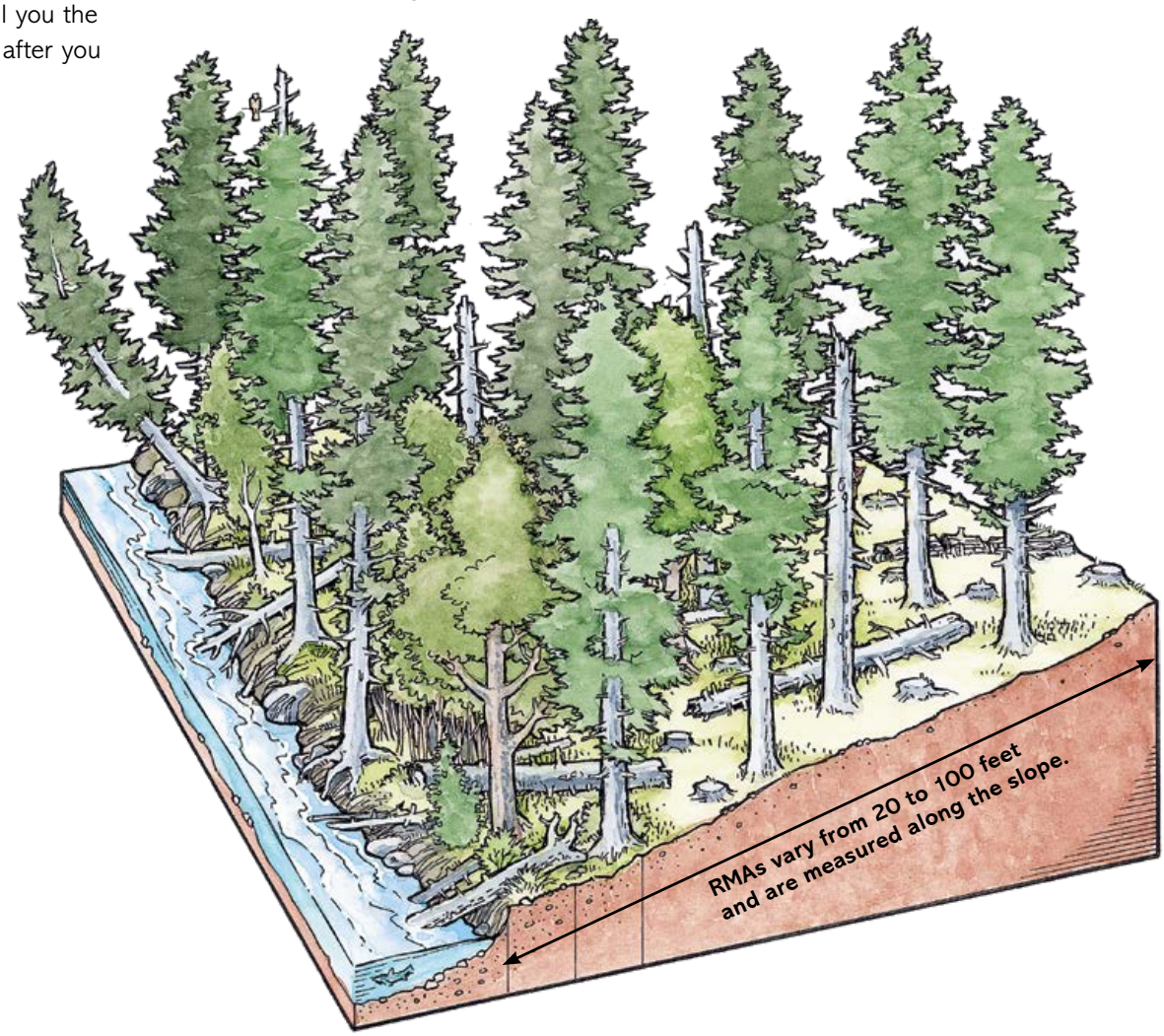
The protection requirements for streams differ according to the geographic region in which the stream is located.

How can you identify the classification of your stream, wetland or lake?

ODF field offices have maps showing the classification of waters within the local area. The maps show known streams, lakes and significant wetlands, along with the size class and extent of fish or domestic water use. It is your responsibility to identify streams in proposed operations areas, including those that might not show up on ODF maps, and bring them to ODF's attention. ODF will tell you the classification of the streams after you file your Notification.



The state is divided into seven geographic water protection regions, each with its own protection requirements. Precise region boundaries can be found on ODF field office maps.



What are RMAs (riparian management areas)?

Unique "riparian" areas are found along the edges of streams, lakes, reservoirs, springs, marshes, bogs, ponds and seeps.

To help protect these water bodies, RMAs are locally specified and have requirements for retaining trees, snags and understory vegetation, and for limited or modified practices.

How RMAs help to protect key resources?

TOP, RIGHT: RMA plants, down logs and soils serve as a filter, trapping pollutants and keeping them from entering streams, wetlands and lakes.

CENTER, RIGHT: Many wildlife species, like this Columbia torrent salamander, rely on RMAs for the necessities of life: food, water, protection from predators and a place to rear young.





Do RMA widths differ?

Yes, depending on the stream type and size (see page 20).
Yes, depending on the size of the lake (see page 34).
Yes, depending on the kind of wetland (see page 36).
When there are two water features, use the dominant water feature RMA.

Is an RMA required for all waters of the state?

No, small Type N streams may not require a specific RMA, though some vegetation protection may be necessary — this is similar for other wetlands and other lakes without fish that are one-half acre or less.

What long-term benefits of RMAs are expected?

A primary goal of the RMA protection requirements is to develop more mature streamside forests (80 to 200 years old), especially those with conifer trees. Such forests provide channel shade, large logs that fall into the stream for fish habitat, bank-holding roots, snags for wildlife and quantities of leaves, needles, branches and insects that feed aquatic life. With time, the requirements are expected to promote conifer-dominated RMAs, while allowing for some trees to be harvested.



In the future, more streams will have mature forest in their RMA.

For more information, see:

You want to harvest timber on your property. How do you plan for it? (page 13).

You want to harvest timber along a stream. What do you need to know? (page 19).

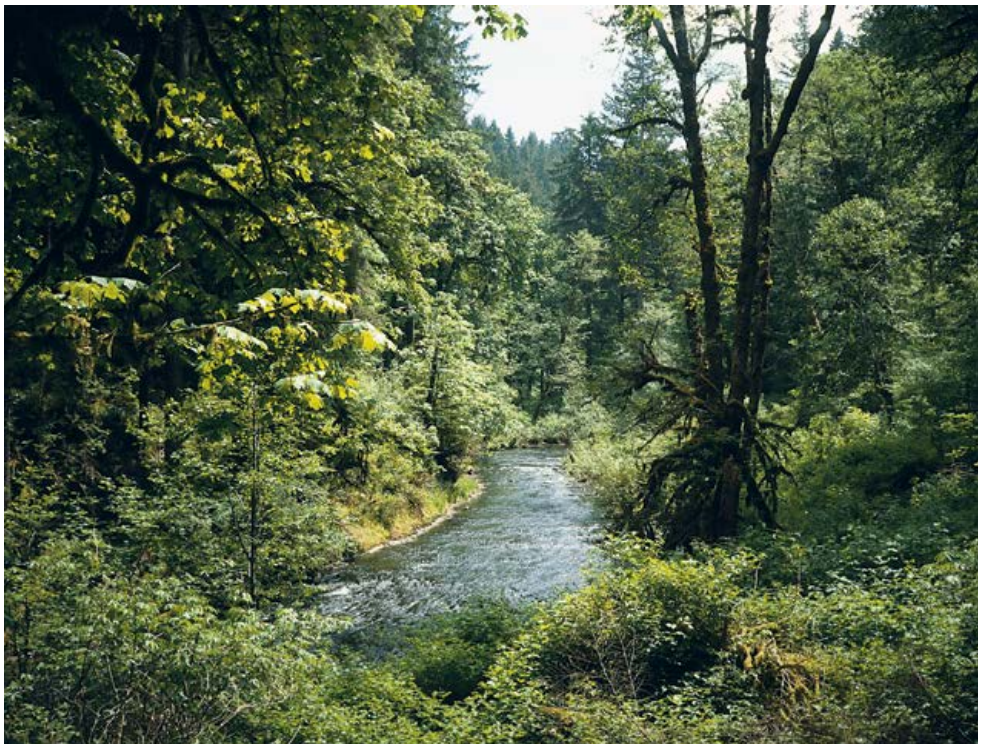
You want to harvest timber near a lake. How do you meet the requirements? (page 34).

You want to harvest timber in or near a wetland. How do you meet the requirements? (page 36).

For other information sources, see the Appendix, pages 197-198.



In RMAs that are conifer-growing sites but currently dominated by hardwoods, especially red alder, more extensive harvesting may be allowed so conifers can be planted. This requires a written plan (see page 143).



In RMAs where the native tree community is hardwood-dominated stands such as ash, cottonwood or maple, the goal is to retain and grow sufficient hardwood trees. Some harvesting may be needed for successful reforestation to replace dead and dying trees in such stands.

PLANNING A TIMBER HARVEST

You want to harvest timber on your property. How do you plan for it?

What can happen when you don't know the requirements?

"A logger harvested the trees on my property last year. Now I've got a letter from the Oregon Department of Forestry (ODF) telling me I'm required to replant the harvest unit. I've got two years to do the planting, and then four more years to take care of the seedlings. I didn't know about this. I figured the trees would come back on their own. It's going to cost a lot and I used the money from the harvest for something else. If I'd known about all of this before I would have done things differently."

Signed, Uninformed Forest Landowner

How can you prevent this from happening to you?

When you harvest timber or sell or purchase cut-over land, you have a legal obligation to know whether you need to reforest. Sellers of land with reforestation requirements have an obligation to inform potential purchasers about the reforestation responsibility. This obligation goes with the land to the new landowner. The processed E-Notification of Operations includes a notice to the landowner: "Reforestation may be required after timber harvest."

Is there flexibility?

It's your decision to choose between four broad types of harvest (Table 2-2, page 17) and how much timber to harvest on your property.

Your decision will determine if you need to reforest, limit the harvest unit size, or leave wildlife trees and down logs to meet the requirements.

Forest landowners also must protect streams, lakes, wetlands and wildlife sites. These topics, along with harvest slash disposal and forest fire regulations, are discussed later in this manual.



The following pages describe the steps forest landowners can go through to plan timber harvests on their properties. The examples show how the Oregon Forest Practices Act and Rules consider different scenarios and offer flexibility.



Are you a landowner ready to harvest some timber?

Perhaps your goals can be described this way:

You need to sell some timber for some income. You want to thin your trees, but you want what's left to be a healthy, vigorous forest.

Maybe you have the information called for in Steps 2, 3 and 4. You've identified the site class for the harvest unit, the size of the unit and which trees you'll leave. For example:

The harvest unit is Site Class III, the "high" category. Harvest size: 35 acres.

The plan: leave 90 square feet of basal area per acre in trees at least 11 inches in diameter. **See this harvest unit on page 15.**

Are steps 2-4 new to you?

Be sure to check out information in the appendix. You can learn how to determine this information, but some landowners hire a professional forester for help.

Follow these steps to know what your timber harvest requirements will be

STEP 1
Determine the kind of harvest (Type 1, 2, 3 or Unclassified) you intend to conduct (Table 2-2, page 17).

Do this before you submit your E-Notification of Operation using FERNS to ODF.

To do that you need to know three things:

- the harvest unit site class
- the harvest unit acreage
- the diameters and basal area of the trees you will leave

STEP 2
Determine the site class of your harvest.

Tree growth on Oregon's forestland varies with our changing climate and different soil conditions. Site class is a measure of forestland productivity. Several important requirements in the Oregon Forest Practices Act are based on site class.

For purposes of the Oregon Forest Practices Act, forestland site classes are grouped into three categories:

- Site classes I, II and III are the high category.
- Site classes IV and V make up the medium category.
- Site class VI makes up the low category.

Be careful not to confuse site class with site index, which is a measure of how tall trees will grow at a particular location. For more information on site class and how to determine it for your harvest unit, see the Appendix, page 145. The E-Notification of Operations system provides several types of base maps to draw and edit your boundary and calculate the unit acreage.

STEP 3
Determine how many acres the harvest unit will cover.

Harvest unit size determines whether some important restrictions apply. First there's the requirement to leave wildlife trees and down logs on Type 2 harvest units larger than 25 acres. Then there's the requirement to limit Type 3 harvest units to 120 acres, with a few exceptions. As you go through this example you'll understand why knowing your harvest unit size is important.

You can figure out the size of your harvest unit using a scaled aerial photograph, topographic map or global positioning system. Accurate acreage measurements are your responsibility. The E-Notification of Operations system provides several types of base maps to draw and edit your harvest unit boundary and calculate the acreage.

STEP 4
Determine the diameters and basal area of the trees you will leave on the harvest unit.

This is where you decide and measure which trees you plan to leave in the harvest unit. Tree diameter is measured 4-1/2 feet above the ground, on the uphill side of the tree, and is referred to as diameter at breast height (DBH). Basal area is the cross-sectional area of each tree stem at DBH, for a specific area such as an acre.

How much basal area you leave and the diameters of the leave trees are two of the keys to determining the type of harvest you intend and the requirements that will apply to the harvest unit. See the Appendix, page 156 for more information on measuring tree diameters and calculating basal area.

STEP 5
Determine if the operation is likely to be active during a "declared fire season."

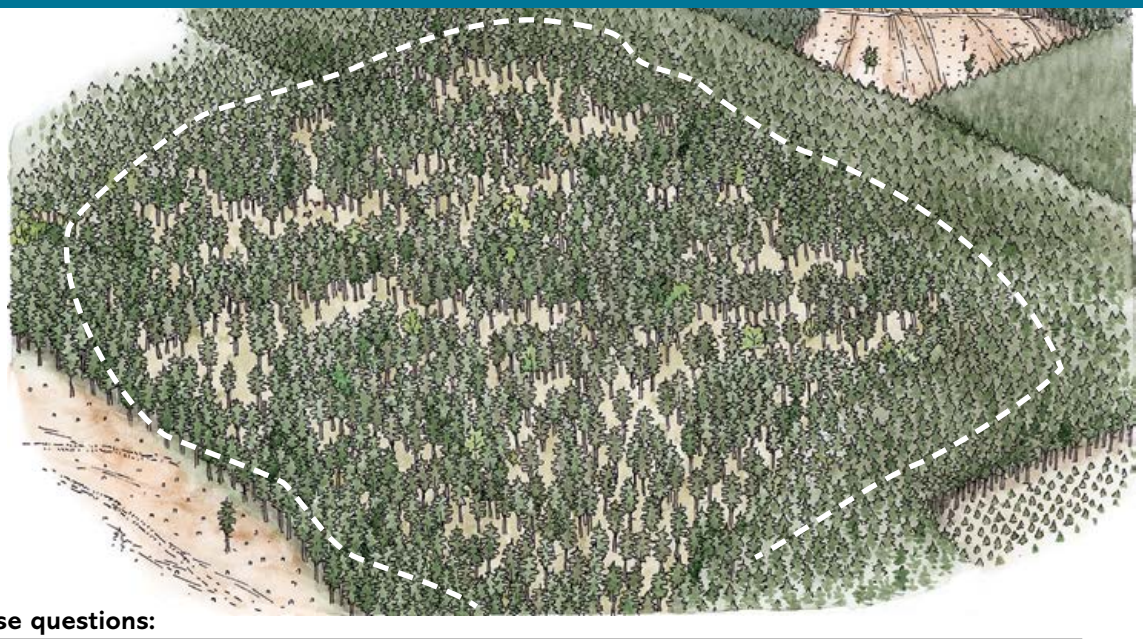
A "declared fire season" exists when the local risk of wildfire is identified as significant, a period often extending from early July to October. During this time, operators are required to be alert and able to suppress a small fire, including having suppression equipment on-site and meeting daily firewatch requirements, as well as having additional liability for a fire originating in the harvest unit. See pages 85-90 for more information.

STEP 6
Determine if a written plan is required.

Written plans are required to protect streams, wetlands, bird sites and public safety. Sometimes the requirements for a written plan may be waived. See pages 6 and 143.

Your harvest unit example:

Site Class III, high; Harvest size, 35 acres, leaving 90 sq. ft./acre in 11" or larger trees.



You now need to answer these questions:

Question 1

How much of this forest will be harvested, and will there be a reforestation requirement after harvest?

Question 2

Will there be a requirement to leave wildlife trees and down logs when harvesting?

Question 3

Will the harvest unit be Type 1, Type 2, Type 3 or Unclassified? The answer to this question is needed to help answer Question 2 and determine if the size of the harvest unit must be limited to 120 acres.

Question #1 rephrased:

After the harvest, will the stocking of seedlings, saplings and poles, and trees 11 inches and larger in diameter, meet the standards for reforestation for Site Class III forestland? The standards are different for each site class; see Table 4-1 on page 77 to find the standards for all site classes. From that table you can see that Site Class III reforestation rule standards are:

Plant or retain 200 seedlings per acre (see sidebar)

Or

Retain 120 saplings and poles per acre (see sidebar)

Or

Retain 80 square feet of basal area per acre in 11 inch DBH and larger trees

Or, as described on page 78:

Landowners can decide to plant or leave an "equivalent combination" determined by the "equivalent calculation" formula

What are seedlings?

Live trees of acceptable species of good form and vigor with a DBH of less than one inch.

What are saplings and poles?

Live trees of acceptable species of good form and vigor, with a DBH of one to ten inches

An answer to question #1:

Although your forest could be clearcut, you've decided to first thin your trees to provide some income and improve the growth and vigor of the remaining stand. You plan to leave at least 90 square feet of basal area per acre in 11-inch DBH or larger trees. With this decision, you will meet or exceed the reforestation rule standard for Site Class III forestland. No reforestation, which usually involves planting seedlings, will be required.

Question #2 again:

Will you need to leave wildlife trees and down logs? (See more about wildlife trees, snags and down logs on page 38.)

An answer to question #2:

If you had planned a harvest of 25 acres or less, wildlife trees, snags and down logs would not be required. However, if you needed a bit more income this year to cover some expenses, you might consider a harvest of about 35 acres. You now need to determine if the trees you intend to leave after harvest will meet or exceed the standards in Table 2-1.

Your plan is to keep as much as 90 square feet of basal area per acre in trees 11 inches or larger. That is higher than the Site Class III reforestation standard of 80 square feet. By doing that, you are not required to leave wildlife trees and down logs, but you could plan to leave some.

Question #3 again:

Will the harvest unit be Type 1, Type 2, Type 3 or Unclassified? The answer to this question is needed to help answer Question 2 and determine if the size of the harvest unit must be limited to 120 acres.

An answer to question #3:

You can use Table 2-2, on page 17 to determine your type of harvest. You have a vision of how the forest will look after harvest, and it seems to match the illustration and description for the Unclassified category. An Unclassified harvest has no requirement for reforestation or wildlife trees. The Unclassified category matches your planned harvest, and perhaps the following statement also fits:

Table 2-1 Leave Trees and Site Class

When planning a harvest over 25 or more acres: leave the amounts in columns 2 or 3, or leave at least two wildlife trees and two down logs per acre.

Site class	# Trees per acre at least 11 inches at DBH or	Square feet of basal area per acre in 11-inch or larger trees
I, II and III	50	33
IV and V	30	20
VI	15	10

"My goal was to make some money to pay some expenses this year. I wanted to thin out the stand, but also keep a lot of trees. I want them to keep growing and they give the property a nice feel. I figured out I could do what I wanted by leaving enough trees to make up at least 80 square feet of basal area per acre."

What if?

What if you changed your harvest goals and decided to remove most of the trees, leaving some scattered trees that add up to about 10 square feet of basal area per acre? And, because your stand was very dense to begin with, not many saplings or seedlings will remain after harvest.

- In this case, you'll see that the trees that will be left after harvest will be less than the reforestation stocking standards for Site Class III forestland; therefore, reforestation would be required.
- You'll also see that there will be less than 33 square feet of basal area and the harvest unit size is more than 25 acres, so wildlife trees and down logs will have to be left (see Table 2-1).
- Finally, look at the illustrations and descriptions in Table 2-2. Type 2 and Type 3 might match these changed harvest goals. Because both reforestation and wildlife trees are required, it must be a Type 3 harvest.
- Type 3 harvests have one more restriction: They are limited to 120 acres unless ODF reviews a written plan for an exemption before logging.

Is there more to know about wildlife trees and down logs requirements?

Leave at least two wildlife trees and two down logs per acre. Items 1, 2 and 3 below offer a brief overview. Details are on pages 38-40.

1. Green trees or snags, left for wildlife, must be at least 30 feet in height and 11 inches DBH or larger and at least 50 percent must be conifers.
2. Down logs or down trees must be 50 percent conifer and at least 10 cubic feet gross volume, no less than 6 feet long. One downed conifer or hardwood log, at least 20 cubic feet gross volume and no less than 6 feet long, may count as two logs.
3. Wildlife trees and down logs may be left in one or more clusters rather than distributed throughout the unit.

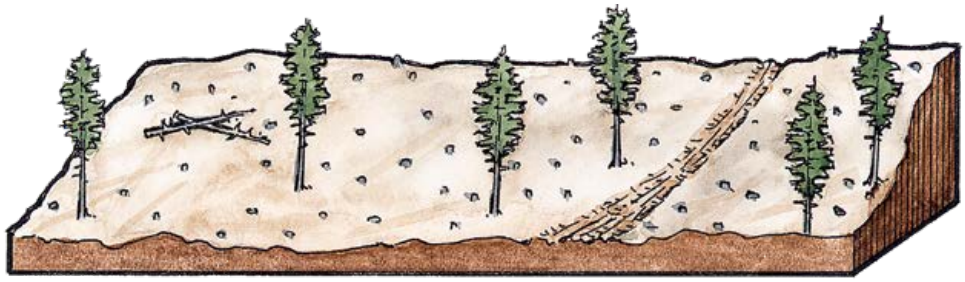
What is the take-home message?

- It is to the landowner's advantage to preplan a timber harvest.
- It is to the landowner's advantage to know the harvest type in advance.
- Landowners need to know the harvest type to understand the reforestation and riparian management area requirements.

Table 2-2 Four Types of Harvest and Their Requirements

TYPE 1 HARVEST

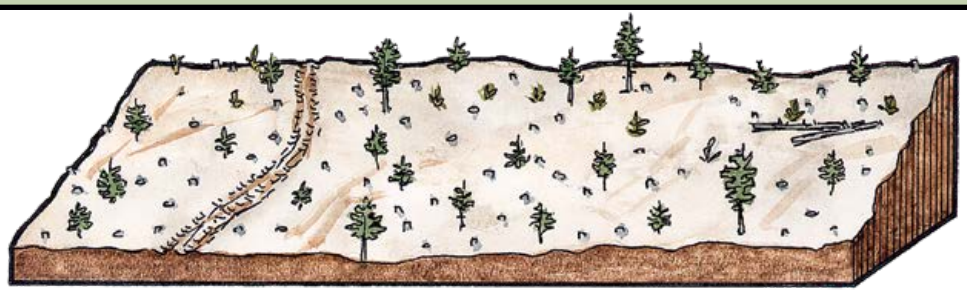
Heavy thinning or shelterwood – few or no seedlings, saplings or poles remaining.



- Does not meet reforestation stocking standards.
- Must plant within two years and have "free-to-grow" seedlings within six years.**
- No wildlife trees or down logs are required if adequate basal area of 11" trees or larger is left (see Table 2-1).

TYPE 2 HARVEST

A clearcut in which the required seedlings, saplings and poles are left. The number of large trees is below Table 2-1 requirements.



Requirements for <25 acre harvests

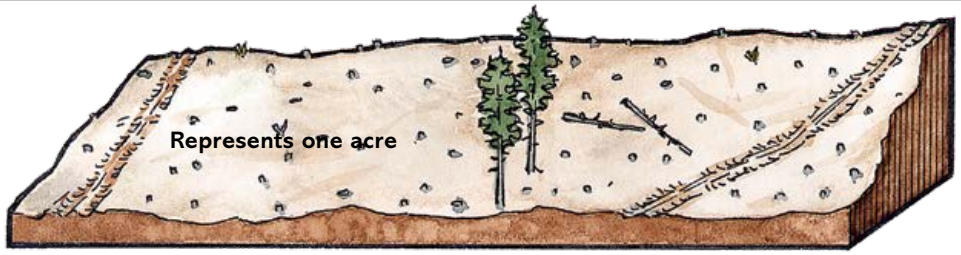
- meets the reforestation stocking standards.
- no reforestation required.

Requirements for >25 acre harvests

- Leave two wildlife trees and two down logs per acre.*
- No reforestation required.

TYPE 3 HARVEST

A clearcut, where few seedlings, saplings or poles remain. The number of large trees is below Table 2-1 requirements.



Requirements for <25 acre harvests

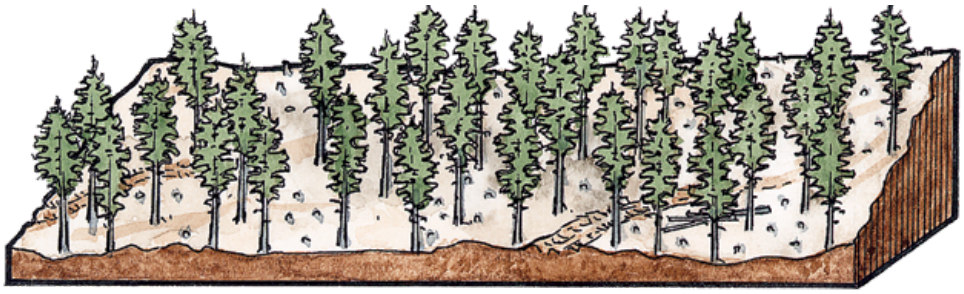
- Does not meet reforestation stocking standards.
- Must plant within two years and have "free-to- grow" seedlings within six years.**

Requirements for >25 acre harvests

- Leave two wildlife trees and two down logs per acre.*
- Subject to 120-acre size limitation.
- Must plant within two years and have "free-to- grow" seedlings within six years.**

UNCLASSIFIED HARVEST

Commercial thinning to space remaining trees or light partial cut.



- Meets the reforestation stocking standards.
- No reforestation required.
- No wildlife trees or down logs are required if adequate basal area of 11" trees or larger is left (see Table 2-1).

*See more about wildlife trees and down logs on pages 38-40. **See full details about reforestation requirements on pages 75-83.

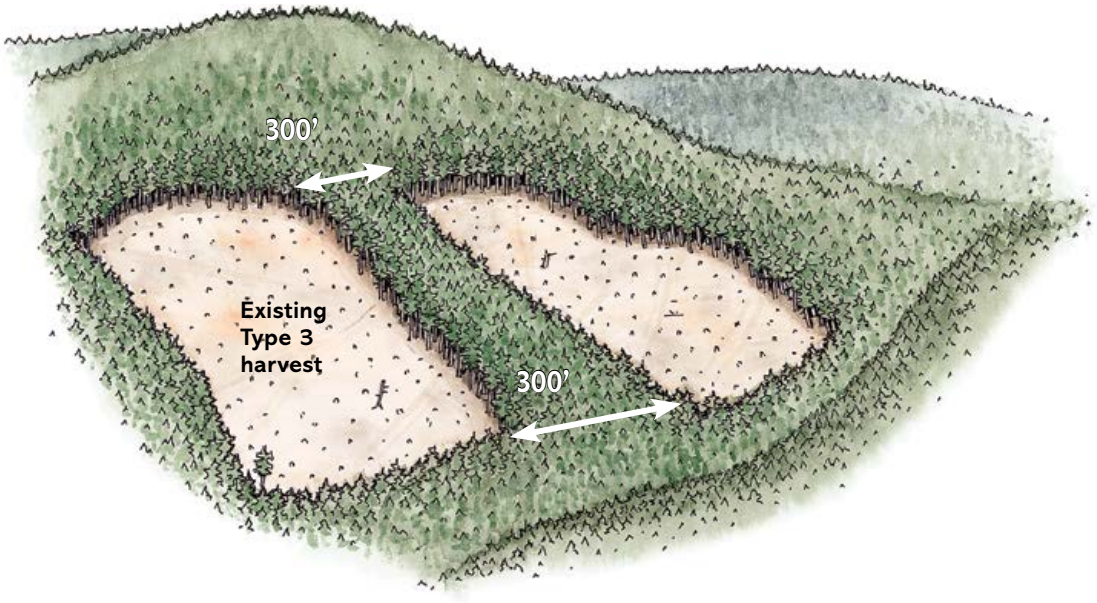
More about harvest size

1. COMBINED TYPE 3 HARVEST UNITS

   When a Type 3 harvest unit is within 300 feet of another Type 3 harvest unit on the same ownership, the combined acreage of the two units must not exceed 120 acres. However, this requirement does not continue forever. The acreage of an existing Type 3 harvest unit will not be included in the total once it meets the following standards:

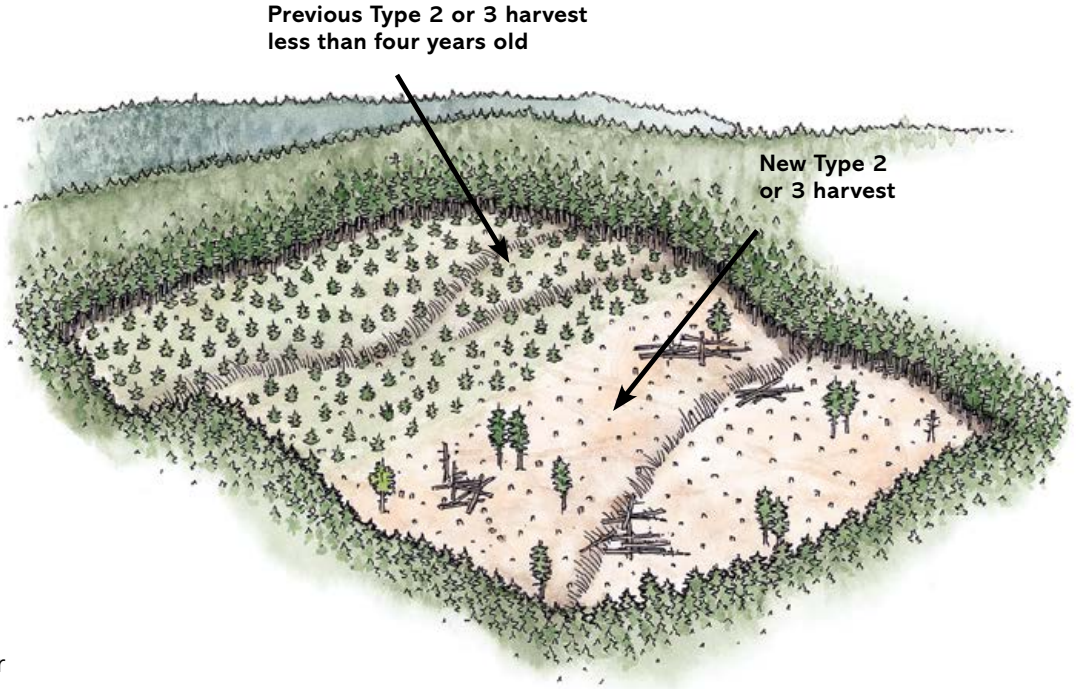
   The number of trees per acre required by the reforestation rules is present, and either:

   - the trees are at least four feet tall; or
   - the unit was planted or seeded at least four years ago and the stand is "free-to-grow" (see page 76 for definition of free-to-grow)



2. TYPE 2 OR 3 HARVESTS NEXT TO PREVIOUS TYPE 2 OR 3 HARVESTS

   Wildlife leave trees and down logs must be left on any combination of contiguous Type 2 or 3 harvests over 25 acres on the same ownership, even if the individual harvests are less than 25 acres. For example, if a landowner harvests a 15-acre unit one year and 15 acres next to it two years later, wildlife trees and down logs would be required for the entire 30 acres when the second unit is harvested. They could be provided in either or both units. A landowner who did not leave them in the first unit would need to leave enough for both units in the second one.



For other information sources, see the Appendix, pages 197-198.

You want to harvest timber along a stream. What do you need to know?

This section is a step-by-step process to help you plan for and meet the water protection requirements for fish, wildlife and water quality while harvesting along a stream. This is a complicated part of the Act, but it also allows for flexibility to accommodate different situations. Be sure to read: "How waters of the state are classified and protected," pages 8-12, before proceeding.

When your plan is complete, be sure to review the protection requirements that apply when conducting your harvest. They include: "What you should know when felling, bucking and limbing trees near water," page 55; "What you should know when cable logging near water," page 67; "What you should know when ground yarding near water and using temporary crossings," page 57; and "What are the requirements for log landing," page 68.

Question 1

Do you know the geographic region of your harvest? For more details, see page 10.

Question 2

What is the stream size? For more details, see page 8.

- small
- medium
- large

Question 3

Do you know what type of stream is in the harvest area? For more details, see page 8.

- Type F – has fish use, may also be used for domestic water
- Type SSBT - small or medium Type F streams that have salmon, steelhead or bull trout (SSBT) use
- Type D – used for domestic water, no fish use
- Type N – neither fish use or domestic water use

Most medium and large streams are likely to be Type F. Remember, operations within 100 feet of a Type F, SSBT or D stream require a written plan. See the Appendix, page 143, for an example. Sometimes a stream segment is Type F, Type SSBT and Type D. Always apply the higher stream vegetation protection requirement when there is more than one Type on a stream segment.

Question 4

What type of harvest do you plan to conduct along the stream?

- Type 1
- Type 2
- Type 3
- Unclassified

If you don't know your harvest type, read: "You want to harvest timber on your property. How do you plan for it?," on page 13. It's important to determine the harvest type and how much stocking will be left after your harvest, or you risk violating tree retention requirements. Know your harvest type before proceeding.

Question 5

What length of stream is affected by your planned harvest?

Either measure its length in the field or figure out the lineal feet of affected stream from a scaled aerial photo or topographic map.

Question 6

How should you mark the Riparian Management Area (RMA)?

If you're not familiar with RMAs, read: "How waters of the state are classified and protected," pages 8-12.

Once you know your stream type and size, check Table 2-3 for the RMA width that's required. You should mark the RMA boundary generally parallel to the stream. Use flagging, marking paint or signs, at intervals frequent enough to avoid confusion during logging.

Table 2-3 Riparian Management Area Widths (for each side of a stream)

Stream Size	Type F	SSBT	Relief SSBT	Type D	Type N
Large	100 feet	–	–	70 feet	70 feet
Medium	70 feet	80 feet	70 feet	50 feet	50 feet
Small	50 feet	60 feet	50 feet	20 feet	Specific protection measures (see Table 2-16)

Note: SSBT requirements only apply to Type 2 and 3 harvests.

Question 7

How much live conifer basal area is in the RMA?

Once you know how much live conifer basal area is in your RMA, you'll know which trees can be harvested and which you must leave. You don't need this information for small Type D or small Type N streams, which have different protection requirements that are described on page 30.

Note: Basal area to be left for Type SSBT streams is based on total basal area (including hardwoods) not just conifer basal area.

Measure the basal area of live conifers 6 inches DBH and larger inside your marked RMA. Page 156, "How to know the basal area of your harvest, reforestation area or RMA," describes the procedure.

As you go through the following example, you will learn that you may need to gather additional information while measuring basal area, including:

- the numbers, diameters and species of the hardwoods
- the size of conifer snags and down conifer logs

This information could be important, as you will see on page 24.

Here are a few examples:

Example 1 - Type F Stream

You are planning a Type 3 harvest, 1,500 feet long, along a large Type F stream. It's located in the Interior geographic region, one of the seven water protection regions in the state.

Because the harvest will occur within 100 feet of a Type F stream, you'll need to prepare a written plan for ODF. We'll discuss that later in this section (see page 33). First, let's handle the key planning questions and decisions.

1. **How wide should the RMA be?**

   From Table 2-3, a 100-foot-wide RMA for each side of a large Type F stream needs to be marked.

2. **How is the RMA measured?**

   Measure the RMA as a slope distance from the high-water level of the main channel to the boundary.

   What is the high-water level? This is also called the average yearly high flow (not the highest flood flow level). It's where trees and other year-round plants start growing. On many streams, it's the upper edge of the stream bank.

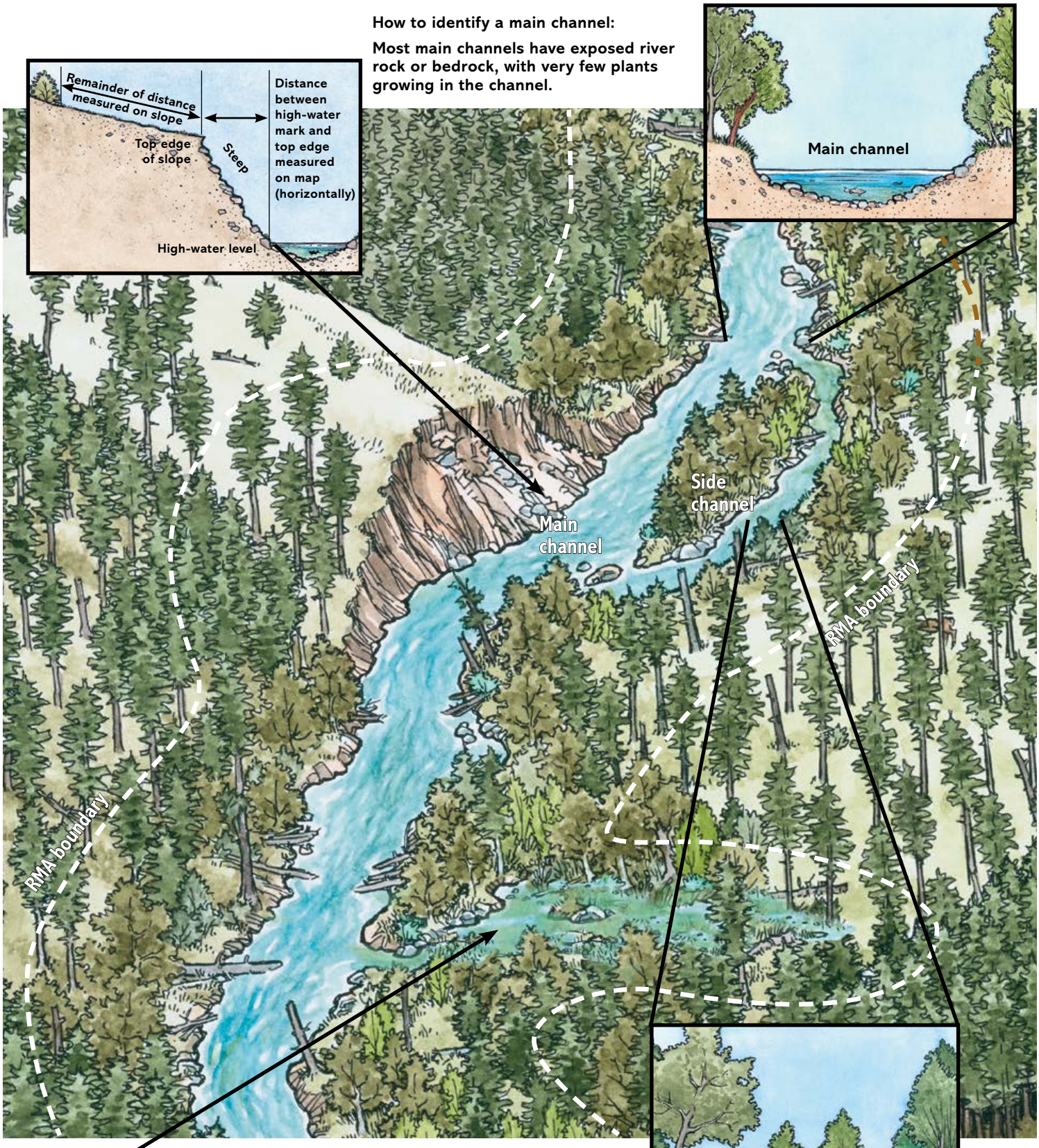
3. **While marking this RMA boundary, you find a stream associated wetland (see page 8) connected to the stream. What protection is needed for this water body?**

   Where wetlands or side channels extend beyond the RMA, expand the RMA to include the wetland or side channel plus 25 additional feet. This does not apply to small Type N streams.

   Notice in the illustration on page 21 how the RMA boundary includes the stream-associated wetland.

4. **There is also a steep slope next to the stream channel in the RMA. How is this situation handled?**

   In the case of steep exposed soil, a rock bluff or talus (loose rock) slope, measure the RMA as a horizontal distance to the top of the exposed bank, bluff or talus slope. From there, measure the rest of the RMA as a slope distance. (See illustration on page 21.)


How to identify a main channel:
Most main channels have exposed river rock or bedrock, with very few plants growing in the channel.
Remainder of distance measured on slope
Top edge of slope
Steep
Distance between high-water mark and top edge measured on map (horizontally)
High-water level
Main channel
Main channel
Side channel
RMA boundary
RMA boundary
Stream-associated wetland (see page 8)
How to identify a side channel:
Most side channels carry water only when the main channel is full. Exposed river rock or channel bedrock is rare. Commonly, permanent plants grow in side channels.
Side channel

5. If you're interested in harvesting some trees from the RMA, you need to measure the RMA basal area. How is this done?

If you don't know how to measure basal area for the RMA see the instructions on pages 156-159.

For this example, you found that the 1,500-foot RMA had 450 square feet of basal area of 6-inch DBH or larger conifers.

6. To see what may be available for harvest, you need to know if the basal area is more or less than the standard target for a large Type F stream. What is this value?

Table 2-4 on page 23 shows that the standard target requires a basal area of 270 square feet per 1,000 feet of stream for a Type 2 or Type 3 harvest in the Interior region. The standard target is the minimum basal area required for the RMA. Note that it changes with stream type, size and region.

In this example, the RMA is 1,500 feet long, so the adjusted standard target is 405 square feet of basal area for the entire RMA (1,500 feet/1,000 feet x 270 = 405). Most RMAs will be more or less than 1,000 feet, so the standard target must be adjusted. The 450 square feet of basal area in the RMA is more than the adjusted standard target of 405 square feet, so you have the option to harvest trees in the RMA (continue for details).

Read this if you want to know what's coming in the next few pages.

1. If the basal area of live conifers in the Type F RMA is more than the standard target, landowners can use the general prescription for Type F streams when harvesting in an RMA. This requires leaving enough basal area to meet the standard target, and is described under item 8 on page 23 and in the Appendix, page 156.
2. If the basal area of live conifers in the Type F RMA is less than the standard target but still greater than half the standard target, the general prescription for Type F streams still applies, except that landowners must leave the number of trees noted in Situation A on page 24.
3. If the basal area is less than half the standard target in the Type F RMA, landowners may be able to use alternative prescription 1 for damaged stands, alternative prescription 2 for hardwood stands, or the default standard. These prescriptions are described on pages 25 and 26.

7. With some RMA basal area available for harvest, what else should be considered?

The general prescription for Type F streams can be used when the RMA has more basal area than the standard target. The general prescription calls for the following to be left in the RMA:

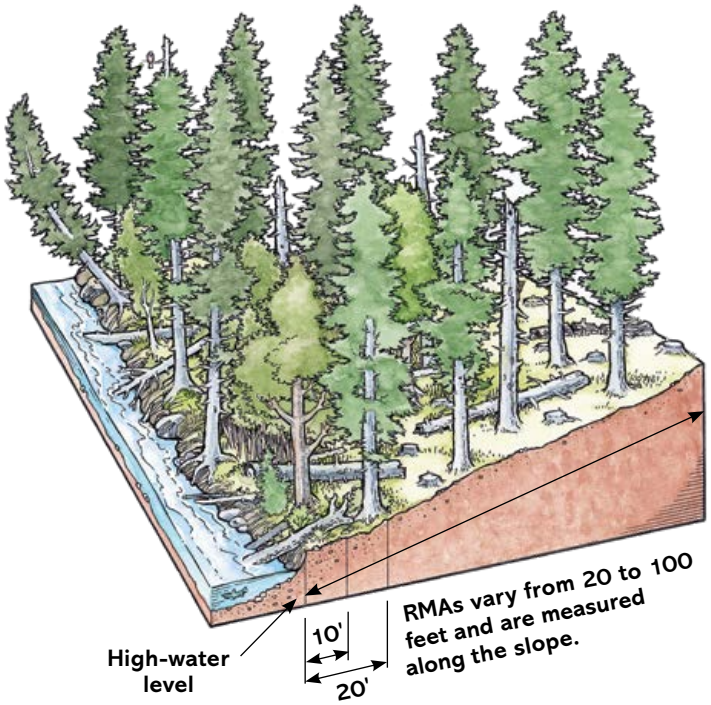
- all trees within 20 feet of the high-water level
- all trees in the RMA that lean over the stream
- all understory vegetation (small trees, brush and smaller plants) within 10 feet of the high-water level
- all snags and down wood in the channel and RMA; any safety or fire hazard snags may be cut, but can't be removed

Exception: Trees and other vegetation may be removed as needed for planned stream crossings or cable yarding corridors (see page 57).

- Enough live conifers 6 inches DBH and larger are required to meet the standard target basal area for the RMA. Hardwoods and snags may count toward the standard target in some cases (see Tables 2-5 and 2-6). Follow this example through for more details.

In some cases the standard target might be met with a few very large trees. However, this could result in large openings with reduced stream shade or an understocked stand. To avoid large openings, landowners must leave a minimum number of live conifers, depending on stream type and size (see below for details):

- Large F: 40 per 1,000 feet, minimum 11 inches DBH
- Large D and N: 30 per 1,000 feet, minimum 11 inches DBH
- Medium F: 30 per 1,000 feet, minimum 8 inches DBH
- Medium D and N: 10 per 1,000 feet, minimum 8 inches DBH
- Small F, D, and N streams: No minimum tree numbers
- For live conifer requirements for Type SSBT see Tables 2-8 and 2-9



8. Where should trees be left in the RMA?

You must leave all trees that lean over the stream and all trees within 20 feet of the stream. After that, you can choose which trees to leave, as long as they meet the basal area standard target and the required minimum number. For the benefit of fish and wildlife, you are encouraged to leave:

- trees distributed throughout the stream length for shade and other resource functions
- trees close to the channel that help stabilize the stream bank
- open-grown trees with large limbs and full crown that serve as wildlife habitat

9. Bottom line: What can be harvested from this RMA?

With 450 square feet of basal area and a required 405 square feet to be left in the Type F RMA, you can remove live conifers that add up to 45 square feet (450-405) as long as the other requirements are met. For example, if the live conifers average 20 inches DBH, about 20 of them could be harvested (see the Appendix, page 156). You can also remove hardwoods that are outside the 20-foot zone. The stream and RMA must be protected with any of the harvesting work (See requirements for working near streams, pages 55-62).

10. In Table 2-4, the Active Management Target is lower than the Standard Target. What situations allow for more harvesting in the Type F RMA using this lower target?

Some streams can benefit from habitat improvement work, such as placing logs or trees in the channel to create pools or hiding cover for fish. It can also mean constructing fencing or off-channel watering sites to keep livestock away from streams, or other work. For streams that can benefit from such projects, landowners who do stream improvement work may be able to harvest more trees under the active management target.

Here's how to use this option. First, have enough basal area to meet the standard target and enough trees to meet the general prescription requirements. Then, with a written plan reviewed by ODF, agree to contribute logs or boulders to the stream (see "For other information sources" at end of this section). Keep in mind that it's possible to use logs from the RMA or logs from the harvest unit to put in the stream, and at the same time reduce the RMA basal area to the active management target level.

Table 2-4 Streamside Tree Retention for Type F Streams with Type 2 or 3 Harvest

Geographic Region	Square Feet of Basal Area per 1,000 feet of Stream, Each Side					
	Large Type F RMA = 100 feet		Medium Type F RMA = 70 feet		Small Type F RMA = 50 feet	
	Standard Target	Active Management Target	Standard Target	Active Management Target	Standard Target	Active Management Target
Coast Range & S. Coast	230	170	120	90	40	20
Interior & W. Cascade	270	200	140	110	40	20
Siskiyou	220	170	110	90	40	20
E. Cascade & Blue Mountains	170	130	90	70	50*	50**

* The maximum live conifer basal area that must be left is 40 square feet. The other 10 square feet may come from snags, dying trees or hardwood trees if available in the RMA.

** The live conifer basal area may be reduced to 30 square feet for the active management target. The other 20 square feet must come from snags, dying trees or hardwood trees if available in the RMA.

Table 2-5 Hardwood, dead and dying trees or snags in the RMA that can count toward basal area targets for west-side Geographic Regions			
Type F Streams Coast Range, S. Coast, interior, Western Cascades and Siskiyou Geographic Regions	Large	Medium	Small
Cottonwood & Oregon Ash (6 inches or greater DBH) left in the RMA and growing more than 20 feet from the high water level may count toward basal area target	X		
A combination of the following can make up to 10 percent of the basal area target:	X	X	X
1. The basal area of hardwoods (except red alder) retained in the RMA that are greater than 24 inches DBH and grow more than 20 feet from the high-water level 2. The basal area of sound conifer snags (6 inches or greater DBH and at least 30 feet high) that are anywhere in the RMA			

Table 2-6 Hardwood, dead and dying trees or snags in the RMA that can count toward basal area targets for east-side Geographic Regions			
Type F Streams E. Cascades and Blue Mountains geographic regions	Large	Medium	Small
All live hardwoods (6 inches or greater DBH) left in the RMA may count toward the basal area target	X	X	X
Sound conifer snags (6 inches or greater DBH and at least 30 feet high) left in the RMA may count toward as much as 10 percent of the basal area target	X	X	X
No more than 40 sq. ft. per 1,000 feet of the standard target or 30 sq. ft. per 1,000 feet of the active management target is required to be live conifers. The remaining basal area required may come from the following, if they are 6 inches or greater DBH: retained snags, dying or recently dead trees, or hardwoods if they are available			X

11. Can some logs be placed in the channel for stream enhancement, even if you don't choose to harvest more trees under the active management target?

Yes. If log placement is part of the current forest operation and a written plan, state and federal permits are not required. This approach is one of the easiest ways to do an enhancement project, but be sure to check with your local ODF office before starting log placement work.

12. There are some hardwoods and snags in the Type RMA. Can any of these be left instead of conifers to meet the Type F RMA requirements under the standard target?

Yes, with some limitations. The basal area of certain hardwood trees, dead or dying trees, or snags can make up a portion of the basal area standard target. See Table 2-5 for west-side and Table 2-6 for east-side geographic regions. This is why you will want to record the number, diameter and species of some hardwoods, along with the size of conifer snags as you measure the basal area of your RMA.

13. Hardwoods are common in many riparian areas, so what happens if the RMA conifer basal area is found to be less than the standard target?

The Type F RMA requirements are based on two possible situations:

- Situation A: The live conifer basal area is less than the standard target but greater than half the standard target.
- Situation B: The live conifer basal area is less than half the standard target.

Situation A: The live conifer basal area is less than the standard target, but greater than one-half of the standard target.

As noted earlier, you must still leave trees within 20 feet of the high-water level, trees that lean over the stream, understory plants within 10 feet of the high-water level, and all snags and down wood in the channel and the RMA. In addition to that, you are required to leave all live conifer trees 6 inches DBH or larger in the RMA up to these maximum numbers:

- 150 conifers per 1,000 feet along large Type F streams
- 100 conifers per 1,000 feet along medium Type F streams
- 70 conifers per 1,000 feet along small Type F streams

The basal area of these conifers is not specified.

Situation B: The live conifer basal area is less than one-half of the standard target.

Depending on the local conditions, one of three different prescriptions can be used:

- Alternative Prescription 1
- Alternative Prescription 2
- 3 Default Standard

Type SSBT may use Alternative Prescription 1 or Alternative Prescription 2 but not 3. Default Standard.

ALTERNATIVE PRESCRIPTION 1

This can be used on Type F and Type SSBT stream RMAs if the RMA can grow conifers and has been damaged by a catastrophic event such as wind, insects, disease or wildfire.

This prescription protects the stream while a new conifer stand grows.

Landowners must leave the following:

- all trees that have fallen in the stream (exception: parts of down trees that lie outside the high-water level may be harvested if it does not make the trees less stable in the stream)
- all live and dead trees within 20 feet of the high-water level of large and medium streams, and within 10 feet of the high-water level on small streams
- *for Type F streams*, enough live trees, dying or recently dead trees, and downed logs within the RMA to meet the active management target (tables 2-4 and 2-10)
- *for Type D and large and medium Type N streams*, enough live trees, dying or recently dead trees, and down logs within the RMA to meet the standard target (tables 2-11 and 2-12)
- all trees that must be left in and near the stream can count towards meeting the basal area requirements, if they are large enough
- live conifers left first, with down or dead trees making up the rest of the basal area target if necessary

For this prescription only, landowners may count double the basal area of each dying or recently dead tree or each windthrown tree in the channel to meet the basal area target.

ALTERNATIVE PRESCRIPTION 2

This can be used on any Type of stream RMA if the RMA can grow conifers but is dominated by hardwoods. To apply Prescription 2:

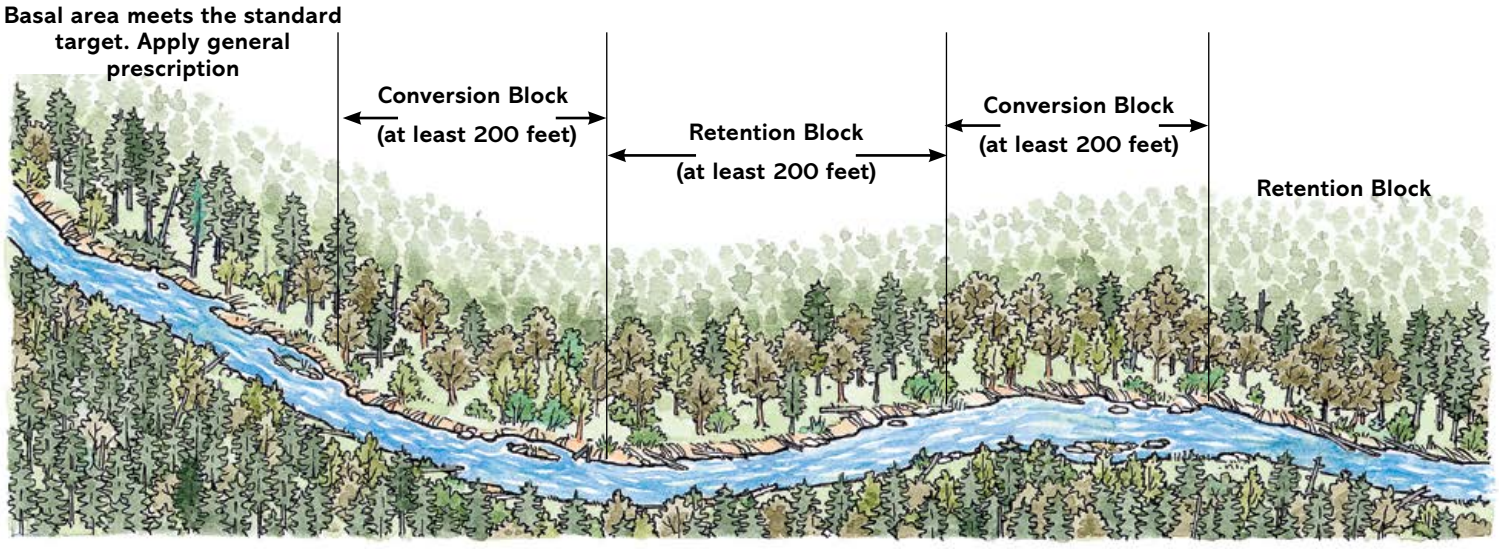
- Identify sections of the RMA (minimum 200 feet long) where the basal area and number of trees meet one-half the standard target, and apply the general prescription (page 24) on those sections (as shown in the left portion of the illustration below).
- In sections where one-half the standard target is not met, divide the RMA into "conversion" and "retention" blocks. The purpose of the conversion blocks is to promptly convert them to conifers by harvesting the hardwoods and planting conifers. Only some hardwoods are harvested in the retention blocks, so as to more gradually change this area to conifers.

To help achieve these goals:

In the conversion blocks:

- Leave all trees growing in the stream and within 10 feet of the high-water level (plus trees within 20 feet that lean over large streams).
- The total length in conversion blocks can't be any more than half the stream length in the harvest unit. Conversion blocks also can't be more than 500 feet long and must be at least 200 feet apart.

Alternative Prescription 2 for RMAs dominated by hardwoods



In the retention blocks:

- For large streams, leave all conifers within 50 feet of the high-water level and all hardwoods within 30 feet of the high-water level.
- For medium streams, leave all conifers within 30 feet of the high-water level and all hardwoods within 20 feet of the high-water level.
- For small streams, leave all trees within 20 feet of the high-water level.

3. DEFAULT STANDARD

If you don't want to – or can't – use Alternative Prescription #1 or #2, or if the RMA is not capable of growing conifers, use the default standard, except for Type SSBT streams. This requires that, except for cable yarding corridors or stream crossings reviewed by ODF, landowners must leave:

- all understory plants within 10 feet of the high-water level
- all snags and down wood in the channel and RMA (any safety or fire hazards may be cut, but can't be removed)
- all trees leaning over the channel
- all conifers in the RMA and all hardwoods within the high-water level for the distances indicated in Table 2-7

14. What if you decide to thin the harvest unit instead of doing a Type 3 harvest along the Type F stream?

Depending on the kind of thinning done, the harvest could be Type 1 or Unclassified (see page 13, "You want to harvest timber"). Either way, all the steps for the Type 3 harvest still apply, except that now the target basal area numbers in Table 2-10 are used instead of those in Table 2-4.

Example 2 - Type SSBT Stream

GENERAL PRESCRIPTIONS FOR TYPE SSBT STREAMS.

The purpose for the SSBT vegetation retention prescriptions is to ensure that forest operations will not impair the achievement and maintenance of the protecting cold water criterion.

These general prescriptions attempt to achieve fairly uniform distribution of trees in the RMA, by specifying amounts of conifer and hardwood basal area and the number of live conifer trees to be left in an Inner Zone and Outer Zone of the RMA located beyond 20 feet of the stream high-water level and within 500-foot stream segments. The trees located within 20 feet of the stream high-water level are in the No Harvest Zone and do not count for basal area or live conifer trees, but they may count toward the wildlife leave trees.

Table 2-7 Default standard requirements: Leave all conifers and all hardwoods within these distances of the high-water level.

Stream	Conifers	Hardwoods
Type F Large	100 feet	50 feet
Type F Medium	70 feet	30 feet
Type F Small	50 feet	20 feet

The general prescription requirements for Type SSBT streams also apply to the "main stem" of any Type F stream upstream of the Type SSBT of a harvest of Type 2 or Type 3 units in the following Geographic Regions: Coast Range, South Coast, Interior and Western Cascades. The extent of the "main stem" is the higher of the upstream boundary of the harvest unit containing the Type SSBT stream, or the upstream boundary of an adjacent upstream harvest unit that is commenced within a year of completing the harvest unit containing the Type SSBT stream.

Operators shall retain:

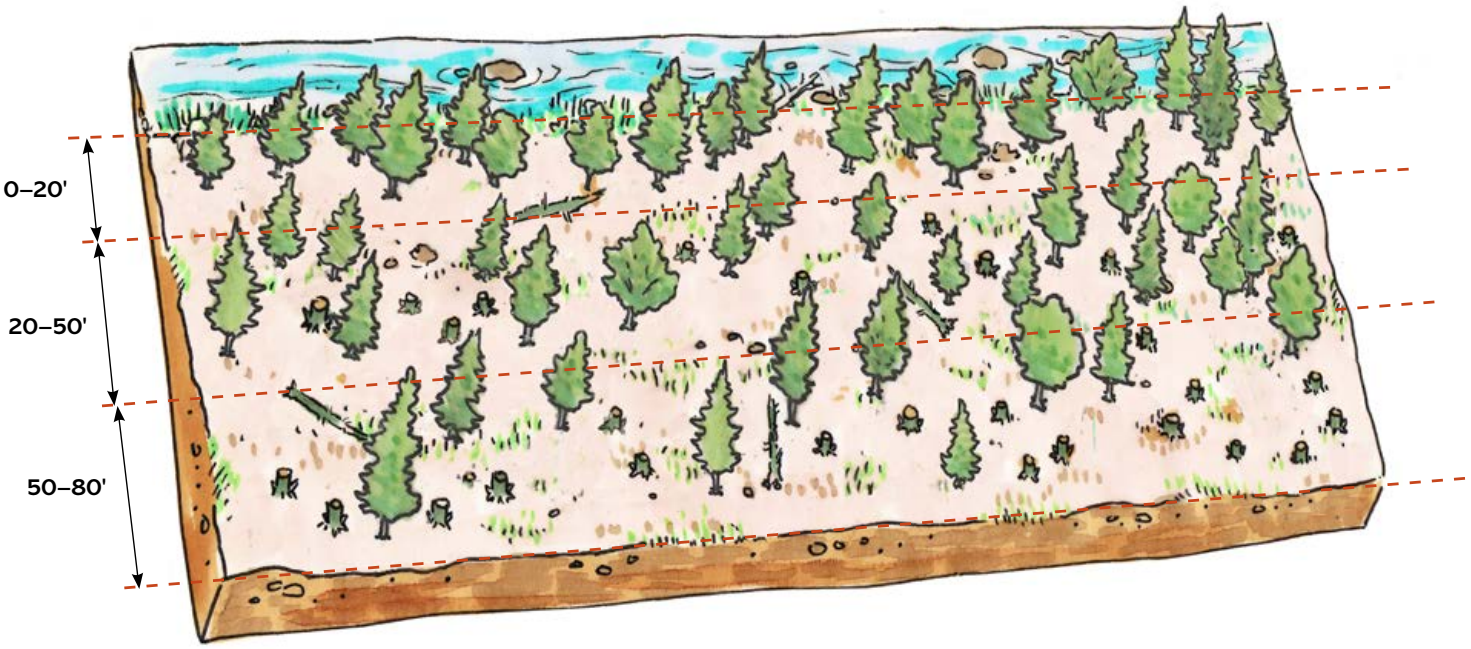
- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees in the RMA that lean over the stream channel

There are several prescription options when harvesting in a Type SSBT RMA, as described below. Additionally, when the live conifer basal area within the riparian managment area is less than half the standard target for a small or medium Type F stream as described in Table 2-4 or medium Type D and N stream described in Table 2-11, the operator may apply the appropriate Alternative Prescription, as shown on page 25.

TYPE SSBT PRESCRIPTION 1 – NO HARVEST RMA:

The operator may apply the Type SSBT Prescription 1 to any Type SSBT stream.

- all trees within 60 feet of the high-water level of a small stream
- all trees within 80 feet of the high-water level of a medium stream



This graphic shows a 200-foot-long section of a Medium Type SSBT stream with tree retention for harvest Type 2 or Type 3. The retention requirements are based on Table 2-8 on page 28. The stand being harvested had 200 trees per acre with an average DBH of 14", so every tree represents about 1 square foot of basal area. The No Harvest Zone (20 feet) will retain all 200 trees per acre, or about 18 trees in the 200 feet shown. The Inner Zone (30 feet) shows 18 trees retained and 10 stumps in the 200 feet shown. This is equivalent to 45 trees and 25 stumps in 500 feet. The Outer Zone (30 feet) shows 10 trees retained and 18 stumps in the 200 feet shown. This is equivalent to 25 trees and 45 stumps in 500 feet.

TYPE SSBT PRESCRIPTION 2 – PARTIAL HARVEST RMA:

Operators shall retain trees that are well-distributed by length and width of the riparian management area beyond 20 feet of the high-water level of the stream, minimize the creation of large gaps, favor small openings in the canopy, and leave residual trees in a manner that promotes understory as well as diameter and crown growth. Operators shall satisfy these requirements by meeting the following minimum standards:

The operator may apply the Type SSBT Prescription 2 – Partial Harvest RMA, where the basal area of trees 6 inches or greater DBH within the RMA, but more than 20 feet from the high-water level of the Type SSBT stream, exceeds the total basal area target shown in Table 2-8.

For small Type SSBT streams, the RMA length will be measured in 500-foot segments and divided into three zones:

- No Harvest Zone: 0 to 20 feet of the high-water level
- Inner Zone: 20 to 40 feet of the high-water level
- Outer Zone: 40 to 60 feet of the high-water level

RMA total 37 sq. ft. basal area and RMA total 8 live conifers; see Table 2-8.

The Inner Zone and Outer Zone shall each contain:

- 10 sq. ft. basal area target, rounded up to the nearest whole number, as a measurement of hardwood and conifer trees and snags 6 inches or greater DBH, and
- up to 10 percent of the basal area requirements may be composed of sound conifer snags at least 30 feet tall, and
- four live conifer trees, rounded up to the nearest whole tree, as a measurement of live conifer trees at least 8 inches DBH, and

For medium Type SSBT streams, the RMA length will be measured in 500 foot segments and divided into three zones:

- No Harvest Zone: 0 to 20 feet of the high-water level
- Inner Zone: 20 to 50 feet of the high-water level
- Outer Zone: 50 to 80 feet of the high-water level

RMA total 69 sq. ft. basal area and RMA total 15 live conifers; see Table 2-8

The Inner Zone and Outer Zone shall contain:

- 18 sq. ft. basal area target, rounded up to the nearest whole number, as a measurement of hardwood and conifer trees and snags 6 inches or greater DBH, and
- up to 10 percent of the basal area requirements may be composed of sound conifer snags at least 30 feet tall, and
- seven live conifer trees, rounded up to the nearest whole tree, as a measurement of live conifer trees at least 8 inches DBH.

TYPE SSBT PRESCRIPTION 3 – NORTH-SIDED BUFFER:

This prescription is intended for the north side of Type SSBT stream segments that run generally east to west for at least 200 feet. The operator may apply the Type SSBT Prescription 3 if:

- the north side of a Type SSBT stream has a Type SSBT stream segment at least 200 feet in length, and
- the Type SSBT stream has a stream valley direction that runs in a general east-west direction, and the stream valley direction is between 60 and 120 degrees east and 240 and 300 degrees west on a compass bearing of 0 and 360 degrees as north

Where the Type SSBT Prescription 3 – North-sided Buffer is not applied, the operator shall apply either Type SSBT Prescription 1 – No Harvest RMA or Type SSBT Prescription 2 – Partial Harvest RMA.

Operators shall:

Retain all trees within 40 feet of the high-water level on the north side of a Type SSBT stream where the stream-valley direction criteria are met. The operator shall describe in a written plan and map where Prescription 3 is intended to be implemented.

Relief for General Prescriptions for Type SSBT Streams

Upon written request from a landowner, relief is available if the additional encumbered forested stream area due to Type SSBT classification is 8 percent or more of the forested portion of any parcel. The additional encumbered forested stream area is measured by the increase in acres of the Type SSBT vegetation prescription over the vegetation prescription for Type F streams. To determine the additional percentage of forested stream area encumbered, the increase in acres is divided by the forested parcel acres.

If a landowner qualifies for Type SSBT relief, there are two prescription options:

TYPE SSBT RELIEF PRESCRIPTION 1 – NO HARVEST RMA:

The width of the Type SSBT RMA is reduced to 50 feet for small or 70 feet for medium Type SSBT streams:

- Retain all trees within 50 feet of the high-water level of a small Type SSBT stream.
- Retain all trees within 70 feet of the high-water level of a medium Type SSBT stream.

Table 2-8. Type SSBT Prescription 2 – Partial Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)

Geographic Regions: Coast Range, South Coast, Interior, Western Cascades

	Basal area target: Square feet of basal area per each 500-foot-long stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)		Live conifer trees (8 inches or greater DBH) per each 500-foot-long stream segment, each side of the stream	
	Medium Type SSBT RMA = 80 feet	Small Type SSBT RMA = 60 feet	Medium Type SSBT RMA = 80 feet	Small Type SSBT RMA = 60 feet
No Harvest Zone	0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.			
Inner Zone	20 to 50 feet: minimum 18 sq. ft.	20 to 40 feet: minimum 10 sq. ft.	20 to 50 feet: minimum 7 trees	20 to 40 feet: minimum 4 trees
Outer Zone	50 to 80 feet: minimum 18 sq. ft.	40 to 60 feet: minimum 10 sq. ft.	50 to 80 feet: minimum 7 trees	40 to 60 feet: minimum 4 trees
	RMA Total (20 to 80 feet) = 69 sq. ft.	RMA Total (20 to 60 feet) = 37 sq. ft.	RMA Total (20 to 80 feet) = 15 trees	RMA Total (20 to 60 feet) = 8 trees

Notes:
1. Distances are measured from the high-water level of the Type SSBT stream.
2. Up to 10% of the basal area requirement may be composed of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.
3. Must meet requirements of each zone and RMA total.

TYPE SSBT RELIEF PRESCRIPTION 2 – PARTIAL HARVEST RMA

Operators shall retain trees that are well-distributed by length and width of the RMA beyond 20 feet of the high-water level of the Type SSBT stream, minimize the creation of large gaps, favor small openings in the canopy, and leave residual trees in a manner that promotes understory as well as diameter and crown growth.

The width of the Type SSBT RMA is reduced to 50 feet for small and 70 feet for medium Type SSBT streams, and Table 2-9 describes the reduced basal area targets and live conifer tree requirements. Operators shall meet the following minimum standards.

For small Type SSBT streams, the RMA length will be measured in 500-foot segments and divided into three zones:

- No Harvest Zone: 0 to 20 feet of the high-water level
- Inner Zone: 20 to 35 feet of the high-water level
- Outer Zone: 35 to 50 feet of the high-water level

RMA total 28 sq. ft. basal area and RMA total 6 live conifers; see Table 2-9.

The Inner Zone and Outer Zone shall contain:

- 7 sq. ft. basal area target, rounded up to the nearest whole number, as a measurement of hardwood and conifer trees and snags 6 inches or greater DBH, and
  - up to 10 percent of the basal area requirements may be composed of sound conifer snags at least 30 feet tall, and
- three live conifer trees, rounded up to the nearest whole tree, as a measurement of live conifer trees at least 8 inches DBH, and

For medium Type SSBT streams, the RMA length will be measured in 500-foot segments and divided into three zones:

- No Harvest Zone: 0 to 20 feet of the high-water level
- Inner Zone: 20 to 45 feet of the high-water level
- Outer Zone: 45 to 70 feet of the high-water level

RMA total 58 sq. ft. basal area and RMA total 13 live conifers; see Table 2-9.

The Inner Zone and Outer Zone shall contain:

- 15 sq. ft. basal area target, rounded up to the nearest whole number, as a measurement of hardwood and conifer trees and snags 6 inches or greater DBH, and
  - up to 10 percent of the basal area requirements may be composed of sound conifer snags at least 30 feet tall, and
- six live conifer trees, rounded up to the nearest whole tree, as a measurement of live conifer trees at least 8 inches DBHiew activity

Table 2-9. Type SSBT Relief Prescription 2 – Partial Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0110)

Geographic Regions: Coast Range, South Coast, Interior, Western Cascades

	BASAL AREA TARGET: Square feet of basal area per each 500-foot-long stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)		LIVE CONIFER TREES (8 inches or greater DBH) per each 500-foot-long stream segment, each side of the stream	
	Medium Type SSBT RMA = 70 feet	Small Type SSBT RMA = 50 feet	Medium Type SSBT RMA = 70 feet	Small Type SSBT RMA = 50 feet
No Harvest Zone	0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.			
Inner Zone	20 to 45 feet: minimum 15 sq. ft.	20 to 35 feet: minimum 7 sq. ft.	20 to 45 feet: minimum 6 trees	20 to 35 feet: minimum 3 trees
Outer Zone	45 to 70 feet: minimum 15 sq. ft.	35 to 50 feet: minimum 7 sq. ft.	45 to 70 feet: minimum 6 trees	35 to 50 feet: minimum 3 trees
	RMA Total (20 to 70 feet) = 58 sq. ft.	RMA Total (20 to 50 feet) = 28 sq. ft.	RMA Total (20 to 70 feet) = 13 trees	RMA Total (20 to 50 feet) = 6 trees

Notes:
1. Distances are measured from the high water level of the Type SSBT stream.
2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.
3. Must meet requirements of each zone and RMA total.

Table 2-10 Streamside Tree Retention for Type F Streams with Type 1 or Unclassified Harvest						
Geographic Region	Square Feet of Basal Area per 1,000 feet of Stream, Each Side					
	Large Type F RMA = 100 feet		Medium Type F RMA = 70 feet		Small Type F RMA = 50 feet	
	Standard Target	Active Management Target	Standard Target	Active Management Target	Standard Target	Active Management Target
Coast Range and S. Coast	300	270	160	140	50	30
Interior & W. Cascade	350	310	180	160	50	30
Siskiyou	290	260	140	120	50	30
E. Cascade & Blue Mountain	220	200	120	100	50*	50**
*The maximum live conifer basal area that must be left is 40 square feet. The other 10 square feet may come from snags, dying trees or hardwood trees if available in the RMA.						
**Live conifer basal area may be reduced to 30 square feet for the Active Management target. The other 20 square feet must come from snags, dying trees or hardwood trees if available in the RMA.						



This is a medium Type D stream.

Example 3 - Type N or D Stream

The process you will follow is the same, but there are a few changes in the requirements. Let's first review the overall process, in which you need to:

- identify the geographic region and the size and type of stream in your harvest
- identify the type of harvest you plan – Type 1, Type 2, Type 3 or Unclassified
- measure the length of stream within the harvest unit
- measure and mark the RMA width and the live conifer basal area in the RMA

Then, answer the following questions:

Question 1

Is your live conifer basal area more than the standard target shown in Table 2-11 or Table 2-12, depending on your type of harvest?

If the answer to Question 1 is yes, you must leave enough trees to meet the standard target shown in Tables 2-11 or 2-12. You must also follow the other general prescription requirements in Item 8 on page 23, including the numbers of trees to be left along Type D and N streams.

As with Type F streams, the basal area of certain hardwood trees, dead or dying trees or snags can make up a portion of the basal area standard target. The allowances for Type D and N streams are similar to Type F streams, but there are differences. See Table 2-13, which applies to west-side geographic regions, or Table 2-14 for east-side geographic regions. Note also that, without fish, Type D and N streams have no active management target option tied to habitat enhancement work.

Question 2

What if your live conifer basal area is less than the standard target?

As with the Type F example, there are two possible situations:

Situation A: The live conifer basal area is less than the standard target, but greater than one-half of the standard target.

You must leave:

- trees within 20 feet of the high-water level, trees that lean over the stream, understory plants within 10 feet of the high-water level, and all snags and down logs in the channel and RMA, and
- all live conifer trees 6 inches DBH or larger (no basal area is specified) in the RMAs of all large or medium Type N streams up to these maximum numbers:

  100 conifers per 1,000 feet along large Type D or N streams

  70 conifers per 1,000 feet along medium Type D or N streams

Table 2-11 Streamside Tree Retention for Type D and Large and Medium Type N Streams with Type 2 or 3 Harvest

Geographic Region	Square Feet of Basal Area per 1,000 feet of Stream, Each Side		
	Large Type D & N RMA = 70 feet	Medium Type D & N RMA = 50 feet	Small Type D RMA = 20 feet
	Standard Target	Standard Target	Standard Target
Coast Range & S. Coast	90	50*	0
Interior & W. Cascade	110	50*	0
Siskiyou	90	50*	0
E. Cascade & Blue Mtn.	70	50*	0

*Hardwoods may count up to 30 square feet per 1,000 feet toward meeting the standard target

Table 2-12 Streamside Tree Retention for Type D and Large an Medium Type N Streams with Type 1 or Unclassified Harvest

Geographic Region	Square Feet of Basal Area per 1,000 feet of Stream, Each Side		
	Large Type D & N RMA = 70 feet	Medium Type D & N RMA = 50 feet	Small Type D RMA = 20 feet
	Standard Target	Standard Target	Standard Target
Coast Range & S. Coast	140	60*	0
Interior & W. Cascade	160	60*	0
Siskiyou	120	60*	0
E. Cascade & Blue Mtn.	100	60*	0

*Hardwoods may count up to 30 square feet per 1000 feet towards meeting the standard target

Table 2-13 Hardwoods, dead and dying trees, or snags in Type D and N stream RMAs that count toward basal area targets for west-side Geographic Regions

Type D and Type N Streams Coast Range, S. Coast, Interior, Western Cascades and Siskiyou Geographic Regions	Large	Medium
Cottonwood and Oregon ash (6 inches or greater DBH) left in the RMA and growing more than 20 feet from the high-water level may count toward basal area target.	X	
A combination of the following can make up to 10 percent of the basal area target: 1. The basal area of hardwoods (except red alder) retained in the RMA that are greater than 24 inches DBH and grow more than 20 feet from the high water level. 2. The basal area of sound conifer snags (6 inches or greater DBH and at least 30 feet high) that are anywhere in the RMA.	X	
1. Hardwood trees retained in the RMA can contribute up to a maximum of 30 square feet of basal area per 1000 feet toward meeting the basal area target. 2. Sound conifer snags (6 inches or greater DBH and at least 30 feet high) can contribute up to 5 percent of the basal area target.		X

Situation B: The live conifer basal area is less than one-half of the standard target.

You can use one of three different prescriptions depending on the circumstances:

ALTERNATIVE PRESCRIPTION 1

Refer to Alternative Prescription 1 under Question 13 on page 24. It is the same for Type D streams and large and medium Type N streams.

ALTERNATIVE PRESCRIPTION 2

Refer to Alternative Prescription 2 under Question 13 on page 24. It is the same for Type D streams and large and medium Type N streams.

DEFAULT STANDARD

If you don't want to – or can't – use Alternative Prescription 1 or 2, or if the RMA is not capable of growing conifers, use the default standard. Except for cable yarding corridors or stream crossings reviewed by ODF, landowners must leave:

- all trees within 20 feet of the high-water level and all trees in the RMA that lean over the stream
- all understory plants within 10 feet of the high-water level
- all snags and down wood in the channel and RMA – any safety or fire hazards may be cut, but can't be removed, and
- all conifers and hardwoods within the high-water level for the distances indicated in Table 2-15

Finally, to be clear about small Type D and N streams (see illustration):

There are no basal area targets for small Type D or small Type N streams. The requirements for small Type D streams are to leave all trees, snags and down logs within 20 feet of the stream and all understory vegetation within 10 feet of the stream. The requirements for small Type N streams are shown in Table 2-16.

Although relatively uncommon, Type N streams subject to rapidly moving landslides have some unique riparian tree retention requirements. Such streams are found primarily in very steep, upland terrain – if you suspect such a situation check with ODF to verify the applicable requirements. See Pages 51-53 for further information about landslide-prone terrain.

General prescription summaries

The Appendix, pages 160-191 includes one-page summaries of the general prescription requirements for streams. Use them when the live conifer basal area in the RMA is more than the standard target.

Table 2-14 Hardwoods, dead and dying trees, or snags in Type D and N stream RMAs that count toward basal area targets for Eastside Geographic Regions

Type D and N streams E. Cascades and Blue Mountains Geographic Regions	Large	Medium
All live hardwoods left in RMA may count toward the basal area target.	X	X
Sound conifer snags (6 inches or greater DBH and 30 feet high) left in the RMA may count toward as much as 10 percent of the basal area target.	X	
Sound conifer snags (6 inches or greaterin DBH and 30 feet high) can contribute up to 5 percent of the basal area target.		X

Table 2-15 Default Standard requirements: leave all conifers and all hardwoods within these distances of the high water level

	Conifers	Hardwoods
Large Type D	70 feet	30 feet
Medium Type D	50 feet	20 feet
Small Type D	20 feet	20 feet
Large Type N	70 feet	30 feet
Medium Type N	50 feet	20 feet

Quick Review

Use one of these:	When RMA basal area is:
General Prescription	More than the standard target
Situation A	Less than but more than half of the standard target
Situation B	Less than half of the standard target
Alternative Prescription 1	Less than half of the standard target and catastrophic damage
Alternative Prescription 2	Less than half of the standard target and dominated by hardwoods
Default Standard	Less than half of the standard target and Alternative Prescription 1 or 2 are not acceptable

Example 3 - Alternate Practice

Can you propose your own idea for stream protection?

Yes. You can always propose a different way of doing things. Such a "plan for an alternate practice" is specifically allowed because written requirements cannot fit every situation and alternatives can sometimes work better. Keep in mind that your plan will need to show ODF how it will protect fish and wildlife and other resources as well or better than the standard requirements. You can't proceed with your alternate plan unless ODF approves it.

Another issue in some streamside forests in drier regions of Oregon is extensive insect damage when trees are stressed by growing too close together. Also, hardwoods such as aspen and cottonwood can be very important for streams in these regions. In such cases, landowners are encouraged to talk with ODF about site-specific plans that can help both forests and streams.

Is there more to know about written plans when harvesting within 100 feet of a Type F, SSBT or D stream?

Yes – there is a lot to know.

The requirements when harvesting along Type F, SSBT or D streams can be somewhat complicated. But this section shows how different options and flexibility are available. If you decide to do a harvest, you must prepare a written plan for review by ODF – an example is shown on pages 143-144.

THERE IS ONE MORE OPTION.

Many landowners choose not to operate in Type F, SSBT and D stream RMAs when harvesting timber. That way they avoid RMA planning and written plan preparation.

Is avoiding RMAs the way to go?

There is no financial compensation from the government for avoiding RMAs or leaving more trees near streams than is required. Some landowners still choose to do so for various reasons.

While the requirements may seem complicated, they do allow for active management within the RMA. Landowners are encouraged to check out all the options and make an informed choice.

For other information sources, see the Appendix, pages 197-198.



Example of a small Type N stream. Such streams often lack fish due to a waterfall or other natural feature that limits access or favorable habitat.

Table 2-16 Retention for Specified Small Type N Streams

Geographic Region	Retain Understory Vegetation and Unmerchantable Conifers* 10 Feet on Each Side of the Stream for:
E. Cascades & Blue Mountains	All perennial streams
South Coast	Portions of perennial streams where the upstream drainage area is greater than 160 acres.
Interior	Portions of perennial streams where the upstream drainage area is greater than 330 acres.
Siskiyou	Portions of perennial streams where the upstream drainage area is greater than 580 acres.
Coast Range & W. Cascades	No retention required
Protect all small Type N streams in all regions from sediment and disturbance as noted on pages 57, 58 and 109. For small Type N streams subject to rapidly moving landslides, retain trees as described on pages 51-53.	

*Unmerchantable conifers means conifers less than 6 inches DBH.

You want to harvest timber near a lake. How do you meet the requirements?

What is a lake?

Lakes have year-round standing open water. A lake includes the water, vegetation, aquatic life, beds, banks or wetlands below the normal high-water level.

What is not considered a lake?

Water developments that are not part of a natural stream – these include constructed features such as waste treatment lagoons, farm ponds and log ponds.

There are two major classes of lakes:

- large lakes (greater than 8 acres)
- other lakes (two kinds):
  - between one-half acre and 8 acres, or less than 8 acres with fish
  - less than one-half acre with no fish

What are lake protection requirements intended to do?

Protect the following functions and values of lakes:

- water storage
- water quality
- water quantity
- habitats for aquatic plants, animals, fish and wildlife

How are large lakes protected during forest operations?

- A written plan, reviewed by ODF, is required for operations within 100 feet of a large lake.
- The RMA width is 100 feet, as measured from the high-water level.
- RMA retention requirements are specified in Table 2-17.
- Operations must never cause sedimentation or drain lakes.
- Activities in the lake RMA must not impair water quality, disturb natural drainage or affect soil productivity.
- Timber felling, yarding and mechanical site preparation requirements in lake RMAs are covered on pages 55-56 and 74.

How are other lakes protected during forest operations?

See Table 2-17 for specific requirements for other lakes with or without fish.

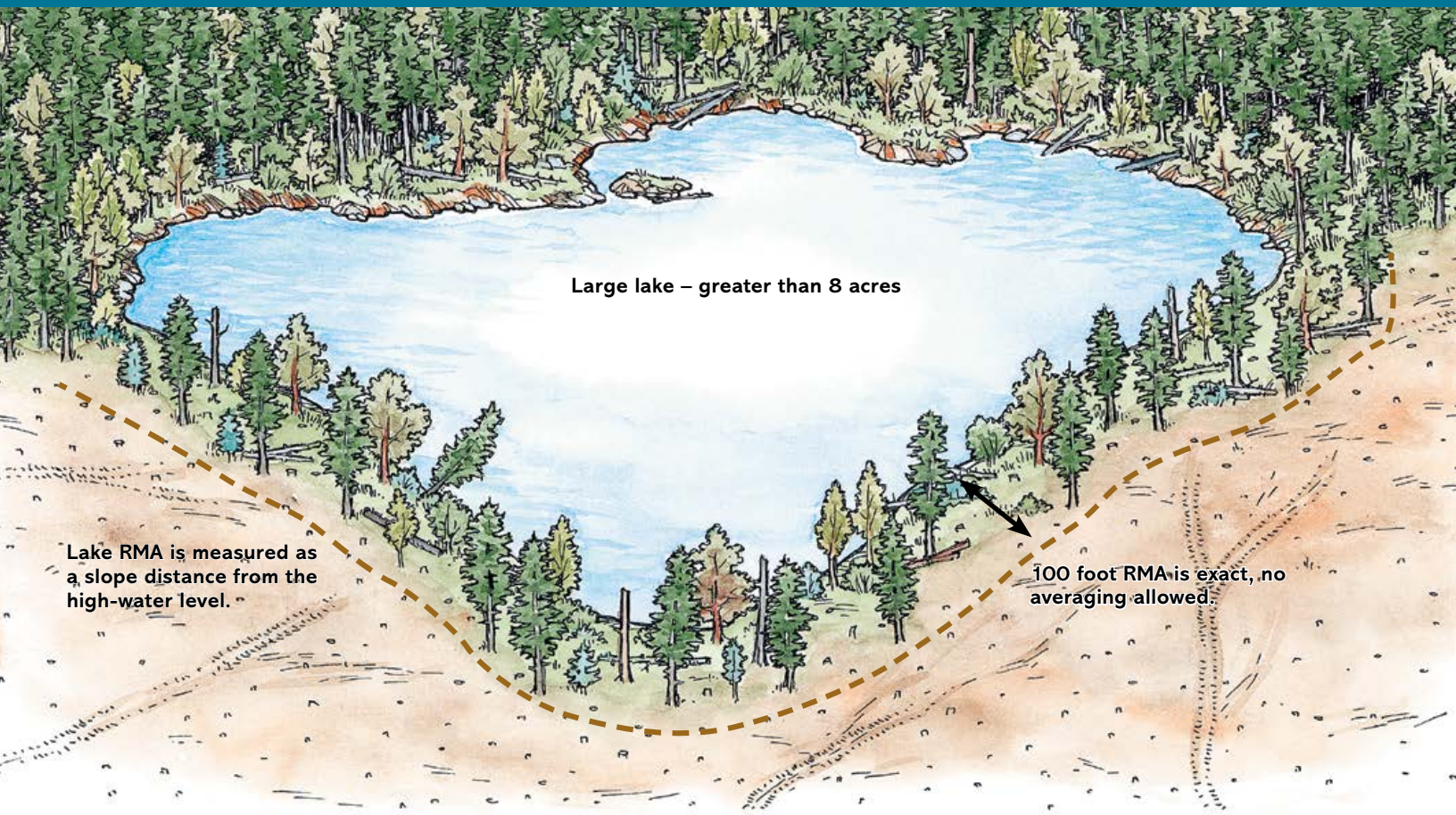


Table 2-17 Lake Protection Requirements

Class of Lake	Riparian Management Area Width (feet)	Retention Requirements
Large lakes (greater than 8 acres)	100	Leave: understory plants, all snags and down wood, and 1/2 of the trees by species and size.*
Other lakes (between 8 acres and 1/2 acre, or less than 8 acres with fish)	50	Same as for large.
Other lakes (less than 1/2 acre, no fish)	No RMA	If greater than 1/4 acre, leave snags and down wood.**

*Leave 50 percent of the original live trees, by species in each of the following size classes:

- 6-10 inches DBH,
- 11-20 inches DBH,
- 21-30 inches DBH,
- larger than 30 inches

The goal is to leave approximately the same species and size distribution as before the RMA harvest.

** These can be counted toward requirements for snags and down logs in clearcuts.

Leave all trees along the edge of the lake. Otherwise, leave trees should be well distributed.

All snags and down wood in the lake and RMA must be left. Snags felled for safety must be left on the ground and cannot count toward snag and live tree requirements in adjacent harvest areas.

Protect the lake from disturbance that would damage water quality.

For other information sources, see the Appendix, pages 197-198.

You want to harvest timber in or near a wetland. How do you meet the requirements?

What is a wetland?

Wetlands, especially smaller ones, are not as obvious as streams and lakes. Wet soils, surface or ground water and water-tolerant plants can indicate a wetland. Plants found in wetlands include Oregon ash, Sitka spruce, cottonwood, willow, cattails, skunk cabbage, reed canary grass, rushes and sedges. Terms for specific types of wetlands include swamps, marshes, bogs and seeps.

Don't be fooled. Wetlands may dry out in the summer and have different sizes and shapes. If you're unsure about an area, check with ODF or seek specialized assistance.

Where will you find wetlands?

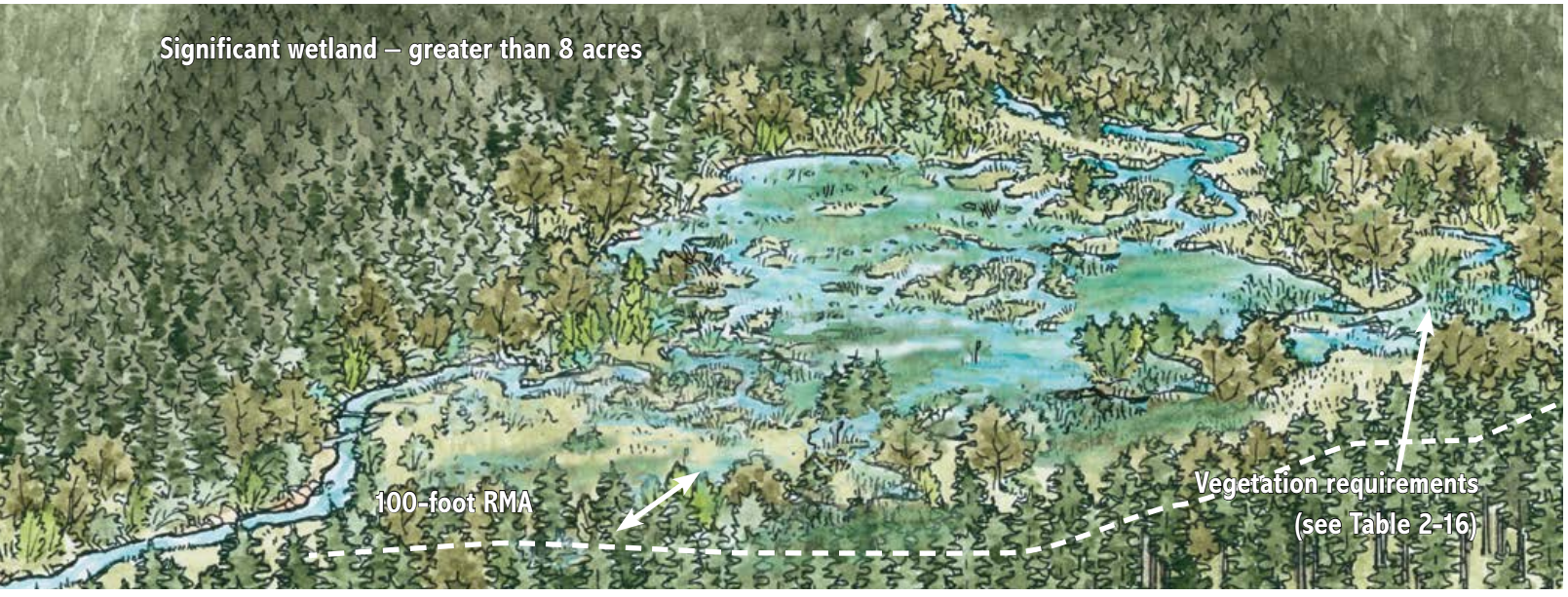
- natural drainages or swales
- low areas with high water tables
- flat valleys or depressions with poorly drained soils
- near streams, rivers and lakes
- lower slopes where springs or seeps emerge
- mountain meadows watered by snowmelt

What is not considered a wetland?

Water developments that are not part of natural streams or lakes (such as waste treatment lagoons, farm ponds and log ponds) are not considered wetlands.

THERE ARE THREE CLASSES OF WETLANDS:

- **Significant wetlands** are greater than 8 acres, or estuaries, bogs or certain eastern Oregon springs (regardless of size).
- **Stream-associated wetlands** are smaller than 8 acres and located next to streams.
- **Other wetlands** are smaller than 8 acres.



How are significant wetlands protected during harvest?

- the RMA width is measured from the edge of the wetland (see Table 2-18)
- vegetation must be left in the RMA (see Table 2-18)
- operations must never drain or cause sediment to enter the wetland
- a written plan, reviewed by ODF, is required for operations within 300 feet of the wetland

Why protect wetlands?

- They contribute surface and groundwater.
- They can maintain or improve water quality.
- They can reduce flood impacts.
- They can provide habitats for aquatic plants, fish and wildlife.
- They can offer recreational opportunities such as wildlife viewing.

How are stream-associated wetlands protected during harvest?

- Give these areas the same protections as required for the stream type they're associated with.
- Further specifics are shown in Table 2-18.
- Converting or draining is not allowed, even for the purpose of establishing trees.
- Never drain or cause sediment to enter a stream-associated wetland.

How are other wetlands protected?

- Snags and down trees in the wetland must be left. See Table 2-18 for specifics.
- Converting or draining is not allowed, even for the purpose of establishing trees.
- When possible, avoid operations in wetlands. Ground equipment must not cause rutting or soil compaction, or affect water quality. Successful operations may occur during dry or frozen conditions. Cable harvesting is an alternative, where appropriate.
- Depleting, adding water or draining other wetlands must be avoided.



Stream-associated wetland and its 25-foot RMA.

Table 2-18 Wetland Protection Requirements

Class of Wetland	Riparian Management (feet)	Area Protection Required (Both wetland & its RMA)
Significant (Greater than 8 acres, or estuaries, bogs or certain E. OR springs)	Estuaries 100 – 200 Bogs 50 – 100 E. OR Springs 50 – 100 Wetlands 100	Leave: understory plants, all snags and down wood, and 1/2 of the trees by species and size*
Stream-associated (Next to a stream)	Stream RMA goes around it ***	Included in stream RMA
Other (Less than 8 acres)	No RMA	If greater than 1/4 acre leave, snags and down wood.** If less than 1/4 acre, no leave requirements.

*Leave 50 percent of the original live trees, by species, in each of the following size classes:
- 6-10 inches DBH
- 11-20 inches DBH
- 21-30 inches DBH
- Larger than 30 inches

Leave trees should be well distributed.

All snags and down wood in the wetland and RMA must be left. Snags felled for safety reasons must be left on the ground and cannot be counted toward snag and live-tree requirements in clearcuts.

** These may be counted toward requirements for snags and down logs in clearcuts.

*** Where wetlands or side channels extend beyond the RMA, expand the RMA to include the wetland or side channel plus 25 additional feet. This does not apply to small Type N streams.

For other information sources, see the Appendix, pages 197-198.

What are the requirements for leaving wildlife trees, snags and down logs?

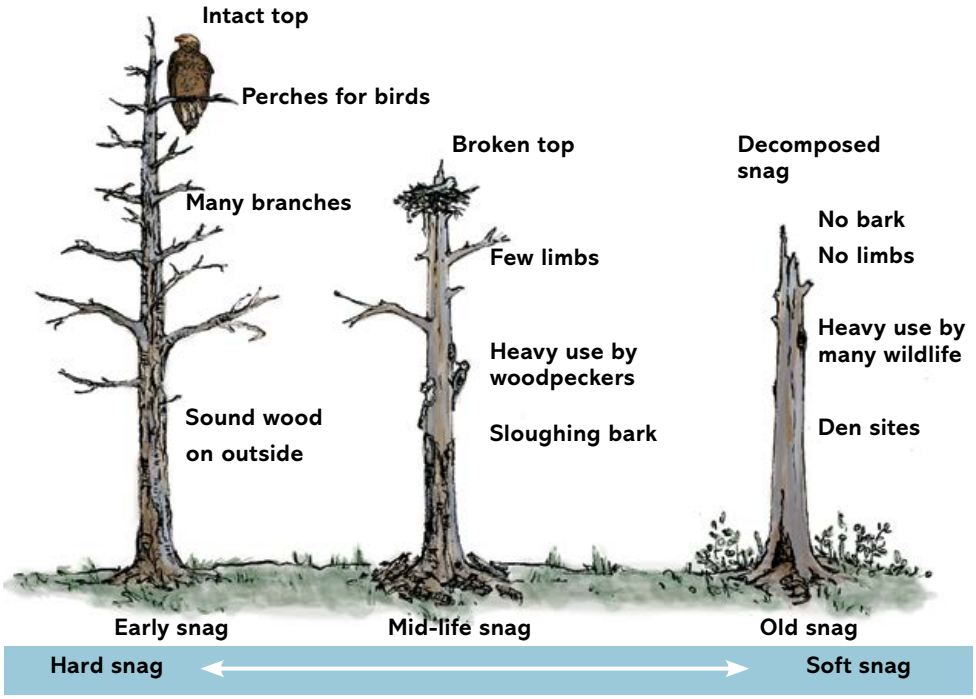
What's the difference?

- Wildlife tree: either a snag or green tree of a minimum size that is required to be left (details below).
- Snag: dead standing tree that has lost its needles and small limbs.
- Down log: existing down log or a down green tree of minimum size (details below).

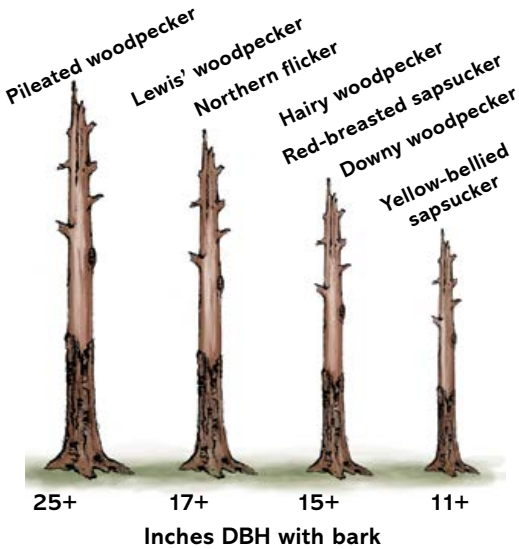
What's so important about snags and down logs?

Snags provide homes to owls, woodpeckers, bats, squirrels, bluebirds, wood ducks, swallows, mergansers, weasels, raccoons and many other animals. More than 50 species of birds and mammals use snags for nesting, feeding and shelter. A lack of snag cavities for nesting can limit populations of some bird species. Snags larger than 20 inches DBH are in short supply on private lands. Snags can be created from live trees, and wildlife respond quickly to their availability.

You can avoid the cost of creating snags by selecting existing snags, or rotting or deformed trees for retention. In eastern Oregon, down logs are used by 150 species of wildlife, including amphibians, reptiles, birds and mammals. Logs are also important to certain insects, fungi and plants. Be aware that too many down logs can be a fire hazard; however, a forest without down logs may have fewer species of plants and animals. It's not necessary to leave sound logs. Deformed or rotten parts of tree stems left in the forest after a harvest can meet down log requirements, if they would be solid enough to pick up with a log loader (see Table 2-19).



Snag diameters most often used by woodpeckers



Larger-diameter, taller snags stand longer and provide more cavities.



Protected areas under the log are used as nesting cover by grouse and as hiding cover by rabbits and hares.



When the bark loosens, there is hiding cover for tree frogs and amphibians. The trunk is a food source for woodpeckers, particularly pileated woodpeckers.



Small mammals burrow into the interior as the log softens. Bears, raccoons and skunks feed on insects.

How do I know when wildlife trees and down logs are required?

If you are planning a harvest of 25 acres or more and the harvest will leave fewer than the number of trees per acre or basal area per acre indicated in Table 2-1 on page 16, wildlife trees and down logs will be required. Just like the requirements for reforestation, the trees per acre and basal area requirements vary according to site class.

Wildlife trees and down logs must be left in all Type 2 or 3 harvests that are larger than 25 acres (Table 2-2 on page 17), and in some cases when adjacent new and older Type 2 or 3 harvests together exceed 25 acres (see Example 2 on page 18).

Regardless of the size of the harvest unit, snags and down logs must be left in all wetlands, and in all RMAs for wetlands, lakes, Type F, and large and medium Type D and N streams (see details below).

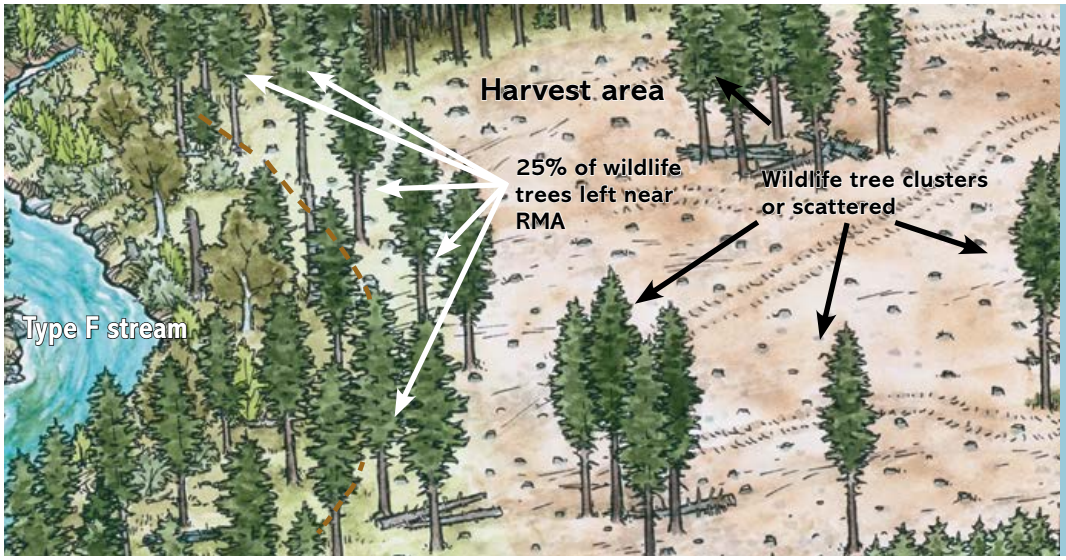
Table 2-19 Down Log Minimum Lengths and Diameters

These sizes = 1 down log (10 cubic feet)		These sizes = 2 down logs (20 cubic feet)	
Length (feet)	Diameter (inches, small end)	Length (feet)	Diameter (inches, small end)
6	18	6	25
8	15	8	21
10	14	10	19
12	12	12	17
14	11	14	16
20	9	20	13
28	8	28	11
		36	9
		44	8

How many wildlife trees need to be left?

On average, per acre you must leave at least:

- two snags or two green trees at least 30 feet tall and 11 inches DBH or larger, at least 50 percent of which are conifers, plus
- two down logs or down trees, at least 50 percent of which are conifers. Each must be at least 6 feet long with a total volume of at least 10 cubic feet. Logs containing 20 cubic feet or more count as two logs (see Table 2-17 for sizes that qualify)



Leave these wildlife trees:

two snags or two green trees

- at least 30 feet tall
- 11 inches DBH or larger and
- 50 percent must be conifers

And two down logs or down trees

- at least 6 feet long
- at least 10 cubic feet total volume and
- 50 percent must be conifers

Harvest areas next to Type F streams.

Where should wildlife trees be left?

Wildlife trees, snags and down logs may be left in one or more clusters across the harvest unit, or they can be scattered throughout the unit (see illustration).

What are the requirements near certain streams?

To provide increased benefits to fish, ODF may require up to 25 percent of the needed wildlife trees be left near the stream if the harvest unit is next to a Type F stream. The trees would be in addition to other trees required to be left in RMAs. Also, to provide extra sources of large wood to streams, wildlife trees must be left along the lower sections of steep, small Type N streams that empty directly into Type F streams. After receiving your notification, ODF will tell you if one of these streams is on your harvest unit.

Can RMA snags and down logs substitute for harvest unit wildlife trees?

Wildlife tree, snag and down log requirements are in addition to other requirements for tree retention, such as for wetland and wildlife site buffers. However, in some limited situations the wildlife and down log requirements can be met by counting snags, trees or logs otherwise required to be left in RMAs or other resource sites. For more information, see the stream protection summaries in the Appendix, pages 160-191, or check with ODF.

What if your harvest is less than 25 acres?

Leaving wildlife trees, snags or down logs is not required if your actual harvest, combined with any adjacent prior harvest on the same ownership, is less than 25 acres. However, leaving wildlife trees, snags and logs voluntarily is always encouraged, to benefit forest productivity and wildlife habitat.

Can snags create a wildfire hazard?

Yes. They are vulnerable to lightning strikes, and during a wildfire hollow snags also can create a chimney effect where burning embers are sent into the air, starting new fires some distance away. Always consider the wildfire hazard of snags.

Can snags create a safety hazard?

Yes. Snags can collapse or drop limbs without warning. Oregon law (OAR Chapter 437, Division 7 Forest Activities safety rules, administered by the Oregon Occupational Safety and Health Division) requires operators to always identify snags and other danger trees. Danger trees have evidence of rot, excessive lean, spike tops, etc.

Never operate machines near snags – they can be accidentally bumped or the ground vibration can cause unexpected collapse. Always mark the safety hazard area around snags. Isolate snags and notify all workers by marking the area with plastic ribbon.

Before beginning tree felling in harvests larger than 25 acres, identify wildlife trees that will be left. This will ensure a sufficient number of wildlife trees are left in the harvest area.

Workers should know about snag hazard areas, especially when moving cables, during log skidding or when tree felling is occurring nearby.

Minimize worker exposure to wildlife tree hazards by leaving them among a clump of trees, along harvest boundaries, near stream RMAs, between cable corridors, on rock outcrops or at the back end of the harvest area.

What do you look for when selecting wildlife trees?

The first choice should be to leave safe snags in safe locations, but it is often necessary to leave green wildlife trees that will eventually become snags. What should you look for?

- a broken or dead top
- dead branches in the crown
- old wounds or scars at the base of the tree
- indication of internal rot (fungi, conks or existing woodpecker cavities along the stem)
- the largest-diameter and tallest trees

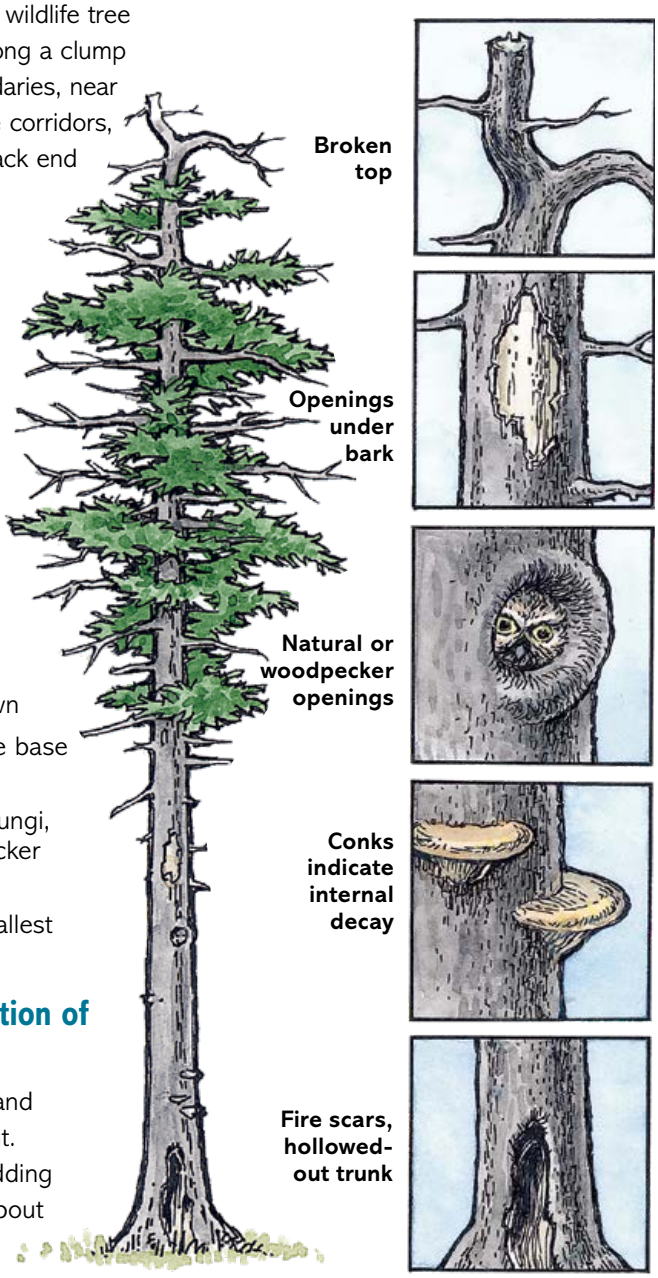
How do I ensure protection of existing down logs?

Down logs can be crushed and broken by logging equipment. Never allow yarding and skidding without informing workers about down log needs. It may be possible to save existing down logs by identifying their location.

Is there opportunity for alternative plans?

Yes. The location and species of wildlife trees and down logs may be modified following review by ODF. For example, you may be able to substitute hardwood species for conifer species when managing for hardwoods, or additional leave trees in one unit for those required in another.

For other information sources, see the Appendix, pages 197-198.



How do you protect sensitive wildlife sites when you harvest?

What are sensitive wildlife sites?

- habitat sites of fish and wildlife species identified as threatened and endangered (T&E) or on other lists adopted, by rule, by the Oregon State Fish and Wildlife Commission or federally listed under the Endangered Species Act (ESA)
- sensitive bird nesting, roosting or watering sites specifically identified for protection in the Forest Practices Act
- biological sites that are ecologically and scientifically significant
- significant wetlands
- critical wildlife or aquatic habitat sites that are listed in the "Cooperative Agreement between the Board of Forestry and the Fish and Wildlife Commission (1984)"

What wildlife species are associated with these sensitive sites?

- northern spotted owl (page 43)
- bald eagle (pages 44-45)
- osprey (pages 46-47)
- great-blue heron (page 48)
- golden eagle
- marbled murrelet
- band-tailed pigeon



Band-tailed pigeons are a game species and also an Oregon Conservation Strategy species. Some mineral springs used by band-tailed pigeons are protected by the Forest Practices Act.

Where are sensitive sites located, and what is your responsibility to find sensitive sites?

Your local ODF office has responsibility for maintaining inventories of sensitive resource sites. When you submit your Notification of Operation form, it is ODF's responsibility to identify any sensitive resource sites that may conflict with your operation. Landowners do not have a responsibility under the Forest Practices Act to search for and inventory unknown sites. However, if a landowner or operator knows of or discovers a non-inventoried site during planning or while conducting an operation, the operation must be stopped and ODF informed.

When and how are sensitive resource sites protected?

When operations conflict with sensitive resource sites, protection is required. For some sites, such as significant wetlands and sites used by northern spotted owls, bald eagles, great-blue herons and ospreys, the conflicts have been identified and levels of protections are established (pages 43-48). For other sites, such as those used by golden eagles, band-tailed pigeons, marbled murrelets or other threatened or endangered species, ODF determines if a conflict exists and develops site-specific protections with the landowner and a representative of ODFW. The following questions must be answered.

(Additional fish or wildlife species may be protected in the future if federal or state Endangered Species Act status is granted.)

1. **Is the site active?**

   Active means the site has been used in the recent past by one of the species listed on page 41. For example, a bald eagle may be using another nest site, but the nest site on your property may still require protection. Another example is an old osprey nest that might have been used by the bird six years ago. This site would be considered "abandoned." No protection is required for abandoned resource sites. Multi-year surveys are usually needed to show that a site is inactive, and these surveys are subject to ODF review.

2. **What, if any, are the possible conflicts?**

   A conflict exists if an operation may lead to sensitive resource site destruction, abandonment or reduced productivity. The proposed operation is reviewed and the site inspected with the landowner, operator and representative of ODFW to identify conflicts. If there are no conflicts, no special protection measures are required.

3. **How are conflicts resolved?**

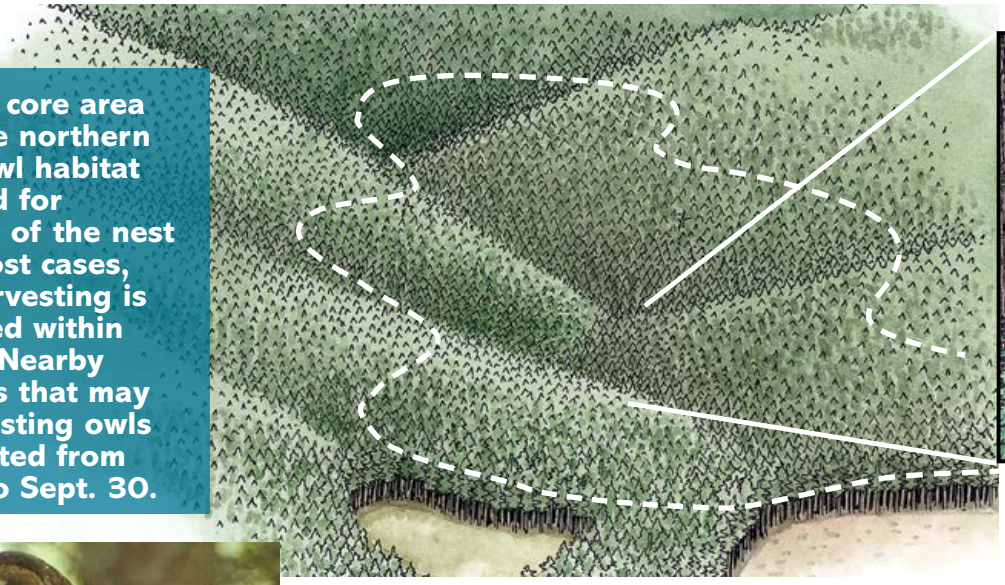
   A written plan must describe reasonable measures sufficient to resolve the conflict in favor of the resource site. Reasonable measures may include, but are not limited to, preparing and implementing a habitat management plan, limiting the timing of forest practices, redesigning the proposed practices in favor of site protection, and excluding the forest activities outright.

What else must a landowner or operator consider when working near sites used by species listed under the ESA?

- Compliance with the Oregon Forest Practices Act requirements does not ensure compliance with the federal ESA. It is the responsibility of the landowner and operator to know and incorporate federal ESA requirements in their actions.
- Landowners with approved "incidental take permits" under the federal ESA may be allowed some exceptions to compliance with the forest practice requirements.
- Additional information about the federal ESA can be obtained from the Oregon offices of the National Marine Fisheries Service (for listed anadromous fish) or the U.S. Fish and Wildlife Service (wildlife and non-anadromous fish).

NOAA
National Marine Fisheries Service
Oregon State Habitat Office
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232
503-231-2202

U.S. Fish and Wildlife Service
Oregon State Office
2600 SE 98th Ave., Suite 100
Portland, OR 97266
503-231-6179



A 70-acre core area of suitable northern spotted owl habitat is required for protection of the nest site. In most cases, timber harvesting is not allowed within this area. Nearby operations that may disturb nesting owls are restricted from March 1 to Sept. 30.



A northern spotted owl nest site can be an actual tree or an activity center of a pair of adult owls.



What about the northern spotted owl?

The northern spotted owl is a threatened species. A threatened species is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Northern spotted owls nest in unique forest habitats that require protection when in use.

What is a northern spotted owl resource site?

It is a 70-acre "core area" encompassing a northern spotted owl nesting site, which can be an actual tree or an activity center of a pair of adult spotted owls. These nesting sites require protection until there is reliable evidence that the site is no longer occupied by a pair of owls. The shape of the core area can vary depending on characteristics of the forest. The boundary is designed to make a contiguous habitat.

How are northern spotted owl resource sites protected?

When a landowner submits a Notification of Operation within one-half mile of a northern spotted owl resource site, ODF will inform the landowner that the owl resource site exists. ODF maintains an inventory of owl sites. If the proposed operation conflicts with the spotted owl resource site, the landowner must submit a written plan for review prior to beginning the operation.

A 70-acre core area of suitable spotted owl habitat is determined by the landowner (sometimes multiple landowners) and ODF. Fledgling owls need this area before they leave the nest site. Mortality of juvenile owls is very high, with predation from other owls and starvation. Suitable habitat is important for their survival before they disperse from the nest.

Suitable spotted owl habitat for the 70-acre core area means:

- a stand of trees with moderate to high canopy closure (60-80 percent)
- a multi-layered, multi-species canopy dominated by large overstory trees (greater than 30 inches DBH)
- a high incidence of large trees with deformities (large cavities, broken tops and other evidence of decadence)
- numerous large snags; large accumulations of fallen trees and other woody debris on the ground
- sufficient open space below the canopy for owls to fly

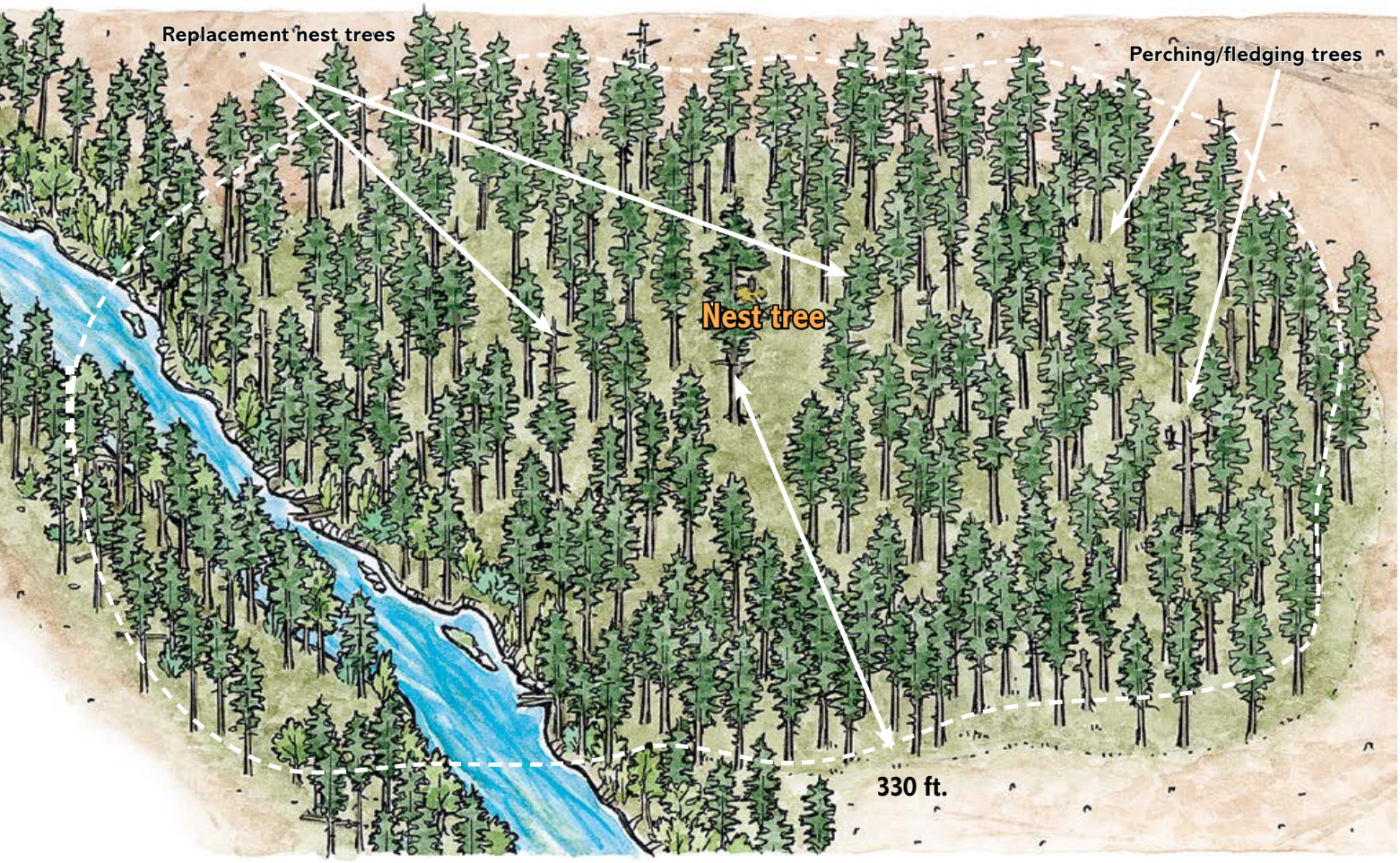
The core area must consist of forest stands that come closest to approximating the conditions desired by spotted owls.

Forest practices that do not maintain the cores area's habitat suitability for owls are not allowed. In most cases, timber harvesting within the core area will not be allowed.

The period between March 1 and Sept. 30 is when nesting owls can least tolerate disturbance. Forest operations within one-quarter mile of a nest site are not allowed during this time. Seasonal restrictions may be waived if survey data shows that the spotted owls are not actively nesting or not present.

Are there exceptions?

Yes. Exceptions to the protection requirements may be granted by ODF if the operator has obtained an incidental take permit from federal authorities under the federal ESA.



The protected area around a bald eagle nest tree is no less than 330 feet. Size and shape depend on use of the area by bald eagles. The resource site includes the active nest tree and all identified key components – perching/fledging trees, replacement nest trees and a forested area around the nest tree. Do not disturb within 660 feet, or 1,000 feet for use of aircraft. For nesting sites, operations are restricted from Jan. 1 to Aug. 31.

What about the bald eagle?

The bald eagle is a legally protected species, and forests with suitable nest trees are needed for its maintenance. Bald eagle nesting sites are sensitive to forest practices and require protection.

What is a bald eagle nesting resource site?

- Bald eagles often construct more than one nest and vary their use between them from year to year. All bald eagle nests within a given territory require protection, although a nest may not be currently occupied or may not have been used for raising young for many years.
- An active nest tree is one in which a bald eagle has nested in the past five years, whether or not the tree still contains a nest. As long as the nest tree remains standing, it and the surrounding designated area require protection. Or if the nest tree has fallen but the surrounding area has suitable replacement trees present, the area requires protection for up to a five year period. This is to allow time to determine if the eagles will return and rebuild a new nest.
- Replacement nest trees ensure the maintenance of a site in the future. Bald eagles show a strong attachment to a chosen territory. If a nest tree is lost, the pair will use a nearby replacement nest tree.
- Perch trees are often adjacent to the nest tree. In addition to perching, they are used as nest access points by adults, or pilot trees that young use when learning to fly. They are often snags or live trees with exposed, strong, lateral branches high in the crown.
- Around the nest tree, perching, fledging and replacement trees compose a forested area that provides additional protection and acts as a visual screen.

Facts about bald eagle nests:

- Nests are 5 to 8 feet in diameter and 2 to 3 feet deep.
- Nests are typically located partway down the tree, as eagles prefer to have live branches to shelter the nest.
- They are found in large trees, in prominent locations, giving a clear view of the water. Nest trees are usually located within 1/4 mile of large water bodies, but rarely right on the water's edge.
- In contrast, osprey nests are smaller, located at the very top of a broken-topped tree or snag, and typically very close to the water's edge.



How are bald eagle nesting sites protected?

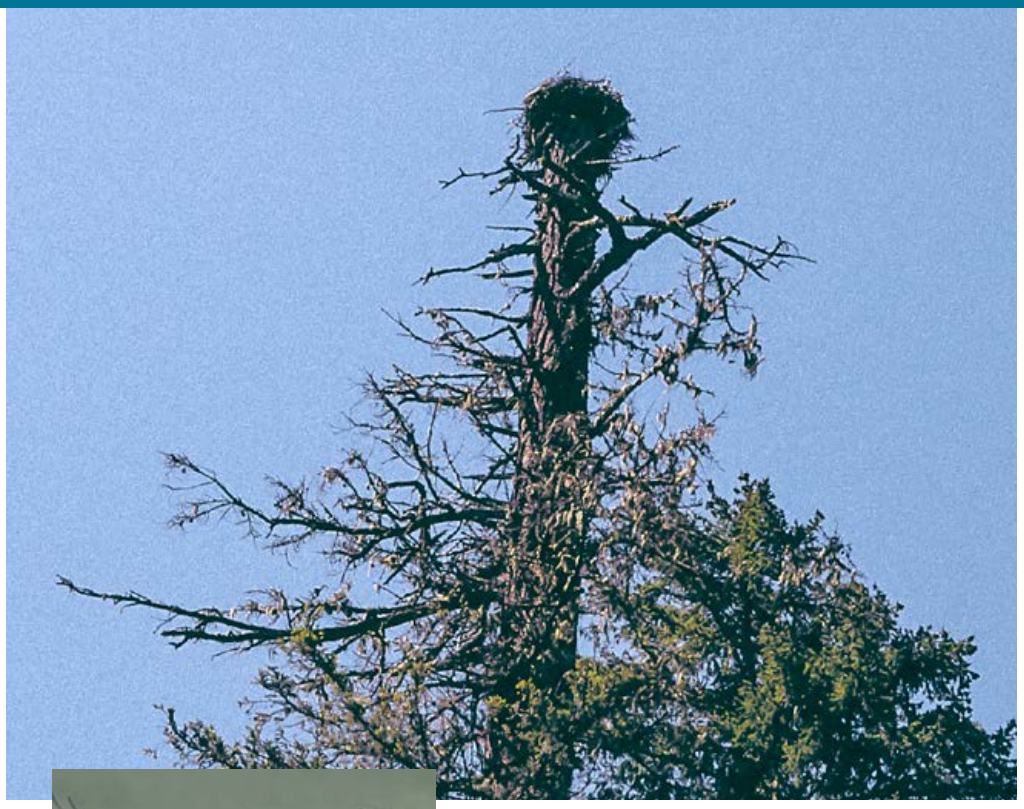
When a landowner proposes an operation within one-half mile of a bald eagle nesting site, a review is started. If ODF determines that the operation may pose a conflict for the site, a written plan describing how the site will be protected is required.

Any forest operations around the site must be designed to protect the trees from damage and windthrow. Experts must agree on the vegetation to be left. Trees are left to perform a job, either to provide a visual screen for the site or to protect the site from windthrow. This area should not be less than 330 feet from the nest. Its size and shape depend on actual use of the area by bald eagles. General guidelines for nesting areas call for maintaining the existing integrity of the stand.

From Jan. 1 to Aug. 31, when nest construction, mating and rearing of young occurs, forest operations are not permitted within 660, feet or 1,000 feet for use of aircraft. ODF may modify this period of time and the distances when an operation will not cause the birds to flush from these trees.

Are there exceptions?

Yes. Exceptions to the protection requirements may be granted by ODF if the operator has obtained an incidental take permit from federal authorities under the federal Bald and Golden Eagle Protection Act: www.fws.gov/pacific/eagles.





© Jim Cruce Photo

Osprey nest trees on forestland are usually large snags and broken-top trees, up to 60 inches DBH and 100-150 feet tall. Often they are above the surrounding forest and large enough to support a nest 4 to 6 feet in diameter and 1 to 2 feet deep. In other locations, osprey are often seen nesting on man-made telephone pole platforms.

What about the osprey?

Osprey resource sites require protection because they provide for successful reproduction of this important species. The birds often nest in large, prominent snags or trees with broken tops. These trees have a limited life span and are vulnerable to damage from forest practices. When using the nesting sites, the birds are also sensitive to human disturbance.

What is an osprey resource site?

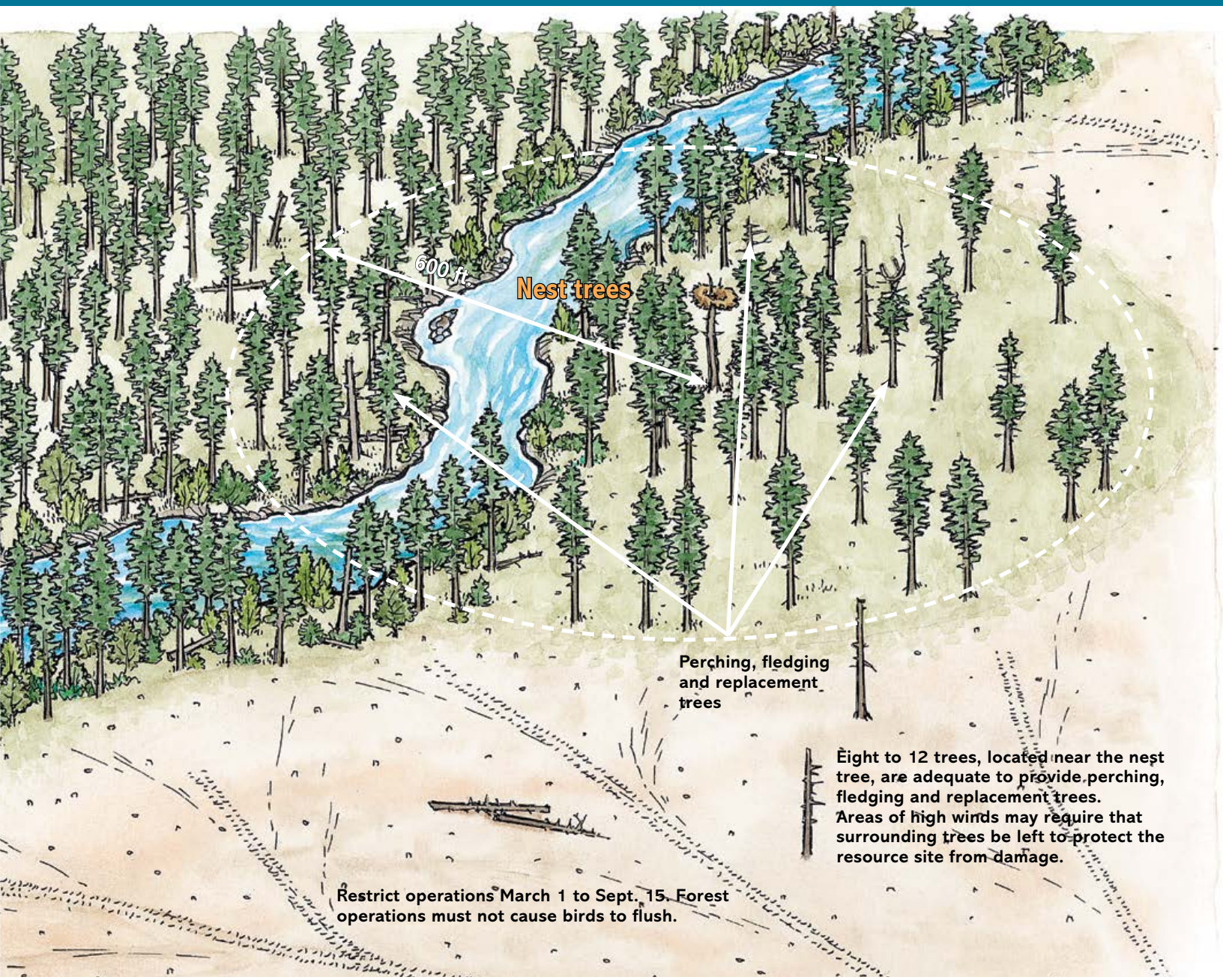
It includes the active nest tree and any identified key components. An active nest tree is one that has been used by osprey within the past five nesting seasons. Key components include perching, fledging and replacement trees.

Osprey are fish-eating raptors. After foraging, an adult osprey eats part of a fish in a tree near the nest, and delivers the remainder to the nest. These same trees are also used as perches by fledglings when learning to fly. Perching and fledging trees tend to be taller and larger in diameter than nest trees and have broken or dead tops, forks or lateral branches high in the crown. They allow easy access and views of the surroundings.



How are osprey resource sites protected?

- The goal is to avoid resource site abandonment or reduced use of the site. It is accomplished by maintaining site integrity and avoiding disturbance during the critical period of use when nest construction, mating and rearing of young occur.



- During forest operations, the active nest tree, perching, fledging and replacement trees must be left and protected from damage. The operation must be designed to protect the trees from windthrow.
- During the critical period of use, the active nest tree and any identified perch trees must be protected from disturbance. Forest operations are not allowed within 600 feet of the active nest tree or perch trees from March 1 to Sept. 15. Seasonal restriction periods can be modified if survey information shows that osprey are not nesting or are not present.
- First, identify the active nest tree. Then choose suitable perching, fledging and replacement trees that are likely to be used by osprey. The trees should be taller than the surrounding forest, with platforms large enough to support nests.
- Resting perches are used by adults when not fishing or tending the nest, and by fledglings when learning to fly. These are large, tall snags or trees that have broken or dead tops, forks or lateral branches high in the crown.
- Eight to 12 trees are adequate for perching, fledging and replacement trees, and should be located near the active nest tree.
- Activities that cause disturbance include timber harvesting, log hauling, road construction and low-flying aircraft.

Are there exceptions?

Yes. There are exceptions to protecting osprey resource sites if ODF determines that the loss of the site will not adversely affect the local population and there are no economically feasible alternatives. Check with ODF.

For other information sources, see the Appendix, pages 197-198.

What about the great-blue heron?

Great-blue herons are colonial nesters, which means there are often many nests together in what's called a rookery. (However, great-blue herons do sometimes nest individually.) Clusters of large nests located near the tops of trees identify a rookery. The rookery is usually near water and is used year after year.

What is a great-blue heron resource site?

It includes the active nest tree and any identified key components. An active nest tree is one that has been used by great-blue herons within the past three nesting seasons. Key components include a forested area around the nest trees that has perching, fledging and replacement trees.

How are great-blue heron resource sites protected?

- The goal is to avoid resource site abandonment or reduced use. It is accomplished by maintaining site integrity and by avoiding disturbance during the critical period of use when nest construction, mating and rearing of young occur.



Great-blue heron resource sites require protection.

- During forest operations, the active nest tree, perching, fledging and replacement trees must be left and protected from damage. The operation must be designed to protect the trees from windthrow.
- During the critical period of use, the active nest tree and any key components must be protected from disturbance. Forest operations are not allowed within one-quarter mile of the active nest trees Feb. 15 to July 31. Seasonal restriction periods can be modified if survey information shows that herons are not nesting or are not present.

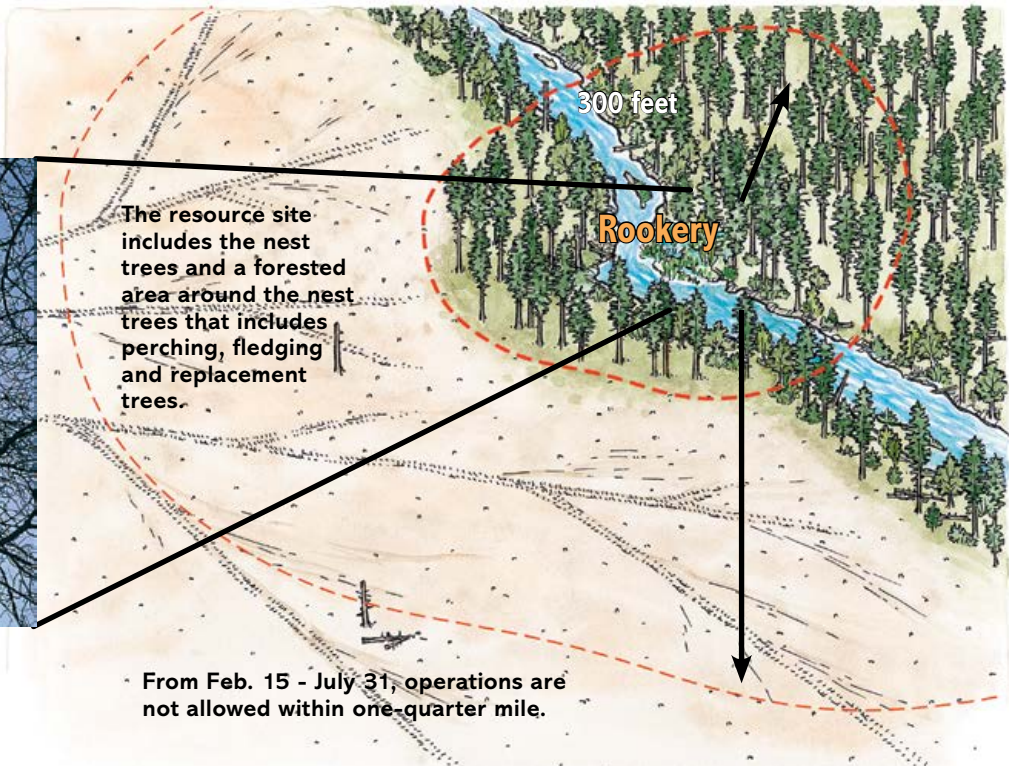
- First, identify the active nest trees. Then choose a vegetative area around the nest trees. Trees used as nest sites should be tall, with plenty of space for these large birds to fly in and out. Older trees with open branching are ideal. A 300-foot area around the outermost nest trees is needed to give a visual screen around the rookery and protect nest, perch, fledging and replacement trees from windthrow.
- Some trees may be harvested within the vegetative area surrounding the active nest trees. When conducting harvest activities within this area, operators must consider great-blue heron resource protection as the highest priority.
- Activities likely to cause the birds to flush from the nest include timber harvesting, log hauling, road construction and low-flying aircraft.

Are there exceptions?

There are exceptions to protecting a great-blue heron resource site if ODF determines that the loss of the site will not adversely affect the local population and there are no economically feasible alternatives. Check with ODF.

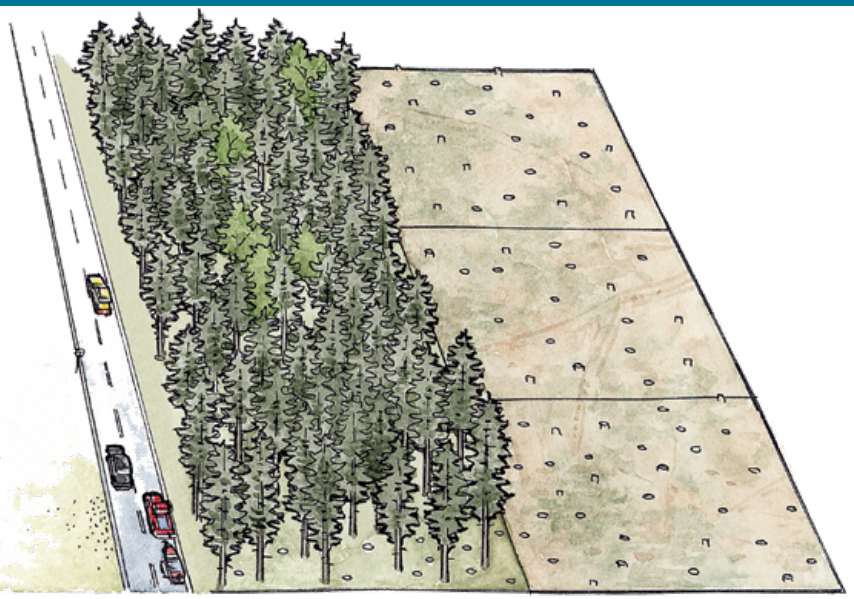


These great-blue heron nests have plenty of space for these large birds to fly in and out. Older trees with open branching are chosen.



What are the requirements for harvesting near scenic highways?

Oregon's popular scenic highways are often bordered by forestlands. When located along certain designated scenic highways, these lands have unique timber harvest requirements to help maintain the public's enjoyment of roadside trees.



Designated scenic highways

These include interstate freeways 5, 84, 205 and 405, plus Oregon state highways 6, 7, 20, 18, 22, 26, 27, 30, 31, 34, 35, 36, 38, 42, 58, 62, 66, 82, 97, 101, 126, 138, 140, 199, 230, 234 and 395.

Are there any exceptions?

Three scenarios are exempt from the scenic highway requirements: timber harvests along highways within urban growth boundaries, harvests on lands zoned as rural residential, or harvests on single ownerships less than 5 acres in size.

What area is affected by the requirements?

The scenic highway requirements apply to the "visually sensitive corridor" that extends 150 feet from the edge of the highway (Area 1 in the illustration). This distance is measured on the slope, along both sides of a scenic highway. The "edge of the highway" means the fence for interstate highways and the outermost edge of the pavement for state highways.

What are the requirements?

The following must be left temporarily on each acre of the 150-foot corridor:

(Note: 1 acre = 290 feet of scenic corridor; 150 x 290 = approximately 1 acre.)

Leave at least 50 healthy trees on each acre, at least 11 inches DBH (species are landowner's choice),

Or

Leave at least 50 healthy trees on each acre that are 40 square feet of basal area.

Note: 50 trees/acre = 17 trees per 100 feet of corridor length.

When can the temporary trees be harvested?

The trees may be removed when the new trees in the corridor understory reach an average height of at least 10 feet,

And

there is at least the minimum number of trees per acre of free-to-grow seedlings or saplings required for reforestation. (See "Will you need to reforest after harvest?" on page 75).

THERE IS AN ALTERNATIVE:

When the area extending from 150 to 300 feet from the edge of the highway (Area 2) has at least 40 square feet of basal area

Or

There are at least the minimum number of trees per acre of free-to-grow seedlings or saplings required for reforestation in Area 2 averaging 10 feet tall.

Then

No trees are required to be left in the visually sensitive corridor, or trees initially left may be removed. (See illustration on page 50).

However, if this alternative is used, Area 2 stocking cannot be reduced below 40 square feet of basal area,

Or

Below the minimum number of trees per acre of free-to-grow seedlings or saplings required for reforestation,

Until

Area 1 has been reforested as required and the stand is at least 10 feet tall and has the minimum number of stems per acre.

QUESTION:

What if the stocking in the scenic corridor (Area 1) is already below 50 healthy trees on each acre?

Then Area 2 cannot be harvested until Area 1 has been reforested and the stand has attained an average height of 10 feet,

And

There are at least the minimum of trees per acre of free-to-grow seedlings and saplings required for reforestation.

How is slash managed in visually sensitive corridors?

Harvests in visually sensitive corridors shall be cleared of major harvest debris within 30 days of harvest completion,

Or

Within 60 days of stopping active harvest activity on the site, regardless of whether the harvest is complete.

What are the reforestation requirements in visually sensitive corridors?

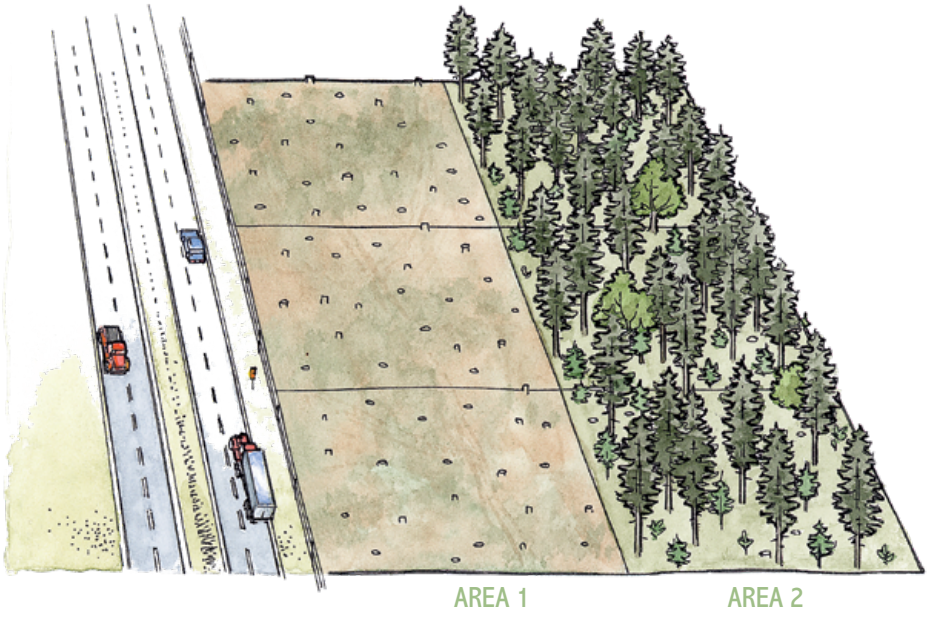
When the harvest in a visually sensitive corridor results in a Type 1 or Type 3 harvest, reforestation shall be completed by the end of the first planting season after the completion of the harvest (see harvest types, page 17).

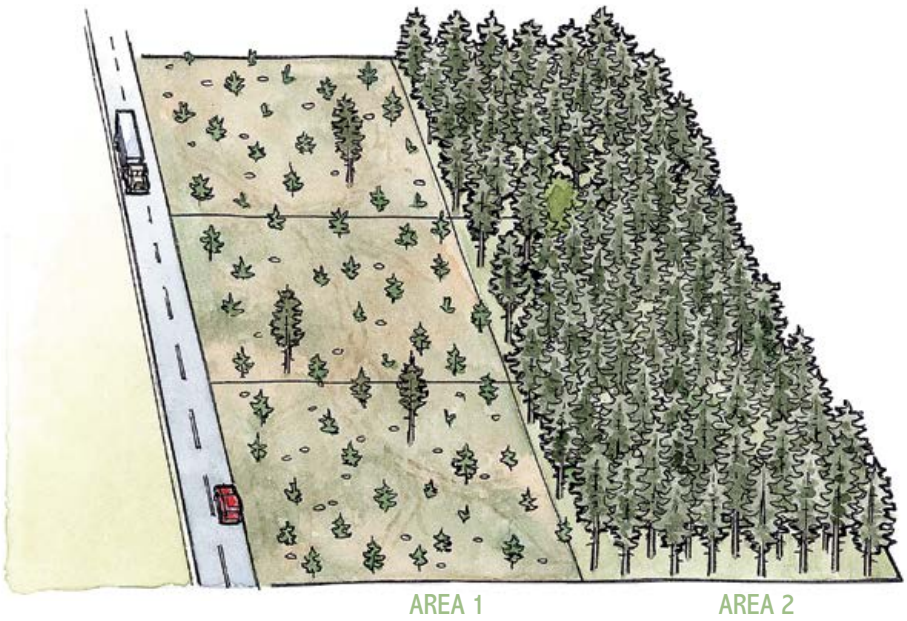
Is there liability for injury or damage from trees left in corridors?

Landowners and operators are not liable for injury or damage caused by the trees left in the visually sensitive corridor to comply with the requirements above. Where public safety is a serious concern, the Oregon Department of Transportation may encourage or prescribe removal of specific trees.

What tree species must be left in the corridor?

The landowner can choose the 50 trees that are left. Hardwoods make good visual screens, so conifers do not have to be left if there are enough hardwoods. The 50 trees on each acre (not an average) are intended to be distributed throughout the visual corridor.





Are modifications or waivers granted?

Yes, ODF may do so when the following circumstances exist:

- to maintain motorist safety
- to protect improvements such as dwellings or bridges
- to protect forest health
- to provide the motoring public with exposure to distant scenic vistas
- when trees that are required to be left are not visible to motorists
- when a land use change is inconsistent with a visually sensitive corridor
- when the requirements will result in severe economic hardship for the owner because nearly all of the owner's property is within the corridor

For other information sources, see the Appendix, pages 197-198.

What are the requirements where rapidly moving landslides may occur?

What is the problem on very steep slopes in western Oregon?

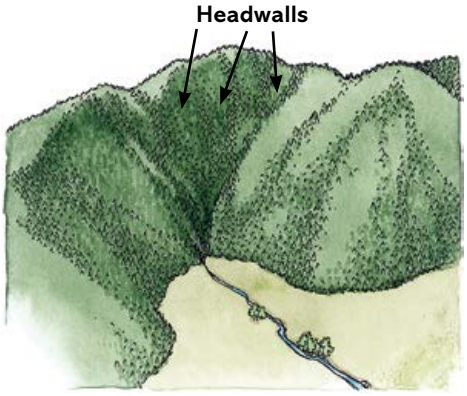
Very steep slopes can be prone to rapidly moving landslides, and timber harvesting and road construction can affect their occurrence. In addition to their potential soil and water effects, they can pose significant threats to public safety. This section describes rapidly moving landslides, where they can occur and requirements for forest practices near such areas. These measures are only one part of the shared responsibility needed among homeowners, road users, and state and local governments for effective protection of the public in areas prone to these landslides.

What is a rapidly moving landslide?

Rapidly moving landslides begin as small landslides on very steep slopes, averaging about 3 feet deep, 30 feet wide and 40 feet long. When these landslides move down steep slopes and into stream channels they are called debris flows or debris torrents. They can affect fish habitat both positively and negatively. They carry logs and boulders, which provide nutrients and contribute hiding cover for fish, but the fine sediment can suffocate fish eggs and emerging fry. If people, homes or buildings are anywhere in their path, serious harm can occur. Other landslides, such as deep-seated earthflows, move more slowly and are not considered rapidly moving landslides.



Scars left by rapidly moving landslides.



Very steep slopes and steep headwalls or draws are prone to landslides.

Where are the high landslide hazard locations?

"High landslide hazard location" (sometimes abbreviated HLHL) refers to a steep area that is likely to be the starting point of a rapidly moving landslide. These locations are:

A. any slope in western Oregon steeper than 80 percent, except in the Tyee core area, where it is any slope steeper than 75 percent (see illustration),

Or

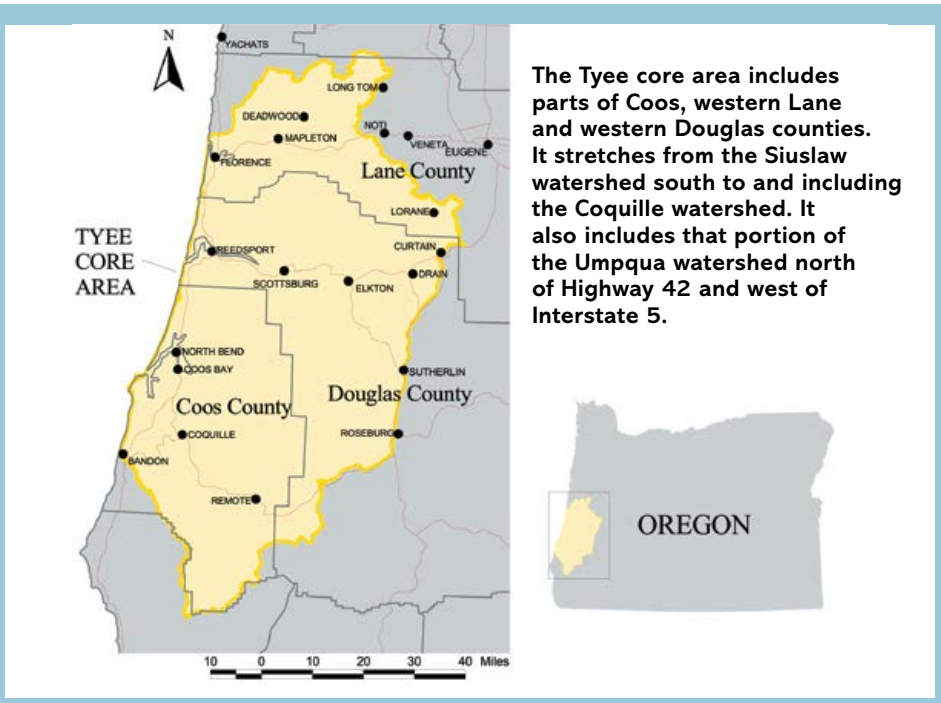
B. headwalls or draws in western Oregon steeper than 70 percent, except in the Tyee core area, where it is any headwall or draw slope steeper than 65 percent (see illustration),

Or

C. a steep slope in any part of the state determined in the field by a geotechnical specialist and confirmed by ODF to have conditions with a landslide hazard equivalent to A or B.

What if your timber harvest or road construction project is located near a high landslide hazard location?

Landowners and operators are responsible for identifying high landslide hazard locations in the activity area, identifying roads, homes and other structures below the activity area, and



The Tyee core area includes parts of Coos, western Lane and western Douglas counties. It stretches from the Siuslaw watershed south to and including the Coquille watershed. It also includes that portion of the Umpqua watershed north of Highway 42 and west of Interstate 5.

What is the Tyee core area?

The Tyee core area is a portion of Oregon where the geology consists of thick sandstone beds beneath the soil surface. These sandstone beds decompose rapidly and have very few underground cracks where soil water can enter. As a result, their shallow soils can become waterlogged and slip off the steep slopes, creating rapidly moving landslide hazards. There are exceptions, however, and geotechnical specialists find slopes that do not have these susceptible characteristics and are not subject to the Tyee slope restrictions.

Table 2-20 Operations in High Landslide Hazard Locations

Downslope Public Safety Risk Level	Requirements	Restrictions
High	Written plan and geotechnical report to ODF	Harvesting or new road construction is not allowed in certain locations
Intermediate	Written plan to ODF; site-specific measures	Limit on how much area can be harvested
Low	Identify downslope structures and public roads in notification to ODF	No ground-based equipment, skid roads or serious ground disturbance Avoid roads in these locations; direct drainage water away from them

Table 2-20 describes major restrictions and requirements for the different levels of downslope public safety risk. You may need a written plan and, in some cases, assistance from a geotechnical specialist to assess and plan the operation. See page 53 for examples of some important factors that can determine local risks.

evaluating the level of risk to public safety. You may need a geotechnical specialist to assist with some or all of these tasks. ODF will review and verify the information you provide and make the final determination of the level of risk to public safety. Table 2-20 describes the restrictions and requirements depending on the level of risk. See below for more details about risk levels.

Determining public safety risk is complex and sensitive work. It is extremely important to work closely with ODF, starting in the planning stages for a harvest or road construction project, if public safety related to landslides may be a concern.

How can streams in high landslide hazard locations affect risk?

Streams that drain high landslide hazard locations can be prone to debris torrents – such streams are often found squeezed into narrow channels with steep sideslopes. When large quantities of debris from a landslide reaches such a channel, the torrent can become even more damaging as it scours additional material from the channel and moves rapidly toward the lower watershed.

If there's a potential public safety risk around these channels, you may be required to leave large trees along streams in locations where they might slow debris torrent movement. Where public safety is not a concern, leaving trees around these channels can provide an important source of large wood that provides good fish habitat.

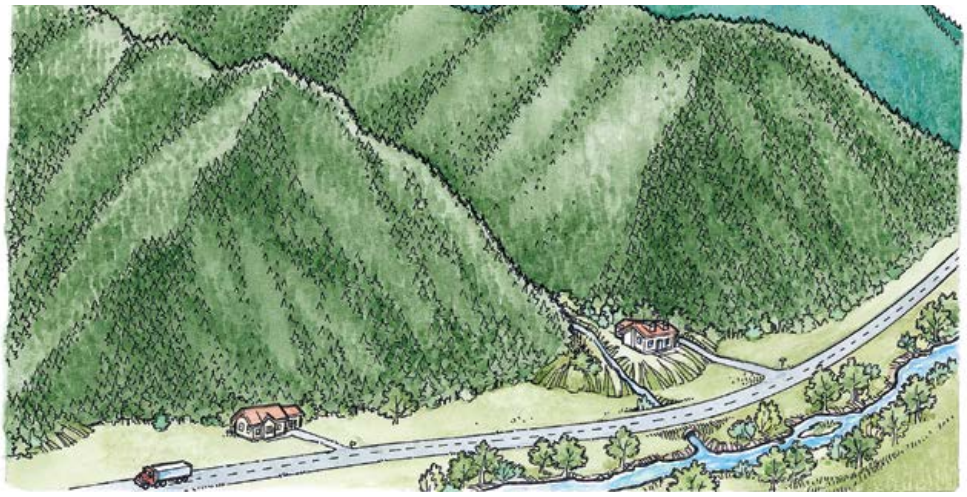
What locations are most risky for people?

How much time people spend in the locations, especially during wet-season storms, is a key risk factor. People in homes or buildings that are in the path of rapidly moving landslides are at highest risk. People traveling on busy roads with this hazard have less risk. Most other circumstances have a low risk.

What about small Type N streams subject to rapidly moving landslides?

Landslide deposits in stream channels that contain large woody debris can benefit fish by improving spawning and rearing habitat and other local conditions. For small Type N streams subject to rapidly moving landslides, some or all of the green trees and snags required for Type 2 or Type 3 harvests larger than 25 acres must be left within 50 feet of these channels for the first 500 feet that drains into a Type F stream. Downslope public safety requirements can supersede this directive, and operators may propose alternate practices (e.g., placing wood in the Type F stream) to meet the same objective. Contact ODF for further details and assistance.

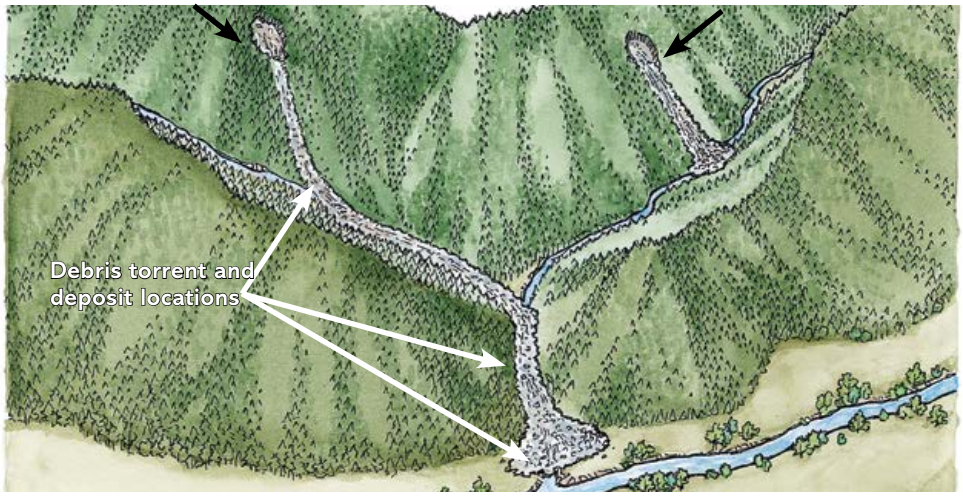
For other information sources, see the Appendix, pages 197-198.



The home at the right is on a debris fan at the base of a debris torrent-prone stream that is susceptible to landslides originating in the canyon behind it. Thus, it has a higher risk than the home at left that is below a single, uniform steep slope.

This landslide had no sharp channel junctions and moved and grew rapidly, causing considerable damage.

This slide stopped when it hit a sharp right angle. This limited damage and, over time, local fish habitat may be improved.



This illustration shows the action of two landslides. Landowners who conduct operations on slopes need to evaluate the potential for landslides. Many locations prone to rapidly moving landslides contain no obvious evidence of prior landslides.

DOING A TIMBER HARVEST

OREGON STATE UNIVERSITY EXTENSION SERVICE

Choosing the right logging contractor

FOR YOUR FAMILY FOREST

Choosing a logging contractor for a harvest operation is an important decision. How do you go about selecting the right person for your property and your particular project? Some of the decision-making is tailored to your situation as landowner, and there are some key questions about their ability to handle your specific issues that you should ask the contractors who might provide these important services.

The questions below are not the only questions you could ask, and should not replace trusted relationships or "gut feelings." They are meant to help you think through what to ask and what the contractors' responses mean.

Questions to ask potential logging contractors

WHAT ARE YOUR QUALIFICATIONS?

Logging mistakes can be irreversible. Make sure you find a logging contractor who is appropriate for the type of work you need to get done.

In Oregon, look for a qualified logging professional. A qualified logger participates in continuing education programs and keeps abreast of current forest and business regulations governing harvest operations in the state. Visit www.oregonloggers.org/Opl_directory.aspx for a list of qualified logging professionals.

WHAT SERVICES DO YOU PROVIDE?

Some loggers only conduct regeneration harvests, while others work on both thinning and regeneration harvests. As the landowner, you need to know whether a contractor can address other project needs, such as log sales, harvest plans, road construction/maintenance, slash treatment, erosion control, reforestation, permitting and harvest taxes.

HOW WILL I BE CHARGED FOR YOUR SERVICES?

There can be several different answers to this question. What is important is that you know upfront whether you will be charged on a percentage or dollar-per-unit basis. Landowner and contractor must agree on what services are included in agreed prices.

WHAT IS INCLUDED IN THE LOGGING PRICE?

It is very important that you know and understand exactly what services will be delivered and when, and whether these services are included in the agreed price. You and the contractor will need to agree on who is responsible (both financially and operationally) for any road improvements, installation of culverts, slash disposal, etc. Be sure you specifically agree that the price includes log trucking.

DO YOU DO ALL THE WORK YOURSELF, OR IS SOME OF IT SUBCONTRACTED?

It is normal for a logger to subcontract aspects of the harvest project. Be sure you know if this is planned, and that you understand how the logger will manage subcontractors. It is also important that you know who is in charge if you are out on the logging project and need to talk to someone.

(continued on other side)

DO YOU HAVE THE APPROPRIATE INSURANCE COVERAGE?

If something were to go wrong during the logging operation, you want both you and the contractor to be protected financially. Loggers should have sufficient insurance coverage for property damage and liability (including woods broadform liability, vehicle liability and workers' compensation). Ask to see certificates of coverage before you sign a contract.

DO YOU USE A STANDARD WRITTEN CONTRACT?

Some people may operate without a written contract when there is an experienced relationship between contractor and landowner. However, it is best to have a written contract that specifies the responsibilities of both parties in the transaction. The contract is legally binding and protects both parties from painful misunderstandings and costly disputes.

IF I'M THINNING, HOW WILL YOU DETERMINE CUT-TREES AND PROTECT LEAVE-TREES?

Both parties must agree in advance to how cut-trees will be determined and leave-trees protected. In thinning operations, some incidental damage to leave-trees may occur. A logger should be able to discuss methods to minimize damage to the leave-trees. Establish a specific measurement — for example, "residual damage to trees will not surpass 5 percent." Stipulate in the contract any fines that will be charged if and when damage exceeds that level.

Establish realistic expectations

The landowner and logger should have frank discussions and clear agreements about the expectations of logging project results. Family forest owners may have unrealistic expectations that conflict with the realities of logging capabilities. Logging small tracts is more expensive, time-consuming and difficult than larger commercial logging projects. Because managing a logging project is so complex, a family forest owner may want to seek special assistance from either:

- a logging contractor whose experience is tailored to small projects; or
- a forestry consultant who can plan and facilitate all contracted arrangements

Where to look for a logger

The list of individuals and firms who can handle your family forest logging needs is constantly changing. However, places where you can look to find a list of potential loggers include:

- Ask other landowners who they work with and trust.
  - Oregon Small Woodlands Association: www.oswa.org
  - Oregon Tree Farm System: www.otfs.org/
- Ask a forester.
  - Society of American Foresters: www.safnet.org
  - Association of Consulting Foresters: www.acf-foresters.org/
  - Oregon Department of Forestry: www.oregon.gov/ODF/Working/Pages/FindAForester.aspx
  - Oregon State University Extension Service: extensionweb.forestry.oregonstate.edu/directory
- Ask log buyers at local timber mills.
  - OSU Forest Industries Directory: www.orforestdirectory.com/
  - Associated Oregon Loggers – directory of qualified logging contractors: www.oregonloggers.org/Opl_Directory.aspx

Helpful resources

See these publications for more information about harvesting operations for your family forest:

- Contracts for Woodland Owners (EC 1192): https://catalog.extension.oregonstate.edu/ec1192
- Small-Scale Harvesting for Woodland Owners (EM 9129): https://catalog.extension.oregonstate.edu/em9129
- Timber Harvesting Options for Woodland Owners (EC 1582): https://catalog.extension.oregonstate.edu/ec1582
- Oregon Forest Resources Institute: http://knowyourforest.org

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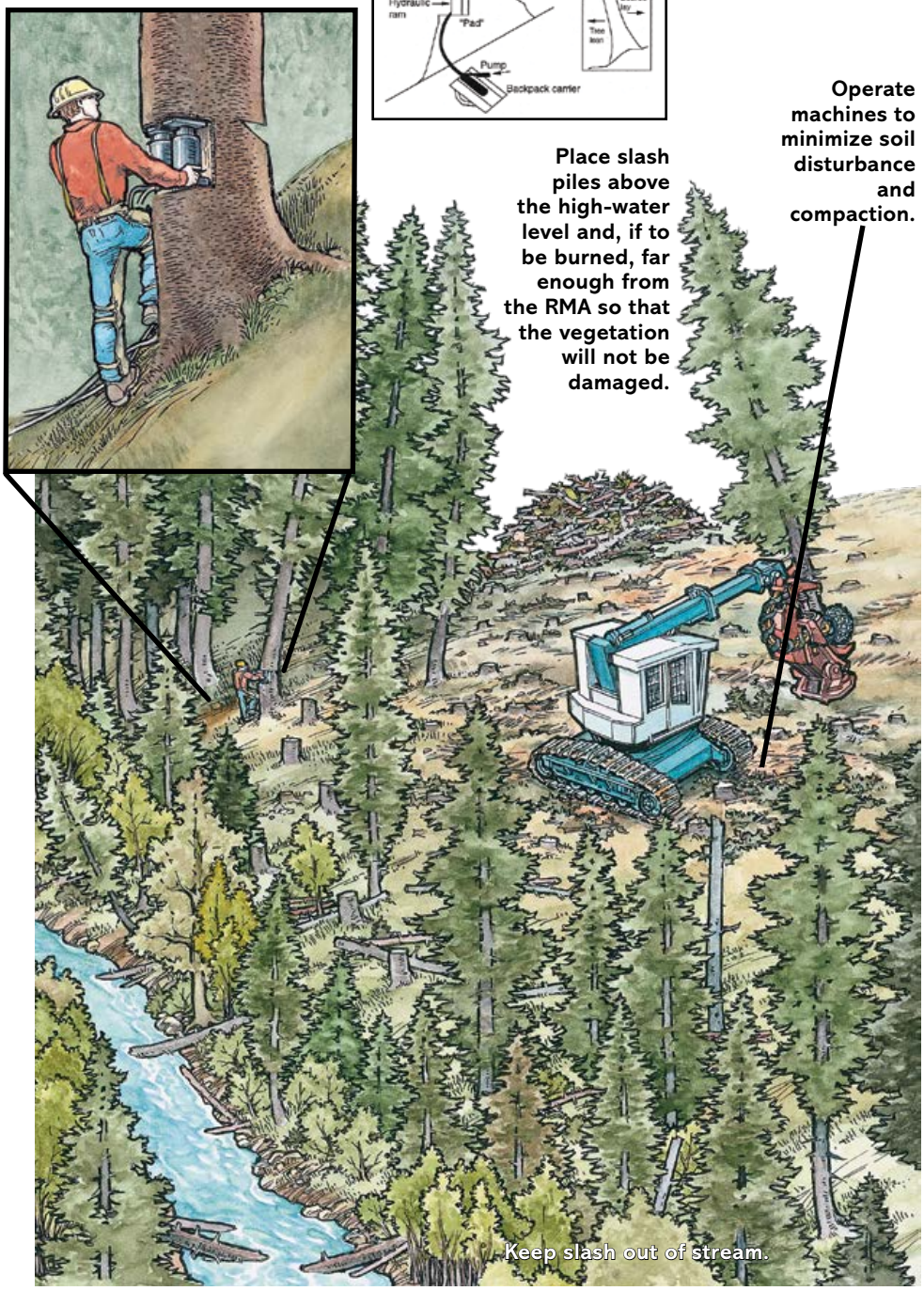
Published October 2017

What should you know when felling, bucking and limbing trees near water?

What are these requirements intended to protect?

- stream channels and banks
- water quality, by keeping slash out of streams
- soils in RMAs, and vegetation that is left in the RMA

Hydraulic jacks help prevent RMA damage and reduce log breakage.



How can tree felling, bucking and limbing cause damage?

These harvesting activities can:

- gouge or break down stream banks
- damage or bury remaining vegetation
- leave slash in the channel or within the high water level
- cause trees to roll, crushing and breaking remaining vegetation
- disturb soil and damage vegetation with mechanical felling equipment

What are the felling, bucking and limbing requirements?

Fell, buck and limb trees to minimize disturbance to channels, soils and retained vegetation in RMAs, streams, lakes and all wetlands greater than one-quarter acre.

When possible, fell trees away from RMAs, streams, lakes and significant wetlands, except trees felled for stream improvement projects that have been planned and reviewed. Note: Because hardwoods often lean toward streams, are shorter and have broader crowns, safety and feasibility concerns may not allow for directional felling. Consult with the Stewardship Forester before falling trees towards the RMA.

Buck and yard hardwood trees to minimize damage to beds, banks and retained vegetation. When it can consistently protect bed and banks,

yard hardwoods away from water before limbing.

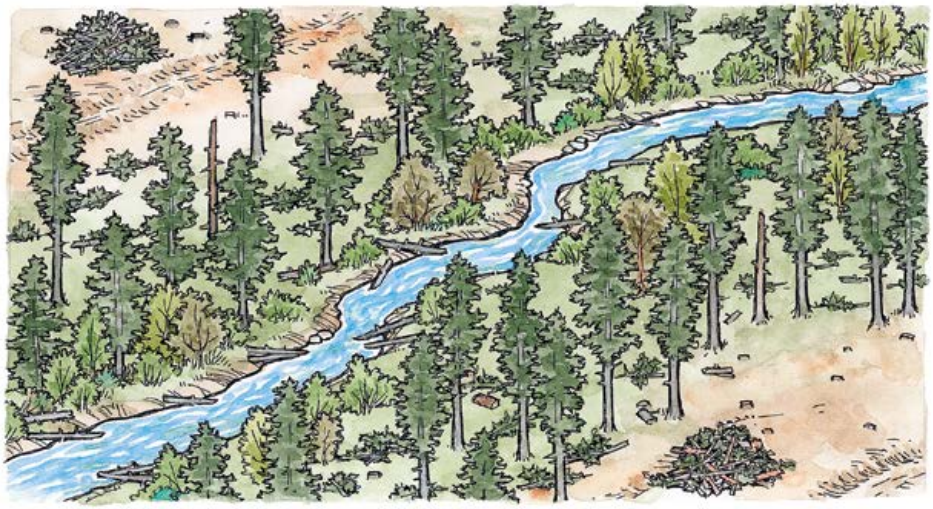
On steep slopes use jacking, line pulling, high stumps, whole-tree yarding or stage-cutting to prevent damage to vegetation retained in RMAs, soils, streams, lakes and significant wetlands.

Minimize slash accumulations in channels, significant wetlands and lakes, including during felling, bucking, limbing or yarding.

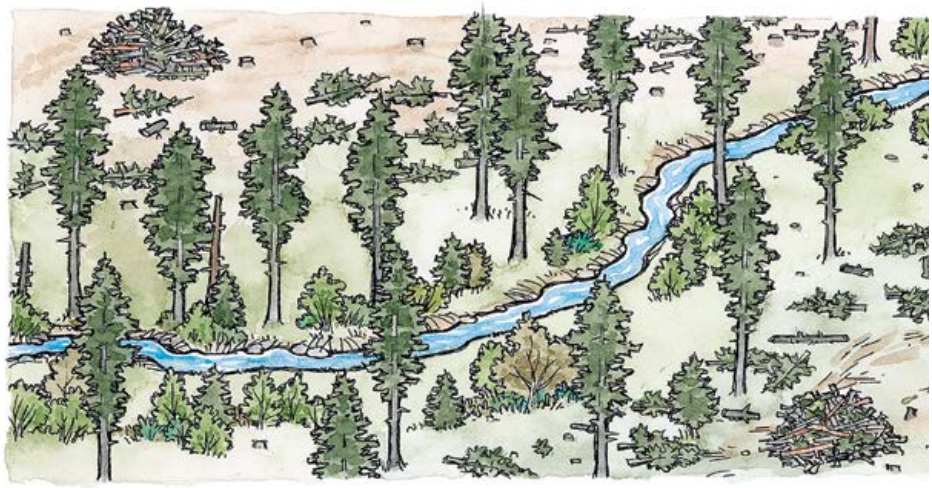
Remove slash within 24 hours from Type F, Type SSBT and Type D streams, lakes and significant wetlands. Don't allow slash to accumulate in Type N streams, lakes or wetlands in quantities that threaten water quality or increase potential for mass debris movement.

Place slash removed from streams, lakes or wetlands above high-water levels and away from streambanks, wetlands and side channels.

HOW MUCH AND WHAT SIZE SLASH SHOULD BE REMOVED?



Type F and SSBT streams: **Leave slash too big for hand removal. It becomes large woody debris. This requires a written plan approved by ODF. Plans need to show a benefit of slash, or that removing it would create greater damage.**



Type D streams: **All slash should be removed from below the high-water level.**



Type N streams: Banks and streambed should be generally free of slash.

What should you know when ground yarding near water and using temporary crossings?

After trees are cut, limbed and bucked into logs, they are moved (yarded) by skidders, tractors or shovels on a skid trail to a landing, where they are loaded onto trucks. Both skid-trail construction and temporary stream crossings may be needed to yard logs cut in the RMA or to yard logs to a landing across the stream. These activities have the potential to disturb RMA soils and vegetation, reducing their ability to limit sedimentation and protect water quality.

What yarding activities can disturb RMAs, wetlands and lakes?

- construction, use and removal of temporary stream crossings
- skid trails that generate muddy runoff that can move into waters of the state

Both of these activities are subject to requirements described in this section.

What are these requirements intended to protect?

- Fish passage on Type F and SSBT streams
- channels and banks
- vegetation left in the RMA
- RMA soils that control runoff and keep sediment out of waters

Maintain RMA vegetation and minimize disturbance to beds and banks of streams, lakes and all wetlands of more than one-quarter acre.



What should be avoided when planning temporary stream crossings?

When improperly built, temporary stream crossings are a threat to streams, lakes, wetlands and fish passage.

WHY?

- Fish may not be able to migrate upstream or downstream on Type F and SSBT streams.
- High water can erode fill materials and wash out crossing structures, creating sediment.
- Crossings must be planned to affect as little of the channel, banks and riparian area as possible.

Minimize the number of temporary stream crossings.



WHAT THIS MEANS:

- Install crossings only where necessary to access across streams.
- Crossings are not allowed simply to straighten skid roads.
- Use existing, permanent roads as much as possible.
- Locate skid trails outside the RMA are used as much as possible.
- A maximum of one crossing per harvest unit is desirable.

Additional temporary crossings can be used when:

- the alternative involves crossing a landslide
- the alternative is skid trails on slopes greater than 60 percent
- the alternative is to cross a property line and the adjoining landowner is unwilling to have skid trails on that property
- the only alternative is a skid trail parallel to and within 100 feet of the stream
- the only alternative is a permanent crossing

When is a temporary crossing structure needed?

- when there is streamflow at the time of harvest
- if streamflow will occur during harvest
- if streambanks are wet or fragile

Is logging equipment allowed in stream channels?

Tractors, skidders, feller-bunchers and any other equipment being used for logging is subject to the following restriction:

Do not operate ground equipment within any stream channel, except as required for temporary stream crossings.

WHAT THIS MEANS:

The only time logging equipment is allowed in a stream is for construction of a temporary stream crossing structure, or when crossing a dry stream with a stable bed and banks.

Is anything else not allowed?

Straightening or shortening any stream channel is not permitted.

What are acceptable temporary crossing structures?

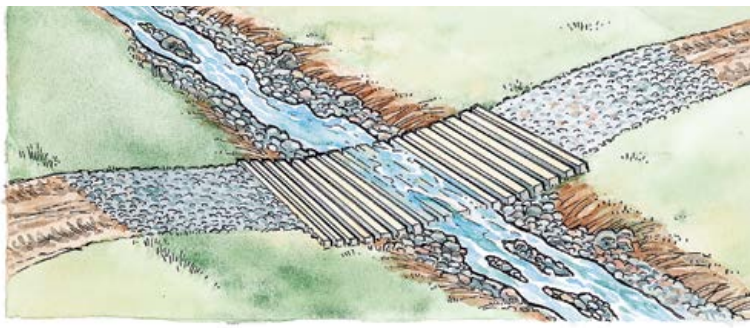
The choice of temporary crossing structure depends on stream size, time of year, whether fish are present and the volume of timber moved via the crossing.

The illustrations show several temporary stream crossings. The improved mat ford and natural bottom ford are for log truck use only. Yarding across these two temporary crossings would result in sediment or wood debris entering the stream.

The other three temporary crossings are for both yarding and truck use.

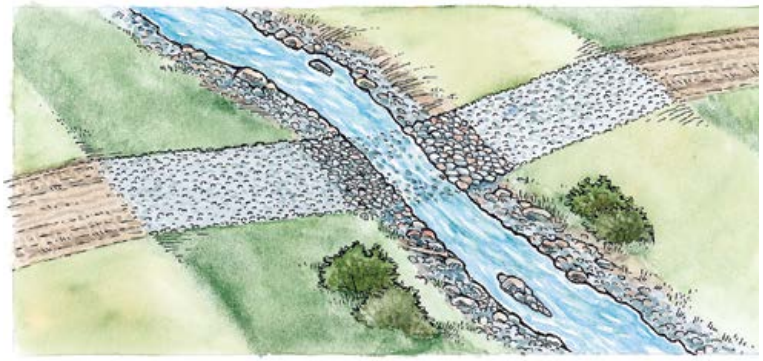
Always remove temporary crossings at the completion of yarding (see page 60).

Examples of temporary crossings



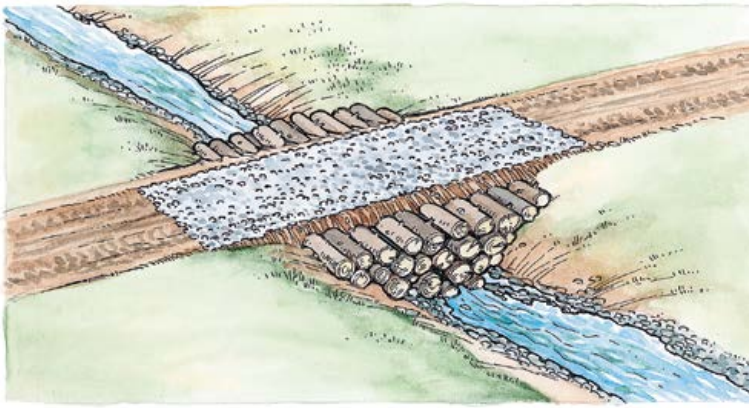
IMPROVED MAT FORD

This is for log truck use only and constructed with concrete or wood planks fastened together.



NATURAL BOTTOM FORDS

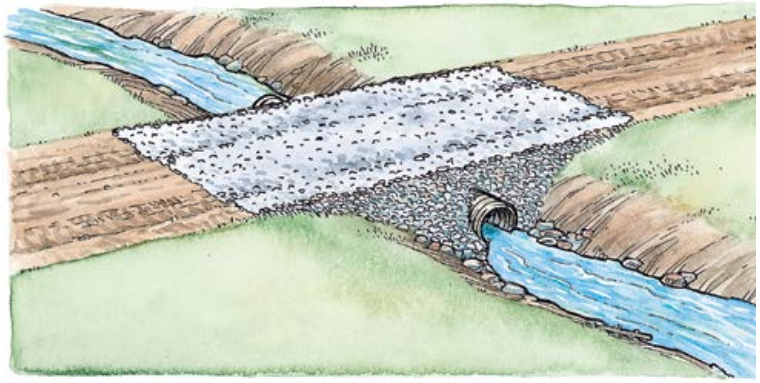
This is for log truck use only. Use this only where bed and banks are gravel, cobbles or bedrock. Approaches must be gravel, cobbles or bedrock. Any bare soil in the approach must be rocked.



LOG CROSSING

Fill over logs should be rock. Keep fill back from ends of logs. Use only for Type N streams with very low flows.

CULVERT AND



ROCK FILL

Temporary stream crossing with culvert and rock fill. Maximum fill is 8 feet. Larger fill requires a written plan (see Page 55). Culvert size must accommodate stream flow during period of use.



BRIDGE

Temporary short bridges provide the greatest stream protection. Use portion of rail car or reinforced concrete. Constructed abutments may not be needed. Wood timbers on the ground some distance back from the bank may suffice.

How do you know if the temporary structure will handle the stream flow?

Use temporary stream crossing structures like a log crossing, culvert or ford capable of passing stream flows likely to occur during use.

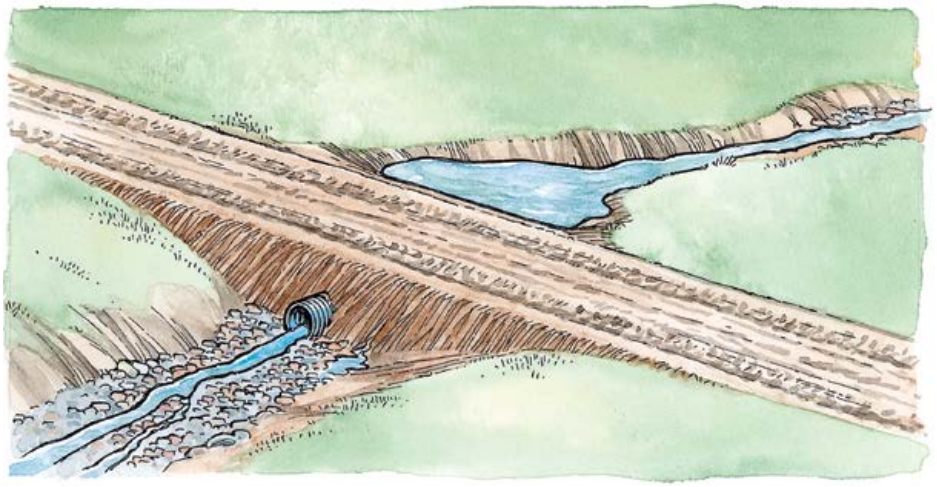
Be sure your temporary stream crossing:

- is able to pass the highest flow reasonably expected during the life of the structure – this is a storm flow that is higher than normal seasonal flow
- is able to pass flows without ponding water behind the fill or saturating the fill soil

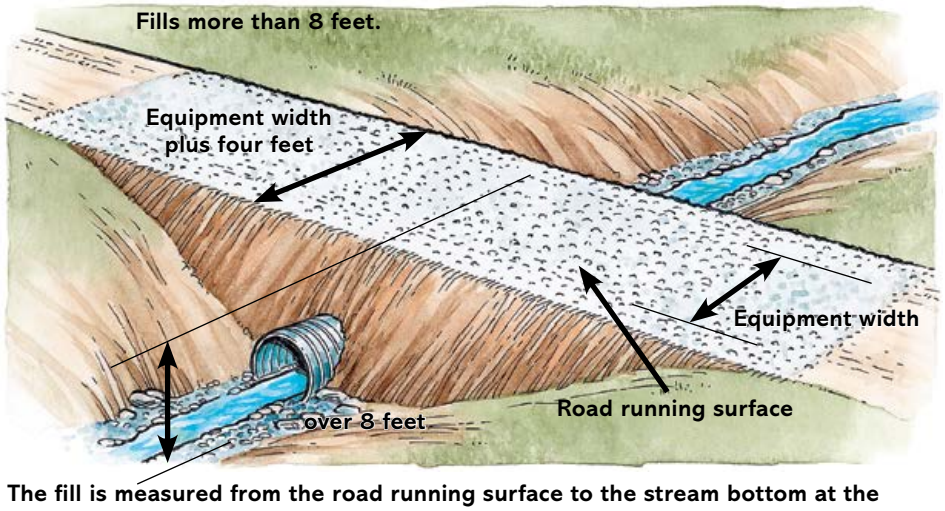
Where should temporary crossings be located?

- Choose a single channel that is narrow and not deeply incised.
- Avoid multiple, braided or side channels.
- Avoid eroded areas or streambanks with exposed soils.
- Banks should be less than 5 feet high. Bridges are better where banks are higher.
- Look for rock, cobble or gravel rather than clays, decomposed granite soils or sand.
- Avoid very wet or weak soils.
- Avoid slide areas, gullies or active erosion areas.
- Approach the crossing at right angles and get up, out and away from the stream as quickly as possible.

Choose temporary locations that minimize cuts, fills or other bank disturbance. Provide cross-drainage on nearby roads and skid trails to prevent runoff and sediment delivery to the stream.



This temporary stream crossing culvert is too small. The stream is ponding behind the culvert and seeping through the fill. The culvert could fail, sending fill soil downstream.



The fill is measured from the road running surface to the stream bottom at the downstream side. Fills more than 8 feet must be designed in accordance with road construction-stream crossing fill rules, except that passage of a 50-year flow is not required for temporary crossings.

When is a written plan required for temporary stream crossings?

A written plan is required when crossing Type F and Type SSBT streams (even if dry).

What is necessary when constructing temporary structures in live streams?

- Keep equipment out of the water.
- Temporary water diversions are OK if done during low flows and if fish are not affected. This means you can either pump stream water around the construction site or use a temporary trench. Be sure to minimize sediment entering water.
- It is recommended that temporary crossing fill be rock rather than soil. This makes it easier to remove after the operation is complete.
- Protect streambed and banks from damage.

Temporary structures must withstand erosion by the stream and minimize sedimentation.

When and how should temporary crossing structures be removed?

Remove temporary stream crossing structures after completion of the operation or prior to seasonal runoff, whichever comes first. Place fill material where it cannot enter the water.

Soil and slash left below the high water level may be carried into the stream if not placed in a stable location.

Rule of thumb: Any material that might make its way into the stream should be removed.

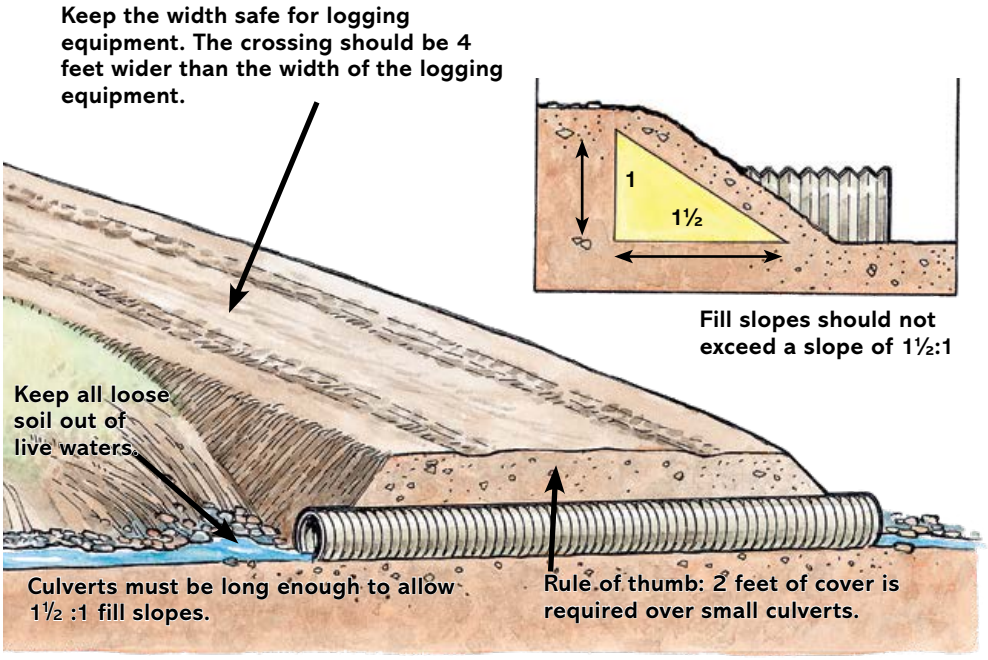
What is necessary when constructing temporary crossings in dry streams?

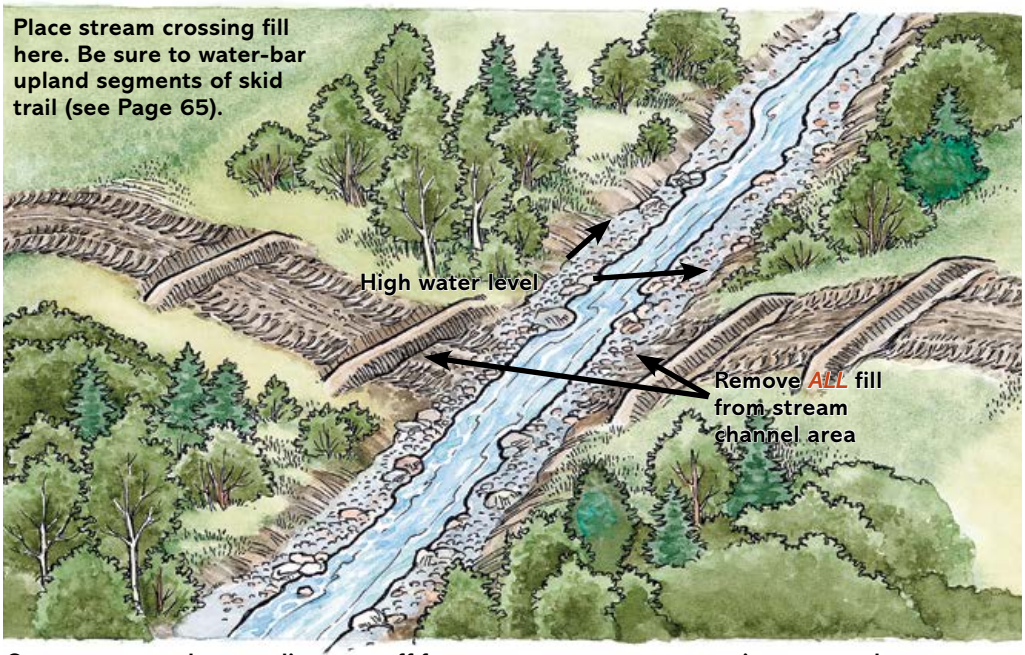
When the channel is dry and will remain dry during the operation, crossing structures may not be necessary.

Locate crossings where bed and banks are clean gravel, cobbles or bedrock. If wetlands or any other wet soils are present, use temporary structures.

A written plan is required to when heavy equipment crosses Type F, SSBT, and D streams, even when dry.

No temporary crossing is required as long as disturbance is no greater than what would occur if structures were constructed.





Construct water bars to divert runoff from temporary stream crossing approaches. Construct as soon as crossing use has ended and before rainy or runoff season.

How do you decommission a temporary crossing in a dry stream?

Remove soil that enters the stream during yarding after the operation or before stream flow, whichever comes first. Place material where it will not enter water.

Construct water bars, dips or other water diversions on stream crossing approaches after the operation or prior to rainy-season runoff, whichever comes first.

What about skid trails in RMAs?

Skid trails are routes used by vehicles to transport felled trees to collection sites (landings). For the purpose of the forest practice requirements skid trails are also defined as:

- any area where equipment constructs a trail by excavating and filling
- any area used by equipment where visible ruts are formed

Machine activity within 100 feet of streams, lakes and other wetlands greater than one-quarter acre must minimize the risk of sediment entering waters and prevent stream channel changes.

Locate, construct and maintain skid trails in RMAs acording to harvesting rules.

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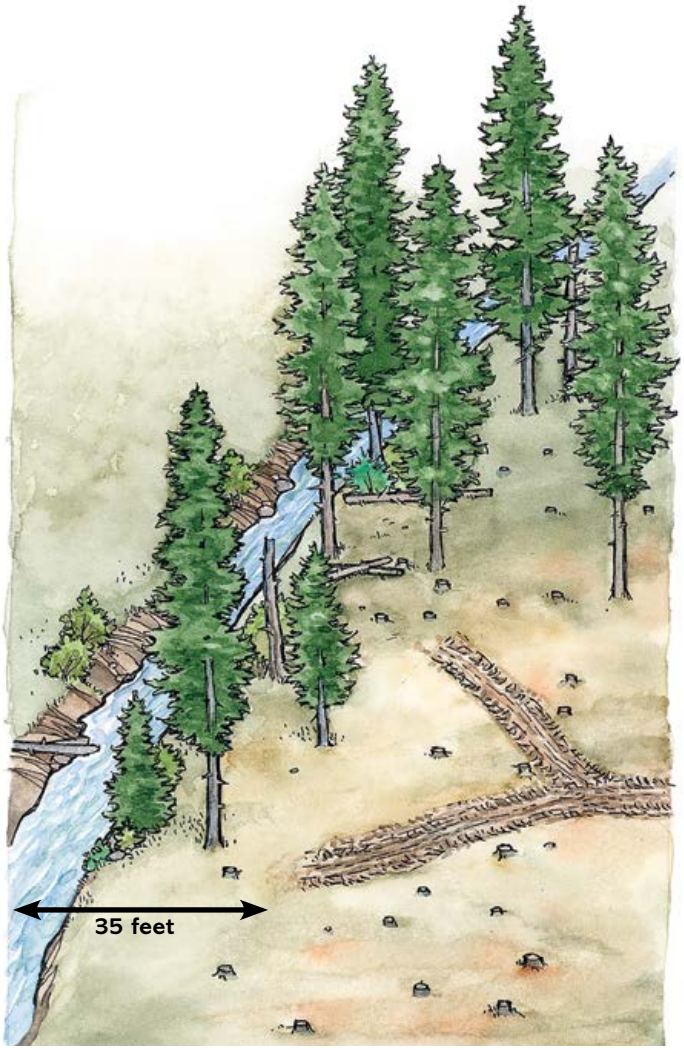
What is not allowed?

Using a stream channel for a skid trail or driving up and down stream channels is not permitted. Restrictions also apply when the stream channel is dry and to Type N streams located in the operation unit.

For Type F, SSBT and D streams in steep, narrow canyons, the distance from the high water level to the steep canyon slope is generally less than 35 feet. This means an alternative logging system (cable or helicopter) must be used.

How far must skid trails be kept from Type F, SSBT or D streams.?

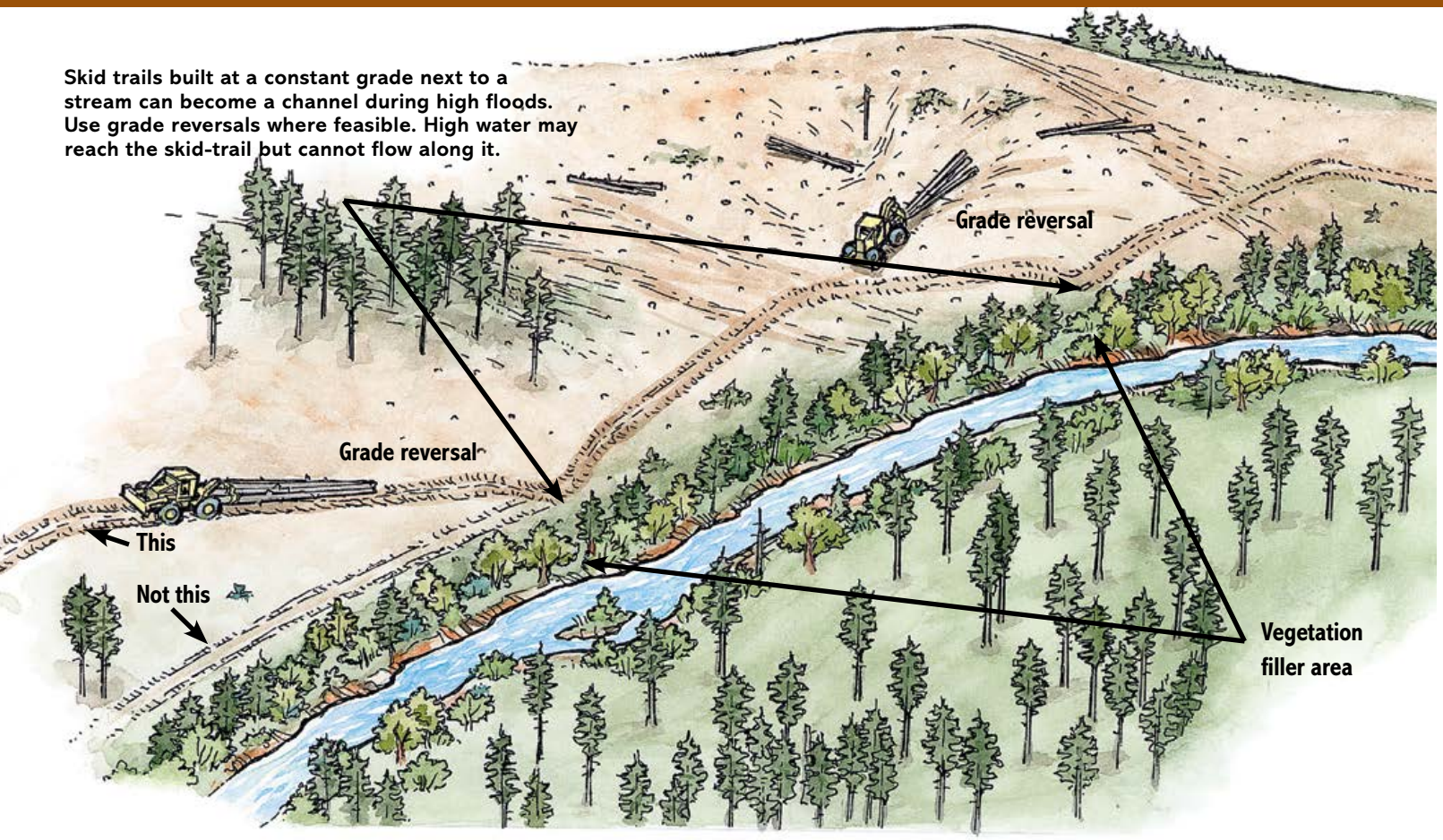
Minimize exposed soil from skid trails in RMAs. Except for stream crossings, do not locate skid trails within 35 feet of Type F, SSBT or D streams. Be sure an adequate vegetation filter exists between skid trails and water so sediment can be filtered from skid trail runoff water.



A minimum of 35 feet of slope distance is required between skid trails and the high water level of Type F, SSBT and D streams. Only stream crossings are allowed closer to streams. Approaches to stream crossings must be designed to get skid trails out of this 35-foot portion of the RMA as quickly as possible.



For Type F, SSBT and D streams in steep, narrow canyons, the distance from the high water level to the steep canyon slope is generally less than 35 feet. This means an alternative logging system (cable or helicopter) must be used.



How far must skid trails be kept from Type N streams and wetlands?

Table 3-1 gives guidelines for minimum adequate setback distances for all Type N streams and wetlands. Distances are measured from the closest area of disturbed soil to the high water level.

Table 3-1 Minimum Skid Trail Setback Distances for Type N Streams and Wetlands

Soil	Slope in Percent		
	0 to 35%	35 to 50%	50 to 65%
Normal	20 feet	35 feet	100 feet
Erodible	35 feet	100 feet	Likely rule Violation

How do you construct skid trails to avoid stream diversion during high flows?

Locate and construct skid trails so that when high flows occur water from the stream will not flow onto the skid trail.

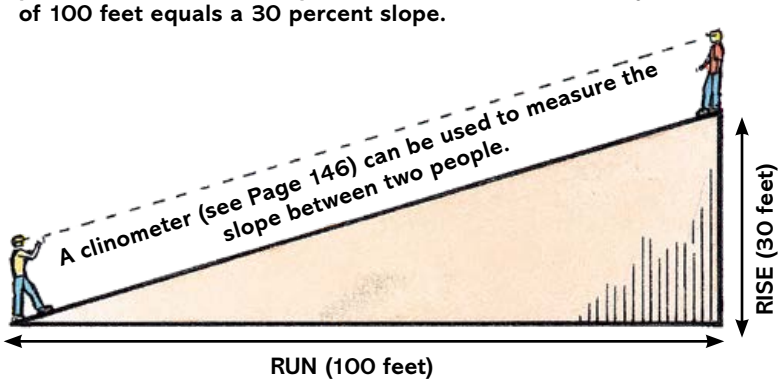
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Skid trails constructed in a floodplain run the risk of diverting waters from the stream. These skid trails can become temporary streams that cause serious erosion.

Avoid the possibility of a channel diversion by trying to keep skid trails well above the stream high water level.

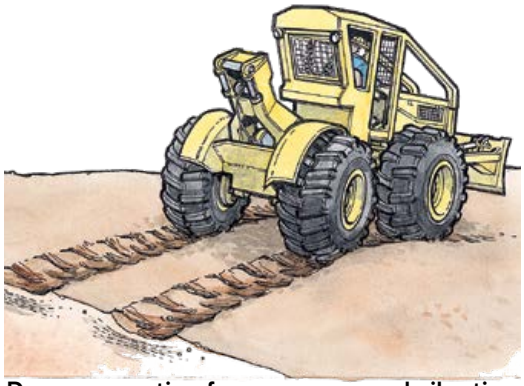
Skid trails below the high water level must have frequent grade reversals or large rolling dips. Grade reversals are essential when skid trails are parallel to channels (see illustration).

How to measure slope in percent: RISE divided by RUN = percent SLOPE. For example: a rise of 30 feet divided by a run of 100 feet equals a 30 percent slope.



What should you know when ground yarding outside RMAs?

- Generally, skid trails should follow slope contours rather than go up and down the slope.
- The potential for erosion increases with the steepness of the slope for ground yarding.
- Skid trail construction on steep slopes often requires cutting and sidecasting.
- Sidecasting removes productive soils, replacing them with less productive subsoils.



Deep compaction from pressure and vibration from heavy equipment can decrease tree growth, and increase runoff and erosion on slopes.

fpa

Avoid ground skidding on unstable, wet or easily compacted soils and on steep slopes unless it can be done without damaging soil productivity through soil disturbance, compaction or erosion.

Locate skid trails where sidecasting is kept to a minimum.

WHAT THIS MEANS:

If more than 20 percent of the harvest unit has major soil displacement, deep compaction or extensive erosion, the operation is considered damaging and not in compliance.



Major soil displacement is the lateral movement of soil, often producing ruts that can change natural drainage and increase erosion.

WHAT THIS MEANS:

There is a risk of sidecast material sliding and causing problems well below the skid trail. Minimize soil disturbance by fitting skid trails to the topography, and avoid buildup of sidecast.

Skid trail sidecast should not cover productive soil for a significant percentage of the unit. It is likely to cause landslides and remove soil from the slope. Any combination of slope covered by sidecast, slides from sidecast and excavated skid trails should not exceed more than 20 percent of the ground in any 5-acre portion of the unit.

Operators should plan to pull back sidecast and place it in the skid trail after the harvest and before the rainy season.

Rule of thumb: A sidecast depth of 3 feet or more is considered excessive on slopes of 50 to 65 percent. Two feet or more is excessive on slopes greater than 65 percent. Note: Know your soil type – some are more prone to failure when placed on steep slopes.



Both the logs and the yarding vehicle can cause excessive soil disturbance, especially on slopes.

What locations are not stable for skid trails?

- actively moving landslides
- high landslide hazard locations (see page 52)
- all slopes steeper than 70 percent
- slopes on non-cohesive soils (sands, decomposed granite soils, and ash), greater than 60 percent
- areas impacted by intense wildfire (reduce these slope guidelines by 10 percent)

Avoid excavating skid trails on slumps or slides. Locate skid trails on stable areas. Minimize the risk of material entering waters of the state.

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Slumps and slides are evidence of less stable soils. Constructing skid trails on these features or other potentially unstable locations can change drainage and steepen or load the slope. These can increase the chance of soil movement and resource damage from erosion and sedimentation.

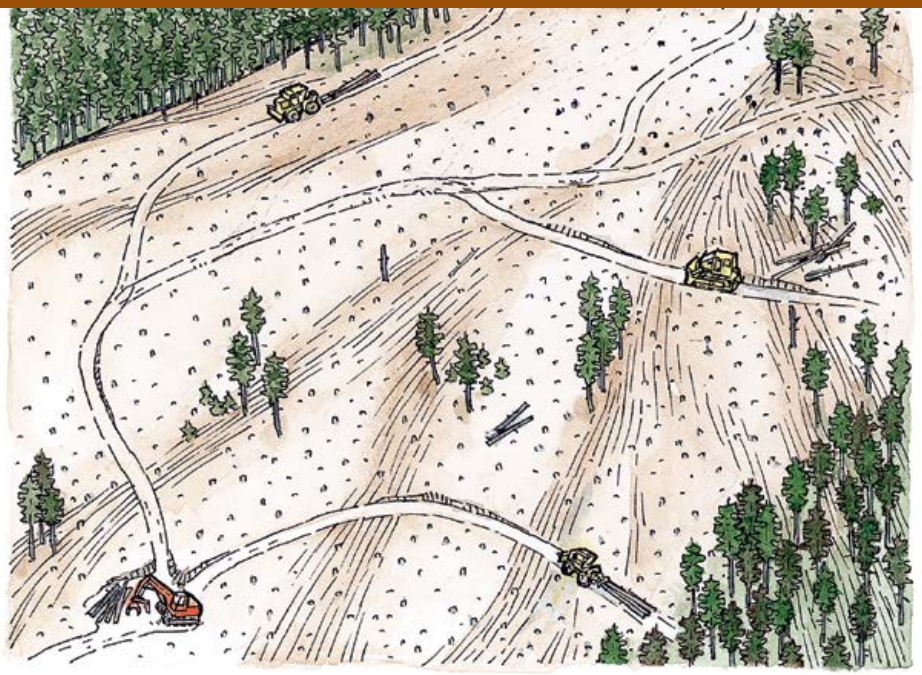
WHAT THIS MEANS:

Landowners and operators need to recognize both stable and unstable locations for skid trails. Also, carefully consider drainage and potential impacts to nearby streams and other waters, whether or not a soil failure might occur.

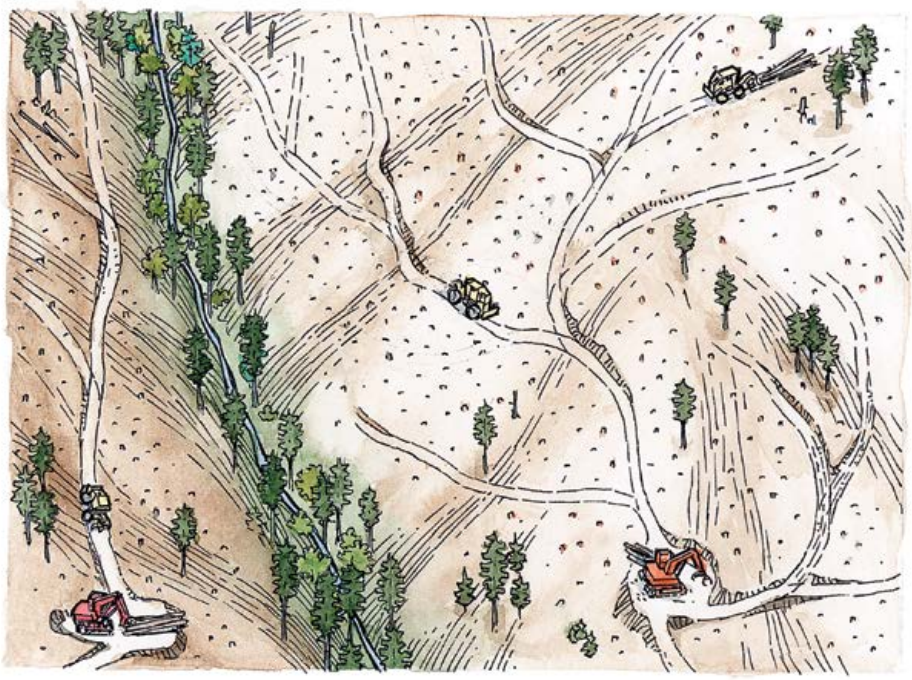
Are there any tips on skid trail layout?

Advance planning can minimize the impact of skid trails on soil and the amount of ground occupied by skid trails. Preplanned skid trails can become permanent parts of your logging unit. They can be used for other management activities and future harvests.

There are two common patterns for preplanned skid trails: branching and parallel (see illustrations).



On gentle slopes, the branching skid trail pattern has one or more main trails from which other trails branch off to provide access to the area.



On steeper slopes, the parallel skid trail pattern attempts to parallel the natural contours of the land.

Shovel logging is a unique yarding method in which a tracked vehicle travels and accumulates logs throughout the cutover area, using few or no constructed skid trails. Similarly, **logging with feller-bunchers or grapple skidders** requires traffic throughout the harvest unit. See pages 151-153 for further information about these systems.

With such harvest systems, care must still be taken to limit soil disturbance and compaction, and to control drainage (see next section) where there is any excavation, filling or rutting in traffic areas.

How is drainage from skid trails controlled?

Construct dips, grade reversals or other effective water diversions in skid trails as necessary to minimize soil displacement and to ensure runoff water is filtered before it enters water.

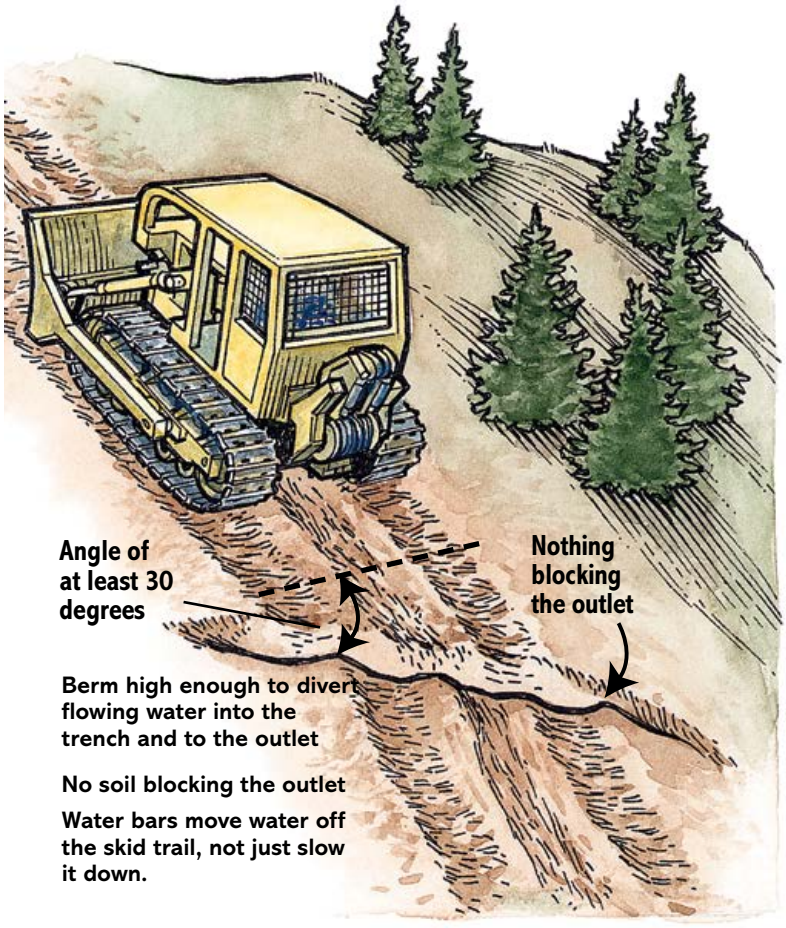
- For drainage dips, see page 113.
- For grade reversals, see page 62.

Drain skid trails by water barring or other effective means immediately following completion of the operation and at all times during the operation when runoff is likely.

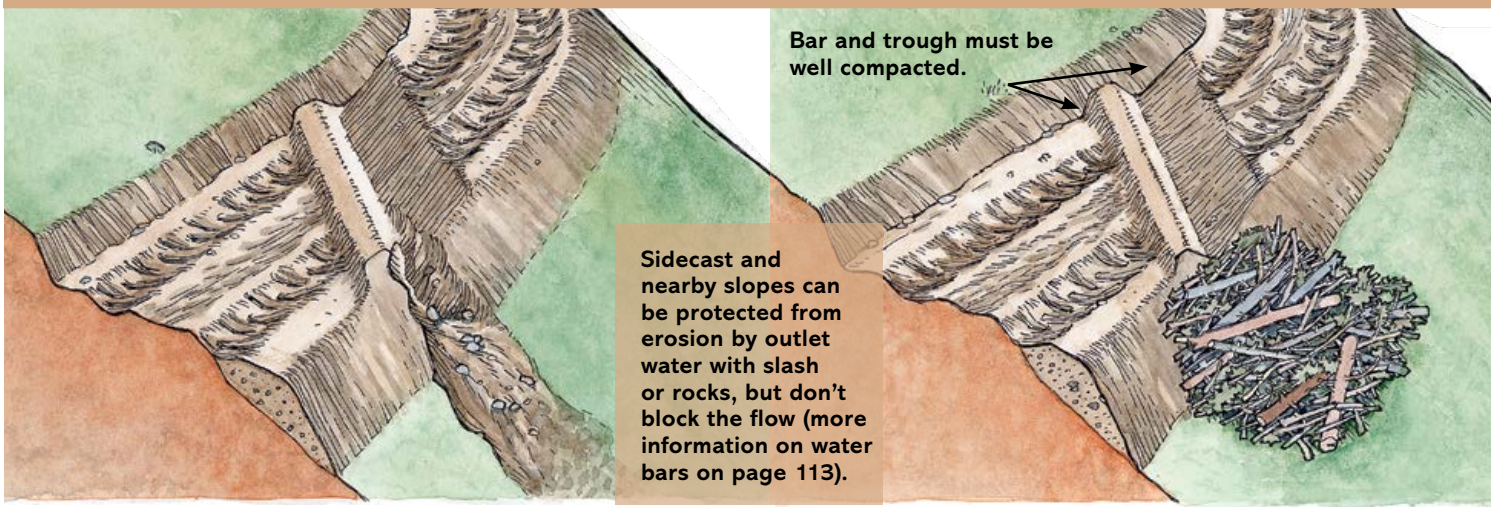
Skid trails with too few grade changes can concentrate water and erode the slope.

Operators are required to keep material eroded from skid trails from entering waters of the state.

Stabilization must be permanent. Water bars must be able to handle or prevent erosion from all potential uses and storm events. This effort must take into account unauthorized recreational traffic.



TIPS ON SKID TRAIL WATER BARS



How do you determine water bar spacing?

Table 3-2 is a guide to minimum water bar spacing on skid trails. Narrower spacing, especially on steep slopes, can significantly reduce the erosive power of runoff and provide extra protection.

Table 3-2 Minimum Water Bar Spacing On Skid Trails

Slope of Skid Road	Soil Description	
Percent (see Appendix)	Sensitive soils (silts, granitics)	Normal forest soil (loam, gravel, cobble)
5 to 15	150 feet	300 feet
15 to 35	100 feet	200 feet
35 to 50	50 feet	100 feet
Over 50	25 feet	50 feet

What other concerns are there for ground skidding on steep slopes or those likely to erode?

Ground skidding on these locations can cause soil damage and allows sediment to enter streams, so there are some unique requirements to protect streams during skidding activities on such slopes.

What slopes or soils have these requirements?

Slopes of more than 60 percent have unique requirements for ground skidding. Note that ground skidding is never allowed in high landslide hazard locations, which typically have more than 70 to 80 percent slopes (see page 52).

The requirements also apply to slopes of more than 40 percent with decomposed granite soils, which are more likely to erode even when less than 60 percent. These soils are most common in areas of southwest Oregon. They have been identified and mapped on county soil surveys.

What are the requirements for steep-slope skidding?

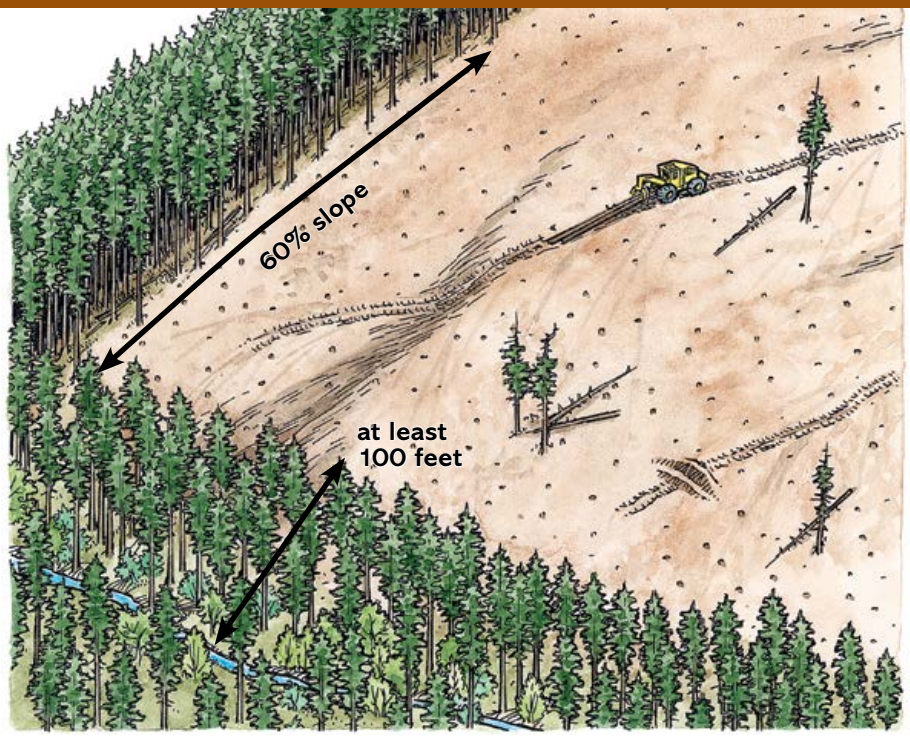
Since ground skidding on steep or slopes likely to erode has a high potential for delivering sediment to streams, it must be done carefully. Here are the requirements:

- Do not construct skid trails straight up and down the slope, because water can flow back onto the skid trail even if water bars are installed.
- Skid at an angle to the slope (see illustration above right).
- Keep skid trails at least 100 feet from stream channels.
- Plan spacing and location of trails carefully – no more than 10 percent of the steep slope area should be disturbed.

How do you build steep-slope skid trail cross ditches?

While similar to water bars, steep slope skid trail cross ditches should be deeper (see photo sequence at right).

For other information sources, see the Appendix, pages 197-198.



Steep slope skidding is allowed. However, skid trails must be at an angle to the slope. Never use skid trails up and down steep slopes.

Begin construction of the skid trail cross ditch at the far edge of the skid trail.



Cut an extra-deep cross ditch at an angle greater than perpendicular to the skid trail, and be sure the ditch is open so water can drain out.



The finished skid trail cross ditch should be deep. This is more than a water bar.



What should you know when cable logging near water?

Cable yarding across streams, wetlands or lakes is a good harvesting choice if it results in less road construction and if the logs can be suspended above the RMA and through narrow, widely spaced corridors. Written plans that are reviewed by ODF are needed for cable yarding across Type F, SSBT or Type D streams, any large or medium Type N streams, and lakes or significant wetlands.

WHAT THIS MEANS:

The written plan should describe cable corridor spacing, corridor width and how vegetation will be protected when operations move from one corridor to another.

Minimize the yarding of logs across streams, lakes, significant wetlands and other wetlands greater than one-quarter acre when harvesting can be done using existing roads or other practical alternatives. fpa

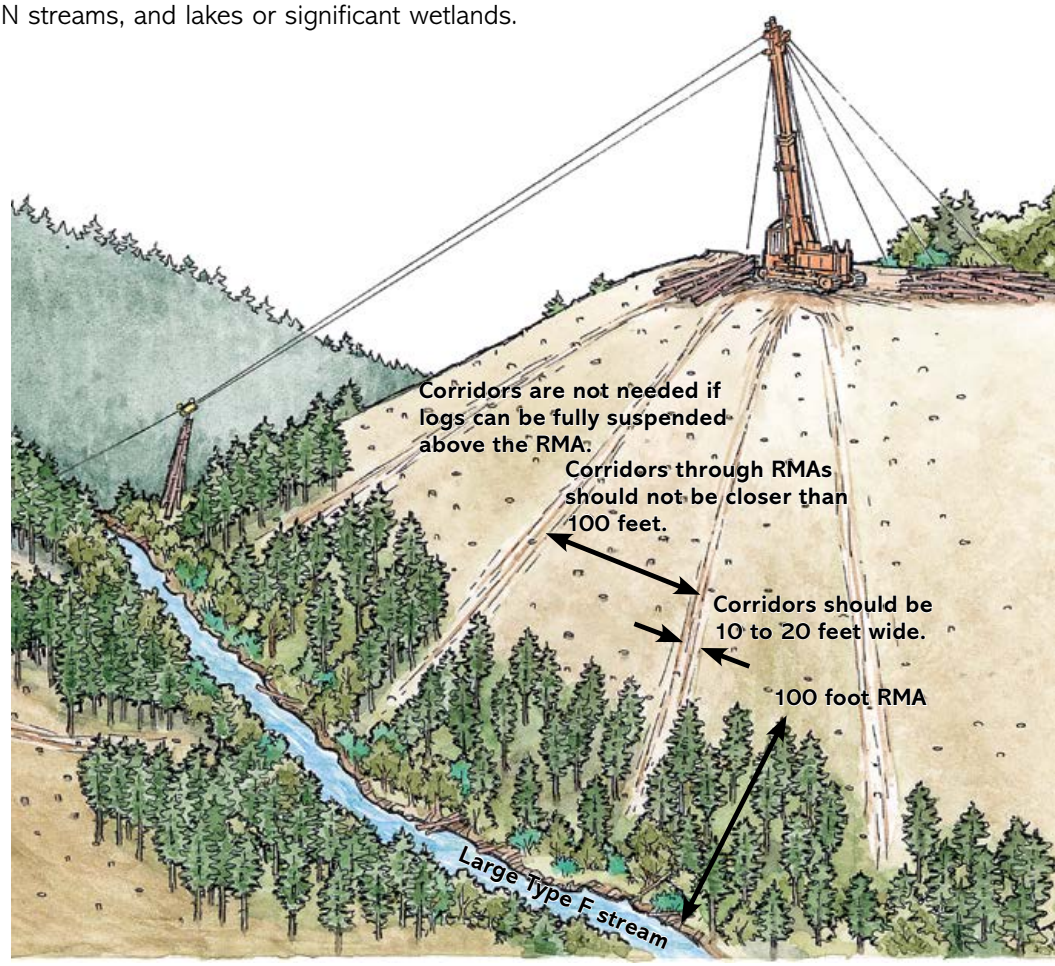
Maintain RMA vegetation and minimize disturbance to beds and banks of streams, lakes, all wetlands more than one-quarter acre and retained vegetation.

What cable logging activities can disturb RMAs, wetlands and lakes?

- cutting trees for cable corridors that are too wide and too close together
- swaying cables in the corridors that damage adjacent trees – minimize cable sway during yarding and when raising and lowering lines
- swinging logs that damage trees adjacent to the corridors
- swinging lines to the next corridor, rather than pulling them out and re-stringing

What are these requirements intended to protect?

- stream channels and banks
- water in the channel
- vegetation left in the RMA
- soils in the RMA



Use yarding corridors through retained streamside trees as long as the number and widths are minimized. Trees outside the corridor must be left with adequate crowns to provide original canopy cover. fpa

How much suspension is needed?

When yarding is necessary across Type F, Type SSBT or Type D streams, any large or medium Type N streams, lakes or significant wetlands, swing the yarded material free of the ground in the aquatic areas and riparian areas. fpa

When yarding across small Type N streams or other wetlands greater than one-quarter acre, minimize disturbance to stream channel or wetland and retained streamside vegetation. At least the leading end of logs must be raised off the ground.

Avoid dragging logs with the lead edge on the ground, and never drag logs:

- down a stream channel
- across a channel
- through wetlands

What are the requirements for log landings?

Logs are yarded from where trees are felled in the harvest unit to openings located near roads in the forest called "landings." There the logs are stored and eventually loaded onto trucks for delivery to a mill or other location. Because landings are built on cleared ground that is often compacted, they are potential sources of runoff and erosion. Sometimes they have a tendency to expand in size (explained below). Keeping them small, drained and well located is what these requirements are all about.

Minimize the size of landings to that necessary for safe operation. fpa

What is the problem with oversize landings?

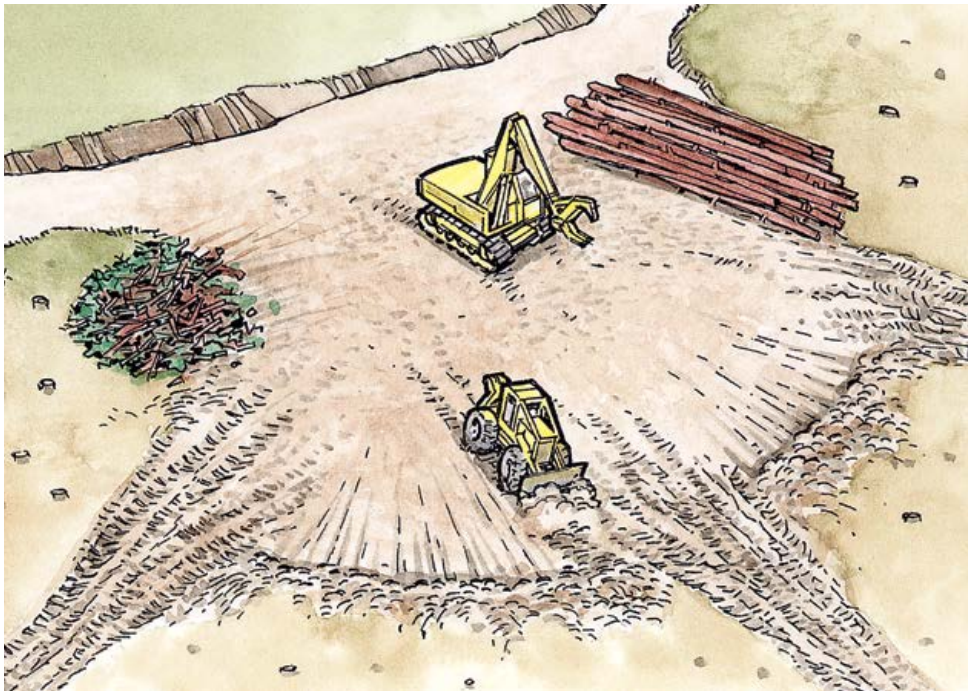
- They are bare, compacted surfaces where runoff can accumulate and erode soil.
- Sediment from landings can move to waters of the state.
- Oversize landings take forestland out of production.

Generally, landings more than one-quarter acre (about 100 feet by 100 feet) are larger than necessary. In many situations, smaller landings will meet safety and operational needs, but sizes and shapes will vary with the logging system and other needs.

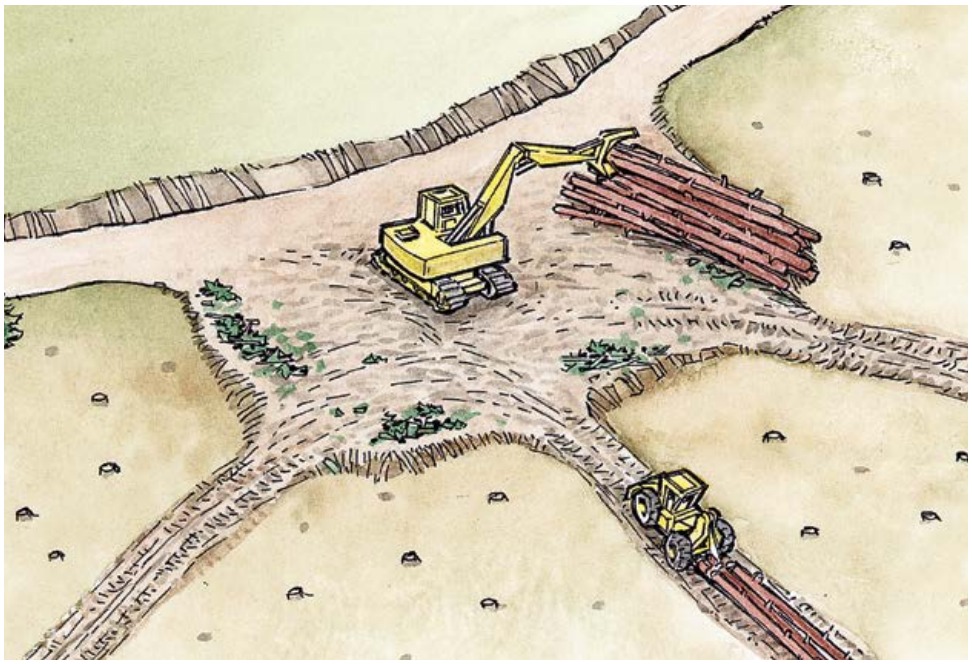
Landings must provide enough space for the skidding, yarding, loading and trucking equipment, as well as the logs that are expected to accumulate prior to loading and hauling. Different systems and equipment, along with the slope of the land and density of trees in the area, influence the number and size of landings needed.

Whole-tree harvest systems, whether ground-based or cable, require larger landings. This is due to the different equipment and space needed to remove and pile tops and limbs and to cut and load logs for transport.

Helicopters require large landings, but usually fewer are needed. Mobile cable yarding machines can operate on narrow sections of road, with little more than a turnout required if truck loading is frequent. Tower yarders may require that a separate "yarder pad" be constructed on a spur road above the main road where logs are landed and then loaded onto trucks.



Tractor yarding requires moderate-size landings that sometimes grow larger than needed. When several skid trails enter a landing and equipment, logs and debris converge, there is a tendency is to "cut the corners" of trails or actively expand the landing. Instead, have trails converge before they reach the landing, and also pile debris where it does not impede traffic yet can be burned, chipped or otherwise utilized later.



Locate landings on stable areas that minimize the risk of material entering water.

WHAT THIS MEANS:

If any part of a landing is on a slope steep enough to pose a risk of fill or sidecast entering waters of the state, it is a violation.

Similarly, It is a violation when landing fill or excavation occurs in such a way that an old landslide (often appearing as a slump) may be reactivated. Landing fill also must not be placed in a high landslide hazard location.

Avoid landings in RMAs. If there is no alternative, you must submit a written plan for review by ODF.

WHAT THIS MEANS:

This requirement is intended to keep landings out of RMAs. It applies even when a portion of a landing may be located in a RMA. And even if the landing is outside the RMA, a nearby location may be a poor choice because of the chance of sediment entering waters of the state.

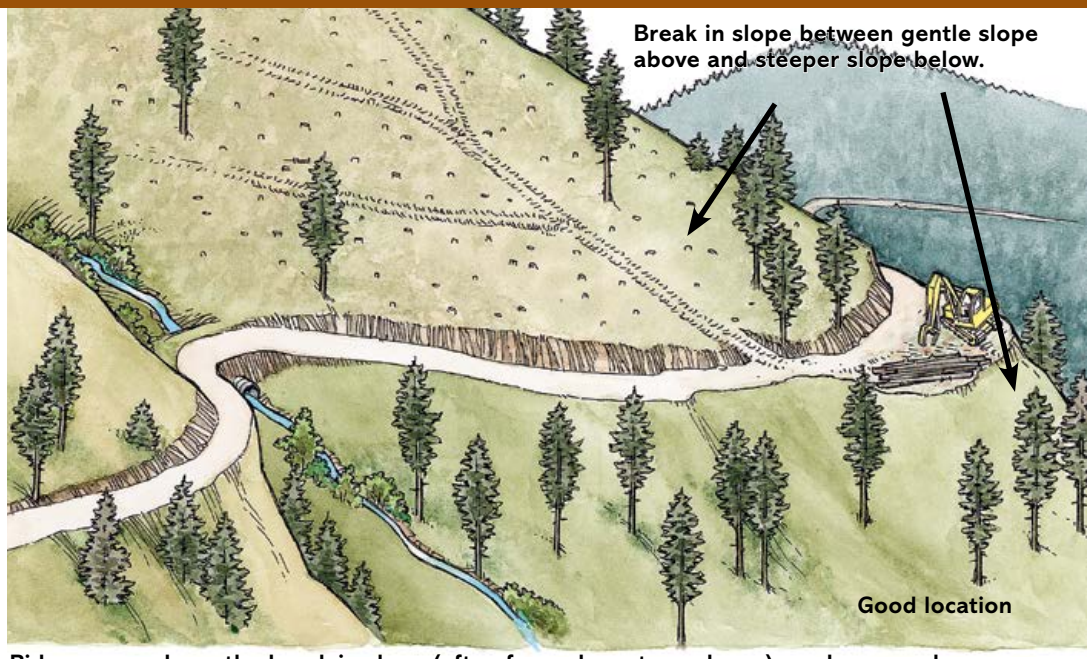
Do not incorporate slash, logs or other large quantities of organic material into landing fills.

WHAT THIS MEANS:

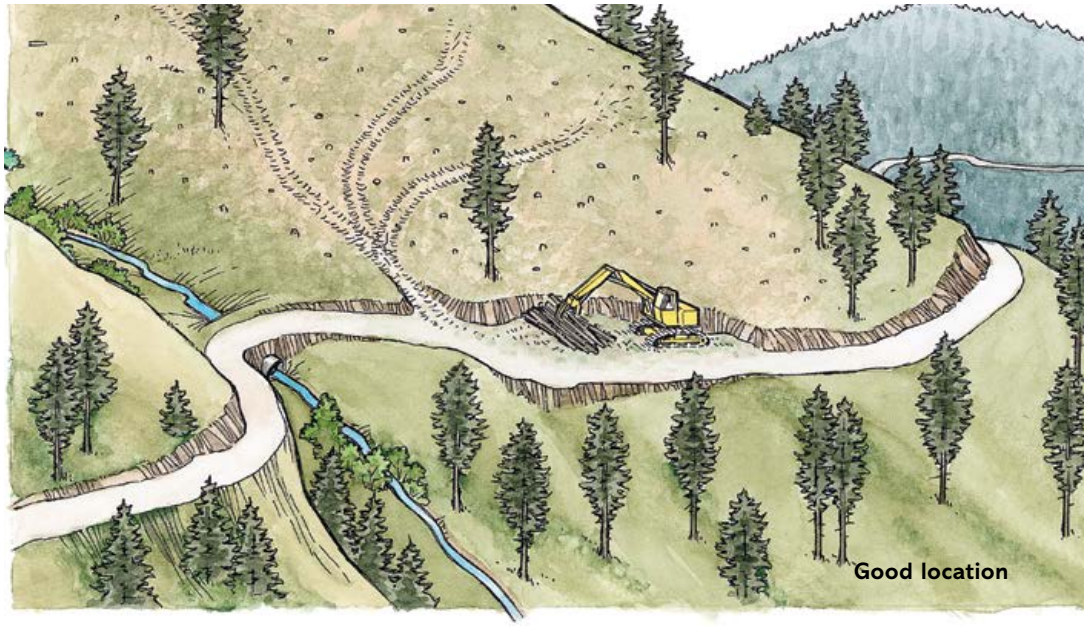
This is intended to prevent a landing fill failure from entering water. When this material decomposes, landing fills can slide downslope. Buried slash may also become a fire hazard.

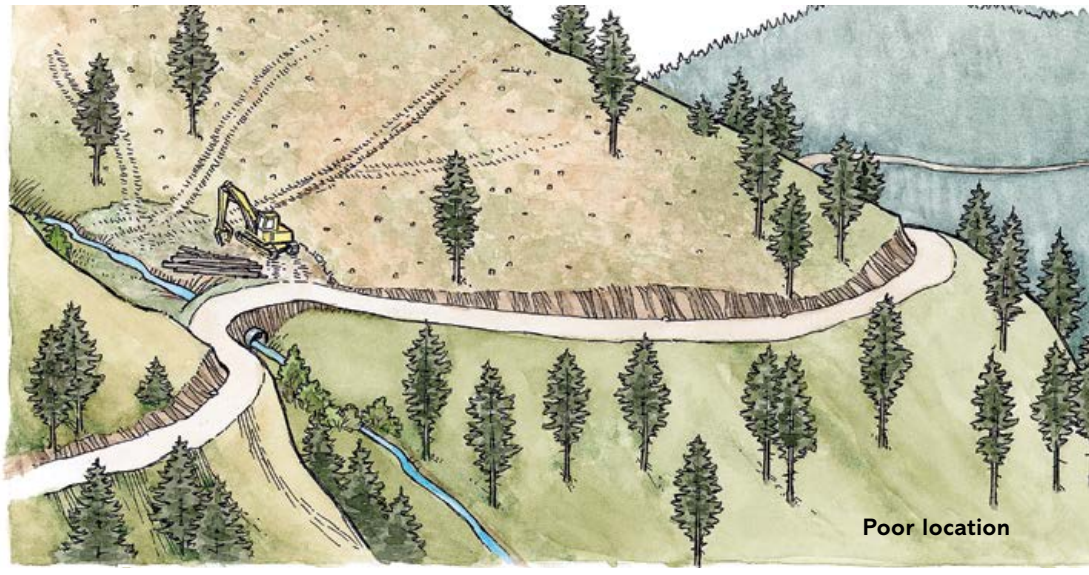
Organic material in landing fills should generally be avoided, but is most serious on slopes of more than 50 percent and when landings are within 100 feet of a water body.

If a landing is constructed such that material can enter waters of the state, it may be in violation.



Ridge noses above the break in slope (often formed on steep slopes) can be a good location for landings.





Put excess material from landing construction in stable locations well above the high water level. End-hauling to a stable location may be necessary.

WHAT THIS MEANS:

This is intended to prevent damage to water quality and aquatic habitat from material used in landing construction.

Excess soil, rock and debris must be placed in stable locations, and never below major-storm flow levels.

This requirement may make it necessary to end-haul this material.

Not allowed:

- building a log landing in a stream channel
- skidding logs into a stream channel,
- dropping logs into a stream channel while cable harvesting

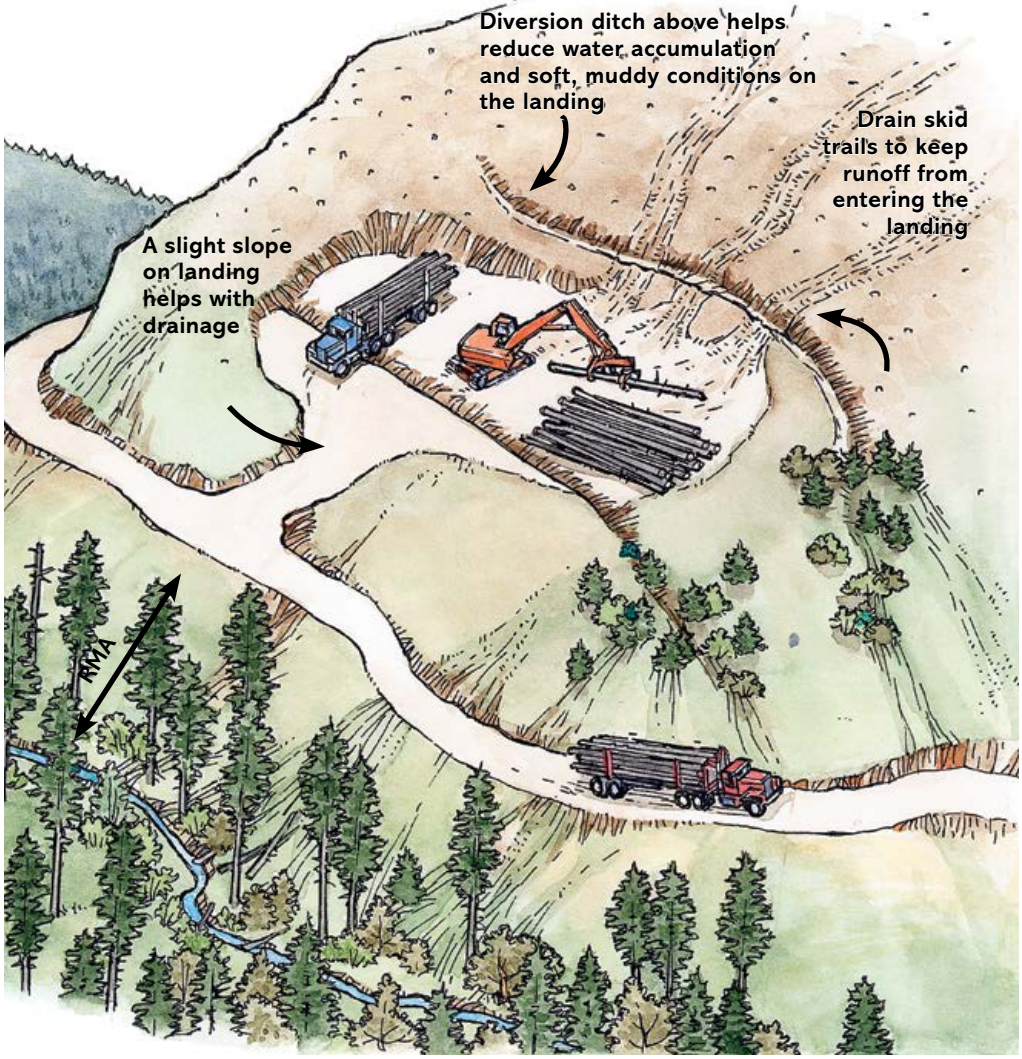
Establish effective drainage on landings during and after use.

WHAT THIS MEANS:

This requirement is intended to minimize sediment entering water.

It is especially important to control drainage from landings constructed above high-hazard sites.

A landing not sloped for effective drainage may be in violation.



Landing drainage structures include culverts, ditches and water bars.



Remove excess material from landings and place it in stable locations.

What should you know about slash treatment and site preparation?

What are slash, slash treatment and site preparation?

When a harvest is finished, some tree tops, limbs and defective wood often are left on the site. This material is called slash, and some of it may require treatment to make the site ready for successful reforestation (site preparation), to reduce wildfire hazards, or both. Piling, burning and chipping are examples of slash treatments. Sometimes slash treatment and site preparation are done together, or it may be a two-step process.

Some questions you need to answer:

- Will the slash create an additional wildfire hazard?
- It's important to anticipate the slash your harvest is likely to generate, and how it will affect the wildfire hazard that currently exists with dead and dying trees, needles and branches on the forest floor, etc. If the harvest is not expected to raise wildfire hazard above your forest's natural wildfire hazard, then slash treatment is less of a concern. ODF can help you determine whether or not the harvest will raise the natural wildfire hazard.
- Will the slash interfere with reforestation?
- If you're planning a Type 1 or Type 3 harvest, reforestation will be required. Your harvest site will likely need some slash treatment, because those harvest types leave enough slash to make it difficult to find suitable planting spots. Also, if natural regeneration is your plan, there may not be enough bare soil to provide a natural seedbed without some slash treatment.
- Are there concerns about burning due to proximity to communities or major highways?
- Increased air quality standards and visibility considerations can limit the days that burning is allowed, especially near larger communities. Plans for slash treatment and any related site preparation should consider the possibility of significant restrictions on burning.
- Are there opportunities to use or treat slash that avoid burning?
- Onsite burning is the traditional treatment to reduce or eliminate slash, but newer equipment and technologies have provided some alternatives and opportunities. Among these is chipping slash to provide material used for biomass energy production. Proximity to biomass energy facilities and road access for chip vans are important considerations.



Slash, after harvest and before treatment.

Why are slash treatment and site preparation important?

- Wildfire hazard can be reduced.
- It can expose planting spots and make reaching those spots easier.
- It may reduce damage to planted seedlings by rodents that hide in slash.
- It can be used to remove vegetation that will compete with newly planted seedlings.
- Minimize slash in waters of the state, which will reduce the depletion of oxygen levels as it rots. Waters of the state include streams, springs, ponds and wetlands.

What can slash do if it is not treated?

- make wildfire control more difficult
- result in insect and disease problems in the surrounding forest
- result in reforestation gaps
- fall into planting holes and interfere with seedling survival,
- get into waters of the state

Are there ways to reduce slash during the harvest?

Yes. Whole-tree harvesting and cut-to-length harvesting are two methods that can reduce slash on the harvest unit (see the Appendix, pages 152-153). Because whole-tree harvesting generates a lot of slash at the landing as yarded trees are topped and delimbed, there may be an opportunity to chip this material and sell it as fuel for biomass energy. This may avoid a need for further slash treatment.

In cut-to-length harvesting, a mobile processor cuts the tree and then tops and delimbs it in the same area. The machine operator can drop the slash in its travel path, and often crush it enough to reduce the wildfire hazard while leaving openings for later tree planting.

What are other ways to reduce slash accumulation?

- Careful tree felling and bucking can minimize breakage, leaving less slash.
- Broader harvest planning and marketing may allow slash piles or their chips to be sold for biomass energy generation.
- Lop and scatter (on-the-ground chainsaw work), combined with machine crushing, may reduce accumulations of slash.
- It may be possible on some sites to chip slash.

How do you treat slash and prepare the site for planting?

Typically slash is treated either by machine, by burning or by a combination of both.

Two commonly used machines are excavators or bulldozers equipped with brush blades. Excavators have the advantage of making cleaner piles for burning. Of course, ground-based machines should be confined to gentle terrain. While they are effective, both machines can cause excess soil disturbance and water quality problems if not used carefully.



This crawler tractor, equipped with a grapple, picks up whole trees and moves them to a landing or roadside.



After limbs and tops are removed at the landing, the material is piled and either chipped or burned. Whole-tree harvesting brings slash to a central location and efficiently disposes of it, leaving a forest floor ready for replanting.



To reduce wildfire hazard, slash can be crushed, cut or lopped so it lies close to the ground for rapid decay. This is effective for light harvests, but usually is not adequate slash treatment for heavily harvested areas.



Crawler tractors with toothed brush blades are used to pile slash. Never use straight blades; they scrape the soil surface and carry soil into the slash pile. Piles free of soil burn cleaner, reduce soil erosion and protect productive topsoil.



An excavator has the advantage of picking up slash rather than pushing it. It can make taller, more compact piles that burn efficiently, with little soil disturbance.

What problems can occur with slash treatment and site preparation?

- Soils can be exposed to erosion, especially on slopes of greater than 35 percent.
- Soils can be compacted and/or rutted.
- Aggressive slash treatment or whole-tree harvesting may be undesirable on less productive sites where organic matter provides a key source of nutrients and other benefits.

How are slash piles prepared for burning?

- Plan ahead! Oregon's Smoke Management Plan has been highly successful in meeting both air quality and landowner objectives, but it does require understanding and patience by all parties. Landowners must register, notify and pay fees to ODF prior to burning, with fees depending on the burn type (landing pile vs. broadcast) and acreage. Local ODF district staff issue approvals for ignition, with assistance from state meteorologists.
- Cover a portion of the pile with a waterproof barrier. (Note: There are restrictions on the type, area and disposal of coverings – contact ODF for details). This allows for burning during wet periods and reduces the risk of escape. The drier material also burns more completely with less smoke.
- Small, scattered piles can be left for wildlife unless mountain beaver (boomers) or other rodents are a problem.

See page 93 for additional tips.



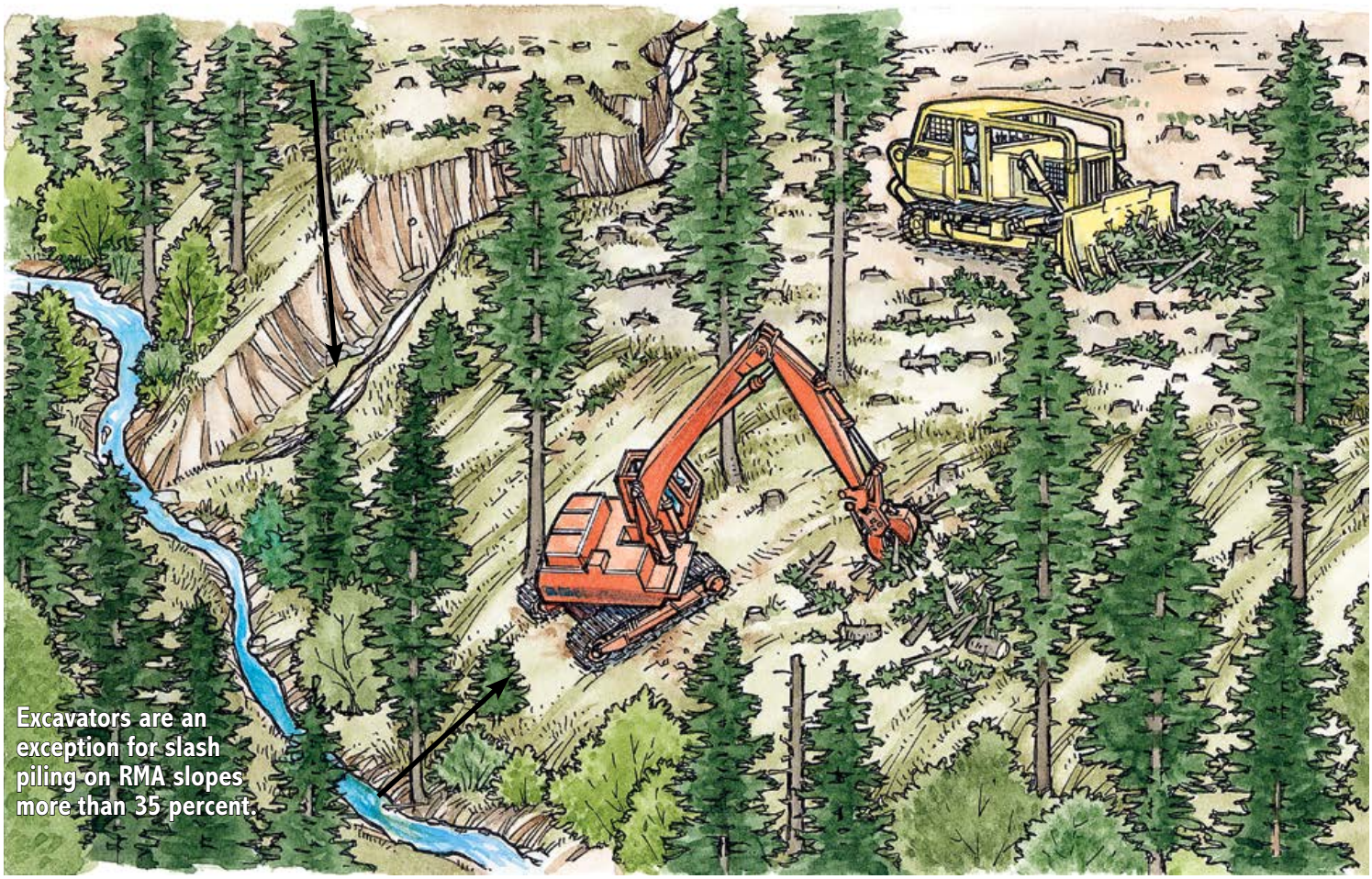
When treating slash, stay clear of wet areas.



The same machine that brings whole trees to the landing may carry slash back and scatter it on the forest floor. This returns nutrients and organic matter to the soil for the next forest. It also protects soil from erosion, especially in skid trails. The fire hazard is minimal because the slash is crushed and close to the ground.

No machine piling is allowed around an eroded gully.

In RMAs, machines on slopes less than 35 percent.



Be sure to have a vegetation filter between machine piling activities and RMAs or waters of the state. This keeps sediment from reaching the stream.

Are there requirements if mechanical site preparation is done near water?

During mechanical site preparation, operators shall not place debris or soil in waters of the state or where it may enter waters of the state.

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When mechanical site preparation is necessary in RMAs or near water, conduct operations in a way that sediment or debris does not enter waters of the state.

When using mechanical site preparation, operators shall provide adequate distance between disturbed soils and waters of the state to filter sediment from runoff water.

Machine piling (see illustration above) is not allowed:

- in RMAs with slopes greater than 35 percent
- on sites with surface or gully erosion
- where subsoil may be exposed or subsoil compaction is likely to occur

An exception: Excavator slash piling in RMAs is allowed on slopes of more than 35 percent, but only during dry periods.



Keep slash out of waters of the state. Slash can deplete oxygen levels as it rots, and in steep reaches it can be a debris torrent hazard.

For other information sources, see the Appendix, pages 197-198.

REFORESTATION AFTER HARVEST

You will be harvesting some timber. Do you need to plan to reforest the area?

The purpose of the reforestation rules is to establish standards to ensure the timely replacement and maintenance of free-to-grow forest tree cover following forest operations.

Each year, millions of new seedlings are planted in Oregon to replace harvested trees. Harvest areas that require reforestation must be replanted within two years. Within six years, those seedlings must be free-to-grow and "well-distributed" (see page 80). The law is clear: It is the responsibility of the landowner to establish the next generation of trees after a harvest.

Planning for reforestation goes hand in hand with timber harvest planning. The harvest activity often triggers both the need and the time limits for reforestation. Harvest machines and activities can be used in ways that promote successful reforestation. Some income from the harvest usually is budgeted for seedlings and other reforestation needs.

Landowners should order seedlings 1-2 years before they need them. The Oregon Department of Forestry has helpful information on ordering and purchasing seedlings (www.oregon.gov/ODF/Working/Pages/Replanting.aspx) Reforestation and seedling information is also available on KnowYourForest.org

When is reforestation required?

Timely reforestation of forestland following operations that reduce tree stocking below established standards is essential to ensure continuous growth and harvesting of forest trees species.

Reforestation is required any time tree stocking after harvest is below the minimum standards. This applies regardless of what the tree stocking was before the harvest.

Who is responsible for reforestation?

The landowner is responsible for reforestation, regardless of who cuts the trees. When the land is sold, if the reforestation requirements are not completed, that obligation transfers to the buyer. By law, the seller must inform the buyer, in writing, of any remaining requirement. Know your legal obligations whether you are a land buyer or seller.

Which forestlands require reforestation?

Any forestland, Site Class VI or better, is subject to the requirements of the reforestation rules.

There are six major forestland site classes in Oregon (page 145).

- I, II and III are high-site-class forestland
- IV and V are medium-site-class
- VI is low-site-class

Be sure to read the section: "You want to harvest timber on your property. How do you plan for it?" (page 13). It describes how to determine your harvest unit site class, its basal area and your harvest type (1, 2, 3 or Unclassified). Type 1 and Type 3 harvests require reforestation.

Where is reforestation not required?

Reforestation is not required on those portions of the harvest area:

- where adequate free-to-grow tree stocking remains after completion (Type 2 and Unclassified harvests meet this standard)
- that are not disturbed by operation activities
- on sites lower than Site Class VI

How many trees per acre are required?

Use Table 4-1 to determine the minimum stocking requirements for high, medium or low site class harvest units. You can meet the requirements by either planting seedlings (Column 2), leaving adequate saplings or poles (Column 3), leaving adequate basal area in trees 11 inches and larger (Column 4) or a combination of the three. Combinations are determined by using the "equivalent calculation" explained on the next page. All of these choices can and should be made when you plan your timber harvest.

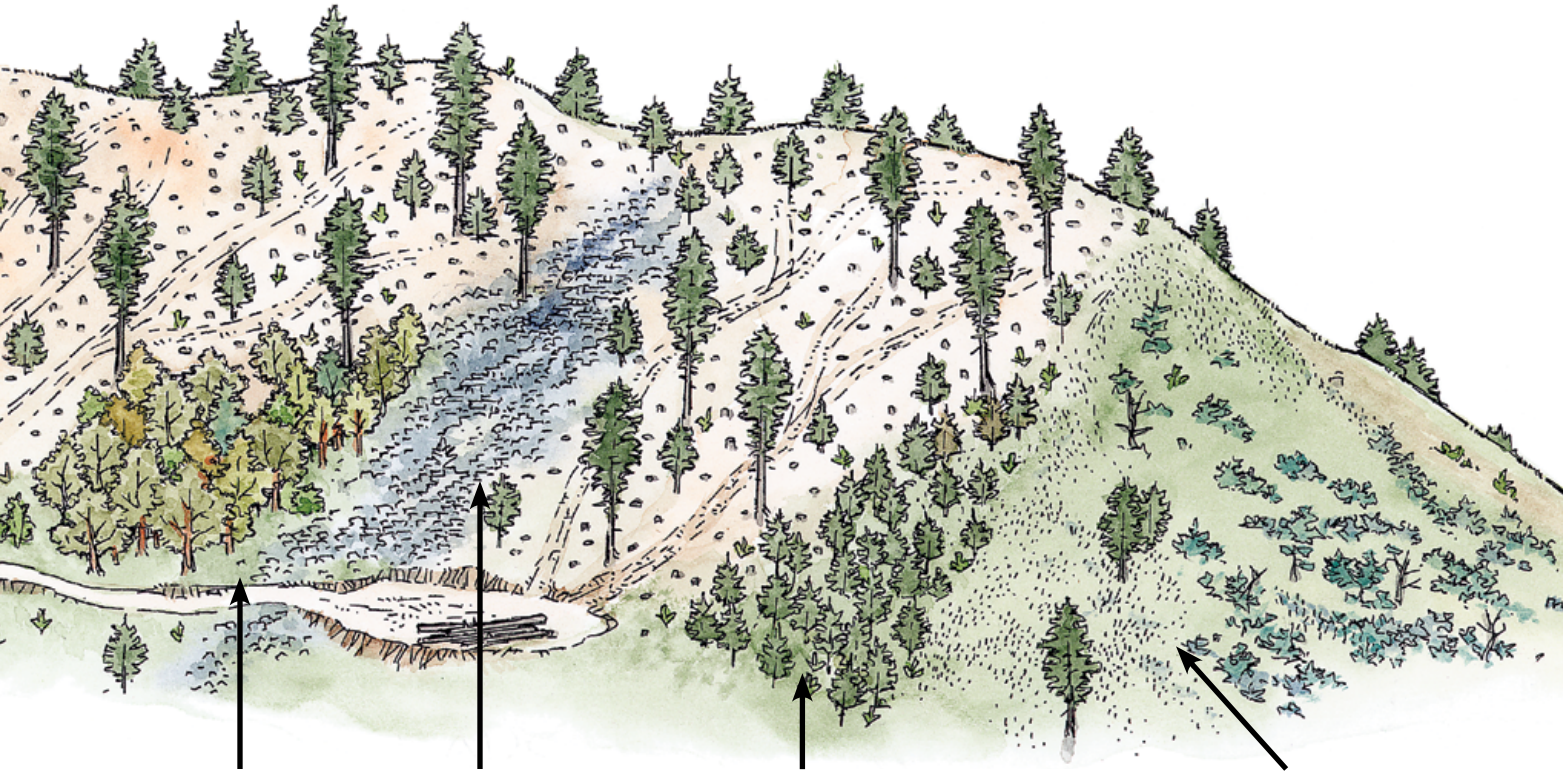
Note that these are the minimum numbers of free-to-grow trees required. As reforestation plans are developed, it's important to consider local conditions and whether all planted and residual trees can be expected to grow and thrive. In addition, the minimum stocking levels may not meet your management objectives.

What are seedlings?

They are live trees of acceptable species of good form and vigor less than 1 inch in DBH.

What are saplings and poles?

They are live trees of acceptable species of good form and vigor, with a DBH of 1 to 10 inches.



This harvest unit includes portions that don't require reforestation. For example, you are not required to plant areas that were not disturbed where young conifer reproduction and hardwoods are growing; areas with very shallow soils that don't support trees; and areas that are lower than Site Class VI.

Table 4-1 Reforestation Requirements for High, Medium and Low Site Classes			
Site Class	Seedlings (less than 1 inch DBH) or →	Saplings & Poles (1-10 inches DBH) or →	Trees 11 inches and larger
High (Site Classes I, II and III)	200 per acre, or	120 trees per acre, or	80 square feet of basal area per acre
Medium (Site Classes IV and V)	125 per acre, or	75 trees per acre, or	50 square feet of basal area per acre
Low (Site Class VI)	100 per acre, or	60 trees per acre, or	40 square feet of basal area per acre

Table 4-2 converts the number of trees per acre to average spacing. For example, if the average spacing between remaining saplings and poles on your Site Class IV harvest unit is approximately 19 feet, you have more than the required 75 (saplings or poles, not seedlings) trees per acre.

Between 300 and 435 trees per acre are included in Table 4-2 because higher planting densities are often used on better sites as well as to account for such factors as animal damage, brush competition and mortality. The first few years after harvest are critical for seedling survival and growth. Prompt planting of suitable stock, brush control and other measures can help ensure reforestation success. Seek out technical assistance and local experience if needed.

Table 4-2 Tree Number and Equivalent Tree Spacing	
Trees per acre	Average spacing (feet)
435	10
300	12
200	15
125	19
120	19
100	21
75	24
60	27

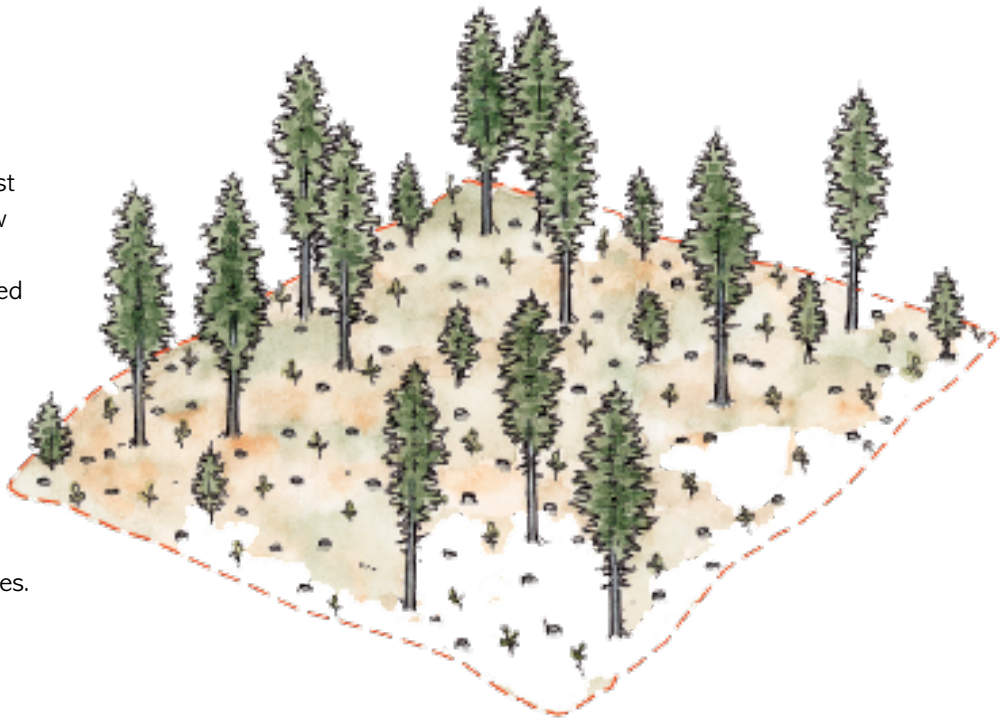
What are the equivalent calculations used for partial cuts?

The equivalent calculation is useful if you're planning a timber harvest in which some areas of seedlings, saplings and poles, and healthy larger trees will be left. Such a harvest could reduce the need for hand- planting new seedlings, but how do you determine their equivalent value? Use the calculation described here.

Note: Regardless of the site class, the following are equal to one another:

100 seedlings = 60 saplings and poles

= 40 square feet of basal area of 11 inch DBH and larger trees.



Use this formula to make the equivalent calculation:

NEW TREES = RULE STANDARD – [# SEEDLINGS + (# SAPLINGS AND POLES/0.6) + (BASAL AREA/0.4)]

New trees are the minimum number of additional free-to-grow seedlings that must be established per acre to meet the Table 4-1 standard.

Rule standard is the site class seedling standard listed in Table 4-1 (200, 125 or 100 seedlings per acre, depending on site class).

 # seedlings means the number of free-to-grow seedlings per acre that were left after harvest.

 # saplings and poles means the number of free-to-grow saplings and poles per acre that were left after harvest. This is divided by the equivalent factor (0.6). This includes wildlife trees and trees left in patches.

Basal area means basal area per acre of free-to-grow trees greater than or equal to 11 inches DBH that were left after harvest. This is divided by the equivalent factor (0.4).

Here's an example:

This Site Class IV, Type 3 harvest has the following trees remaining after the harvest.

Average seedlings per acre = 35
Average number of saplings and poles per acre = 8
Average BA/acre of trees greater than 11 inches DBH = 15

Use the equivalent calculation formula to determine seedling equivalents:

$$\frac{\text{8 saplings and poles per acre}}{0.6} = \text{13 seedling equivalents}$$

$$\frac{\text{15 square feet of basal area per acre}}{0.4} = \text{38 seedling equivalents}$$

35 + 13 + 38 = 86 seedling equivalents

Site Class IV reforestation requirements (Table 4-1) call for a minimum of 125 seedlings per acre, or equivalent larger trees. The equivalent calculation shows that stocking is not adequate. An additional 39 seedlings per acre must be planted, as shown in the calculation below.

FROM THE EQUIVALENT CALCULATION FORMULA:

125 tree standard – (35 + 13 + 38) = 39 new seedlings to be planted per acre.

Will larger trees left on the unit meet the reforestation standards?

When planning a harvest in which trees 11 inches or larger will be left, the basal area (Appendix, page 156) of these trees determines whether the reforestation standards (Table 4-1) will be met. Table 4-3 shows the basal area (Column 2) for individual trees with diameters ranging from 11 to 32 inches. For a given average tree diameter, the other columns show the number of trees per acre that equal the reforestation standards of 80, 50 or 40 square feet of basal area, and the average spacing between those trees. This helps in assessing and planning for reforestation needs.

Table 4-3 Equivalent Reforestation Standards for Trees of Varying Diameters

Avg. DBH of trees 11" or greater	Basal area (ft^2) per tree	# Trees equal to 80 ft^2 BA per acre	Avg. space between Trees (feet)	# Trees equal to 50 ft^2 BA per acre	Avg. space between trees (feet)	# Trees equal to 40 ft^2 BA per acre	Avg. space between trees (feet)
11	0.66	122	19	76	23	61	26
12	0.79	102	21	64	26	51	29
14	1.07	75	24	47	31	37	34
16	1.40	58	27	36	35	29	39
18	1.77	46	31	28	39	22	44
20	2.20	37	34	23	44	18	49
22	2.60	31	37	19	48	15	54
24	3.14	26	41	16	52	13	58
26	3.69	22	44	14	56	11	63
28	4.28	19	48	12	60	10	68
30	4.90	17	51	11	63	8	73
32	5.58	15	54	9	69	7	78

FOR EXAMPLE:

Let's say you are planning to harvest on Site Class III. You know from Table 4-1 that at least 80 square feet of basal area per acre of 11 inch or greater DBH trees must be left to meet the reforestation standards.

According to Table 4-3, 80 square feet of basal area could be 122 11-inch trees with average spacing of 19 feet, or it could be 15 32-inch trees with average spacing of 54 feet, or some other combination of average diameter and spacing for the trees you must leave.

Note the importance of site quality: Another harvest is planned on a Site Class VI area, which has a reforestation requirement of 40 square feet of basal area per acre. You would need to leave 61 11-inch trees with average spacing of 26 feet, or seven 32-inch trees with average spacing of 78 feet.

In either case, if the minimum basal area can't be maintained with the expected harvest removals, you need to plan for tree planting to meet the reforestation requirements.

Do the required wildlife trees count toward reforestation standards?

Yes, if they are alive and large enough. Live conifer trees 11 inches DBH and larger left standing in harvested areas to meet the wildlife tree and snag requirements will be counted toward reforestation stocking standards if the trees are free-to-grow.

To meet both reforestation and wildlife tree requirements, trees must be conifers at least 11 inches DBH, 30 feet tall and free-to-grow. The law allows these conifers to be double-counted. This is an incentive for landowners to retain free-to-grow conifers, rather than hardwoods, as wildlife trees. Why? In general, conifers live and last longer and are used by more wildlife species.

Do the required RMA trees count?

No. For the purpose of determining compliance with the tree stocking requirements of the reforestation rules, tree stocking in RMAs within an operation area will be considered separately from stocking in the rest of the operation area.

Since the purpose of an RMA is water protection, it is important that RMAs are planted after harvest. You are not allowed to leave understocked openings in the RMA where harvesting has occurred. Landowners are expected to do site preparation and planting inside RMAs, and make good-faith efforts to reforest streamside areas. ODF determines if a reasonable effort has been made. However, a slightly lower level of stocking in an RMA is preferable to repeated entries with chemical or mechanical methods to achieve full stocking.

Free-to-grow trees left in the undisturbed parts of the RMA may not be counted toward the required stocking of the disturbed area. Similarly, reforestation is not required in understocked parts of the RMA if they were not disturbed by the operation.





Above: These ponderosa pine are free-to-grow. Right: This Douglas-fir is not free-to-grow.

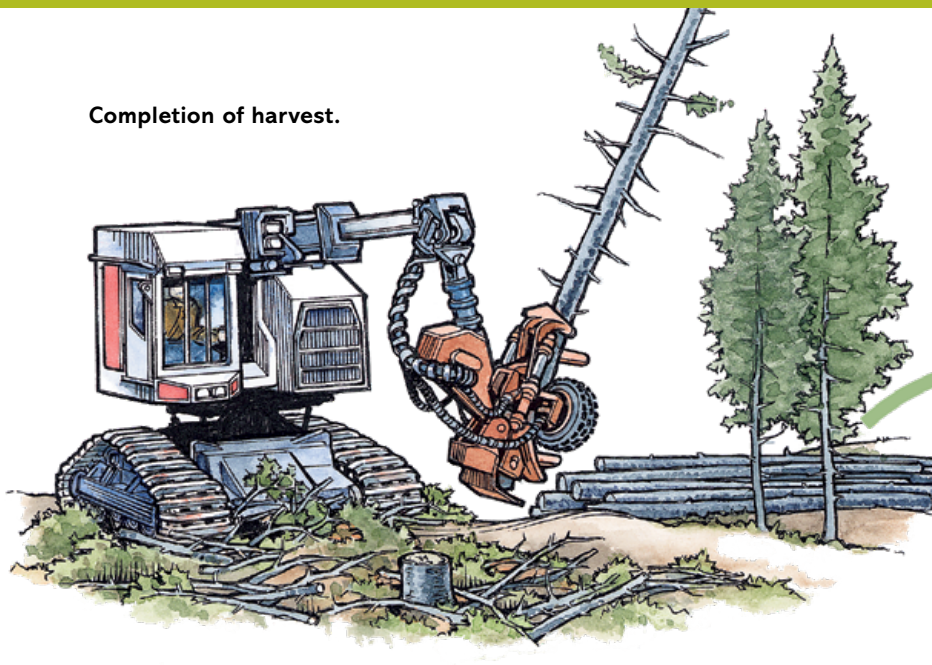
What does free-to-grow specifically mean?

Reforestation involves more than just planting seedlings or saving seedlings, saplings or poles on the harvest unit. To meet the requirements at the end of six years, the harvest unit must be a stand of freely growing, well-distributed trees, of acceptable species and form, with a good chance of becoming healthy and taller than neighboring grass and brush competition. (Keep reading for more about the six-year requirement below.)

What does well-distributed mean?

An effort must be made to reforest the entire harvest unit. However, the unit will be considered adequately stocked and the trees well-distributed if at least 80 percent or more of the harvest unit has at least the minimum per-acre required tree stocking. Not more than 10 percent may contain less than one-half of the minimum per-acre tree stocking required for the site class.

Completion of harvest.



These allowances are not loopholes in the reforestation standards, but rather reflect the variable results that may occur even when initial plantings are well-distributed. It's usually a good idea to plant extra trees to account for those that may die or not be free-to-grow after six years.

How much time is allowed for reforestation?

The time period for compliance with the reforestation rules begins at the completion of the operation or 12 months after tree stocking has been reduced, whichever comes first.

Completion of the operation means that the harvest has been completed and the harvest unit will not be disturbed again. Usually, when the yarding process ends, the harvest is considered to be completed. To prevent delays in reforestation, the compliance schedule begins no later than 12 months after stocking is reduced, meaning 12 months after felling begins.

If the harvesting activity extends long enough, reforestation may be required to begin on a portion of a harvest unit even though other parts are not completed.

The landowner shall begin reforestation, including any necessary site preparation, within 12 months of when reforestation is required.

WHAT THIS MEANS:

Whether you intend to depend on natural reforestation (described on page 81) or to hand plant seedlings or plant seed, once the clock starts from the date noted above, you have 12 months to start reforestation activities such as site preparation and ordering tree seedlings. For example, if yarding ends on May 1, you should begin site preparation and order seedlings in the next 12 months. Planting could occur during the coming winter/spring if site prep is completed and seedlings are available. Site preparation is often tied with slash treatment. See pages 71-74 for slash treatment requirements.

First year – reforestation begins; second year – planting completed.



Control brush and grass competition. Chemical herbicides are one method.



The landowner shall complete planting or seeding within 24 months unless ODF has approved a written plan for natural reforestation.

fpa

WHAT THIS MEANS:

If you intend to hand-plant seedlings or plant seed, it must be completed within 24 months unless a written plan for natural reforestation has been approved. Remember, reforestation timing is critical if your harvest is completed in the fall. For example, if the harvest ends on Oct. 1, site preparation activities, such as burning or spraying, may not be possible due to weather. The first planting season (December to April) could be lost. In this case, site preparation would have to be completed before the second planting season so planting could be done during the second planting season.

Within six years – free-to-grow stand is established.



By the end of the sixth full year, the landowner shall have established a free-to-grow stand of trees, which meets or exceeds the minimum stocking level required.

fpa

WHAT THIS MEANS:

An adequately stocked, free-to-grow stand must be established by Dec. 31 of the sixth year after the compliance period has started. For example, all operations completed in 2011 that depend on hand-planting seedlings or planting seed must have a free-to-grow stand established before the end of 2017. Six full calendar years are allowed to establish the next generation of trees.

Can natural reforestation be used to meet the requirements?

Natural reforestation relies on natural processes to reforest a harvest unit. It is acceptable with a written plan approved by ODF. On Site Class VI or other harvest units with poor soils or harsh climates, natural reforestation may be the best way to reforest. In the case of wetlands with high water tables, competing vegetation and limited accessibility, natural reforestation may have greater success than hand planting.

Landowners may submit plans for alternate practices such as natural reforestation that do not conform to the reforestation stocking standards. A plan for alternate practices may be approved if ODF determines that there is a high probability that the purpose of the reforestation rules will be achieved.

WHAT THIS MEANS:

Landowners must submit a written plan to ODF for an alternate practice for reforestation within 12 months of tree stocking reduction. The plan should describe how reforestation will be accomplished and should describe the following:

- seed sources to be used
- site preparation methods
- vegetation competition control methods
- time estimate to obtain a free-to grow stand
- how progress will be evaluated
- what will be done if reforestation does not progress as planned

Time limits for natural reforestation may differ.

When natural reforestation is planned, the time limits for evidence of successful germination and for establishing a free-to-grow stand of trees, which meets or exceeds the minimum stocking level required for the site, shall be established in the approved written plan required for such methods.

WHAT THIS MEANS:

A natural reforestation plan must provide specific time limits for site preparation, evidence of reforestation success, and establishment of a free-to-grow stand. The deadlines should not be shorter than six years and rarely longer than 10 years.

What if reforestation cannot be accomplished?

Extensions are granted when reforestation cannot be accomplished within six years due to circumstances beyond the landowner's control. Those circumstances are determined by ODF and may include:

- tree nursery failure
- inadequate availability of seedlings after salvage harvesting
- extreme drought
- insect infestations
- smoke management restrictions on slash burning
- wildfire or disease damage
- severe wildlife damage that could not be reasonably anticipated or controlled

You must submit a written request for an extension to ODF as soon as you realize your reforestation effort may not meet the deadline. Extensions are granted based on evidence documenting reasonable attempts to comply. You will be required to achieve stocking within a prescribed time using recognized methods.

What are unacceptable reasons for reforestation failure?

- failure of hand-planting success when inappropriate seedlings or seed sources are used
- natural reforestation failures due to poor natural seed crops in the years immediately following a harvest



Using natural reforestation can be less costly than hand-planting, but its reliability varies. A written plan is required for natural reforestation.

- failures on harsh sites due to harvest unit design or competing vegetation
- wildlife damage, such as by mountain beaver, that could be reasonably expected and controlled

How are the tree species acceptable for reforestation determined?

ODF determines the tree species acceptable for artificial reforestation, natural reforestation, and as residual seedling, sapling and pole, or larger tree stocking based on all of the following criteria:

- *Species must be ecologically suited to the planting site.*
- *Species must be capable of producing logs, fiber or other wood products for lumber, sheeting, pulp or other commercial forest products.*
- *Species must be marketable in the foreseeable future.*

WHAT THIS MEANS:

In nearly all cases, native species are considered acceptable and are preferred for reforestation. One exception could be white fir that has moved into a ponderosa pine/Douglas-fir site due to fire exclusion. On Site Classes IV, V and VI, landowners are encouraged to favor ponderosa pine and Douglas-fir to white fir.

A conifer or hardwood species that has any commercial value (even commercial firewood) will meet the requirement of B above. A hardwood or mixed hardwood/ conifer stand is as much a forest as a stand of pure conifers.

Tree species that are not currently marketable -- or marketable in the foreseeable future -- cannot be used for tree stocking. Generally, juniper is not considered acceptable, but it often grows on poor sites (lower than Site Class VI) where reforestation is not required anyway.

Hardwood trees remaining after a harvest can meet up to 20 percent of the required stocking levels if they meet the criteria in A, B and C above. With a plan approved by ODF, hardwoods may supply all the required stocking.

When appropriate, reforest with a mixture of acceptable tree species to reduce the risk of insect and disease losses and to promote stand diversity.

Hand planted seedlings or seed should be genetically adapted to the site.

Do non-native tree species meet reforestation standards?

Landowners wishing to use non-native tree species must submit written plans that must be approved by ODF. The plans are required within 12 months of tree stocking reduction, and must include:

- tree species to be used
- evidence that the species is ecologically suited
- evidence that the species is capable of producing commercial forest products
- research or field tests that show success in similar sites

Are reforestation standards ever waived?

Reforestation requirements may be waived or modified following a stand-improvement operation (e.g., pre-commercial thinning, commercial thinning, overstory removal or other partial-cut harvest) if ODF determines that the after-harvest stand will result in enhanced long-term tree growth and there is a high probability that the purpose of the reforestation rules will be achieved.



WHAT THIS MEANS:

Stand improvement harvests, like those noted, are intended to increase long-term tree growth and value if done correctly. Additional reforestation may not be required. In some cases, stand improvement harvests result in stocking slightly below the stocking standard rules. If that happens, ODF must decide if, in the long term, free-to-grow tree stocking will occupy the site. If so, reforestation will not be necessary.

What's needed if there is an exemption from reforestation requirements?

- Landowners may request a suspension of the reforestation rules when salvaging or converting low-value forest stands in order to establish forest stands that are adequately stocked and free-to-grow. There must be evidence that the landowner qualifies for incentive funding and that the harvest costs will exceed revenues.
- Where reforestation is not required, landowners must protect soil productivity and stabilization within 12 months of the operation with suitable trees, shrubs, grasses or forbs.

What if you want to change to a different land use?

Timber harvesting sometimes is done in preparation for a land use different from forestry. For example, trees often are removed when an area is developed for home sites. Such harvesting is still a forest operation subject to ODF oversight, but requirements by other state and local agencies also will require attention:

- An operations notification to ODF is required, and the form includes a place to note a land-use change.
- If you need or want to remove trees that otherwise would be required to stay or be replaced, you must submit a written plan for approval by ODF. The plan must show that local land-use agencies (city and county, usually) have approved the land-use change and will issue the needed permits, and the change will be in compliance with regulations of other state agencies (e.g., Oregon Department of Environmental Quality, Oregon Department of Agriculture).

What are the penalties for inadequate reforestation?

Landowners will be ordered to comply with reforestation requirements and may be fined up to $5,000. The landowner's property tax status could also adversely change for failure to reforest or complete a conversion of forestland to a non-forest use.

For other information sources, see the Appendix, pages 197-198.

FIRE AND CHEMICALS

OREGON STATE UNIVERSITY EXTENSION SERVICE

Choosing the right chemical applicator

FOR YOUR FAMILY FOREST

Many family forest owners depend on professional operators to help get things done on their property. This often includes the important task of weed control. Finding the right person for the job is important. Finding the right person starts with knowing what to look for when hiring.

Like most forestry practices, weed control is actually a mix of different activities. When hiring a chemical applicator, you're looking for someone with the right mix of knowledge, skill, equipment and staff needed for the job.

It's important to get this right. Weed control is a very important step. Poor work can waste money or injure your trees. Even worse, it could mean damaging the environment or neighboring crops, creating liability issues for you.

So how do you choose the right chemical applicator? It boils down to communicating about needs and expectations. Here are some key questions and specific things to talk about before hiring an applicator to work on your property.

Key questions to ask potential applicators

WHAT ARE YOUR QUALIFICATIONS?

Before you hire anyone to apply chemicals on your land, you need to know that they are qualified to do the job well, and that they will do so legally, safely and without creating liability.

- Ask to see their commercial and/or consulting applicator's license and proof of business insurance. Are their license and insurance valid and current?
- Ask about the level of insurance they carry, if that is appropriate for your job. Some applicators may be willing to list you as "additionally insured" on their insurance policy.
- Ask about their forestry application experience. Who have they worked for? What types of chemical application have they done? Will they provide references?
- Ask about their familiarity with Oregon Department of Forestry forest practice rules for spraying near buffer zones, weather restrictions, record-keeping and using restricted herbicides.
- Are they up to speed on training their workers about the new Environmental Protection Agency Worker Protection Standards?
- Does their licensing and experience qualify them to develop spray prescriptions?

WHAT SERVICES DO YOU PROVIDE?

It's important that you be clear about the services you're looking for, so you can determine whether the operator has the knowledge, equipment and staff needed for the job.

Specific herbicides are used in many different situations, such as site preparation (before planting) or release (after planting), to control both leafy and woody plants. The

(continued on other side)

application can be done in many different ways, including as a broadcast spray, spot or directed spray, "hack and squirt" or stump treatment. It can also be done using different tools, including backpack sprayers, vehicle-mounted sprayers or squirt bottles. The right combination and approach (generally referred to as the "prescription") depends on the season, type of weed and crop tree species.

- Clarify what parts of the job you're doing yourself and what you're hiring for — developing the prescription, doing the application, or maybe both. Do their qualifications match the job?
- What types of application can they do, and what equipment do they use?
- Who will provide the chemicals for the job?
- Which of you will submit the "Notice of Operation" to the Oregon Department of Forestry for the application?

HOW WILL THE WORK BE DONE?

- Ask about their workforce (number and size of crews). What experience and certification does the foreman who would oversee your job have?
- Will they be able to finish your job within the desired time frame?
- Ask how to ensure their crew understands exactly what and where to spray. What photos, maps or on-the-ground markings do they need from you?
- Will the operator provide you with official chemical application records in a timely manner? These include specifics on chemicals, location and rates at which they were applied; information on weather conditions during application; etc.

HOW WILL I BE CHARGED FOR YOUR SERVICES?

There are a variety of ways to work this out. **It's important that you communicate expectations and reach a clear agreement upfront.** Shop around for bids and check references.

- Ask if you'll be charged by the acre or by the job, or if costs will be itemized.
- Ask about billing and when payment is due.
- Do they guarantee their work? Will they come back and fix something if it isn't done right? How will you determine satisfactory service?
- Get a written estimate for the job.

WHERE TO LOOK FOR A CHEMICAL APPLICATOR

The list of individuals and firms who can handle your chemical application needs is constantly changing. However, places where you can look to find a list of potential chemical applicators include:

- Ask other landowners who they work with and trust.
  - Oregon Small Woodlands Association: www.oswa.org/
  - Oregon Tree Farm System: www.otfs.org/
- Ask a forester.
  - Association of Consulting Foresters: www.acf-foresters.org/
  - Oregon State University Extension Service: extensionweb.forestry.oregonstate.edu/directory
  - Society of American Foresters: www.safnet.org
- Oregon Department of Forestry: www.oregon.gov/ODF/Working/Pages/FindAForester.aspx
- Ask a neighboring industrial forester if they could share contacts for applicators they use.
- Ask the state Department of Forestry or OSU Extension Service for a list of applicators in your area. They can provide names but cannot make specific recommendations.

Helpful resources

See these publications for more information about safe herbicide use and regulations:

- *Contracts for Woodland Owners* (EC 1192) https://catalog.extension.oregonstate.edu/ec1192
- *PNW Weed Management Handbook:* https://pnwhandbooks.org/weed

Oregon State University

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Published October 2017

Fire prevention during forest operations

Preventing unwanted fire is required during all forest operations in Oregon, and it's important to understand the many ways this is achieved. This section will help you comply with the requirements during the fire season – further details about these and other fire prevention measures are available from ODF.



Only a small percentage of wildfires are caused by forest operations, but fire prevention measures help reduce the risk of major resource damage and economic losses.

Oregon's Cooperative Fire Protection Program

Oregon's Cooperative Forest Fire protection Program is composed of strong, combined efforts among forest landowners, contract operators, ODF, Keep Oregon Green, local forest protection districts and fire patrol associations, and an effective set of fire prevention requirements that are supported by all cooperators.

The landowner's fire protection responsibility is met by following fire prevention requirements, as well as paying a forest patrol tax assessment to the local forest protection district (included in annual property taxes). A forest landowner/operator has the duty to: a) immediately report all fires to ODF; and b) control a wildfire that starts on an operation. If the landowner/operator has insufficient personnel or equipment to handle a fire, then ODF or a forest protective association will conduct needed firefighting. Also, as an incentive for fire prevention and to keep the tax as low as possible, the law specifies that the party responsible for certain types of fires will pay some ("limited liability") of the firefighting cost. However, negligent operations are subject to full firefighting cost ("unlimited liability").

Why is so much attention given to fire prevention with forest operations?

Forest operations pose a variety of risks for starting wildfires, so Oregon's Cooperative Fire Protection Program (see box on page 85) includes a comprehensive set of fire prevention rules. Enforced during the fire season, these operation rules help keep wildfire losses to a minimum in our forests. Although industrial operations start a small share of all human-caused fires on state-protected forests (less than 5 percent), the potential firefighting cost is much higher on such wildfires — due to accumulated slash, fuel conditions and timber values to protect.

Who is responsible for fire prevention measures?

Preventing wildfires is the responsibility of forest landowners and everyone else involved with forest operations during the fire season. Reducing resource loss, costly firefighting, environmental damage and financial liability — through effective fire prevention measures — is the goal of Oregon's protection program.

Is there any liability if the requirements are met?

If a landowner or operator has done everything correct in readiness and response to a fire in an operation, his or her liability for suppression cost is limited to the first $300,000. If there are any "willful, malicious or negligent" actions or lack of preparedness determined in a subsequent investigation, there is an unlimited liability for suppression cost. More details are given below.

Are any permits needed?

You must obtain a "Permit to Use Fire or Power-driven Machinery" (also called a PDM permit) from ODF prior to starting any operation that uses motorized equipment or tools.

Does this include personal chainsaw use?

Using a chainsaw for personal or recreational purposes does not require a permit. However, it does require the fire prevention practices described under "Chainsaw special requirements" on page 90.

What equipment and resources are required for an operation?

Firefighting equipment required on an active operation can vary with size of operation and time of year – check with ODF for specific details. Basic requirements include:

- a water source, pump, hose and nozzle with specific capacity
- specific firefighting capability of heavy equipment and crew
- specific hand tools, extinguishers, and exhaust spark arrestors
- an on-site firewatch person after daily shutdown, who is ready to take action to report and begin to suppress a fire

See pages 88-90 for more detailed requirements.

Are there exceptions to the fire prevention requirements?

ODF districts or forest protective associations may waive any fire prevention requirement or permit when in their judgment, the operation or proposed alternate preparedness measures would provide sufficient fire prevention without adding greater fire hazard. For example, ODF may issue a written waiver of the PDM permit requirement when an operation is not a fire hazard. Waiver of the permit does not relieve the operator of compliance with other applicable fire requirements. Written waivers also may be granted for alternate methods or equipment proposed by the operator, when those methods provide equal or better fire prevention. All waivers must be requested by the landowner as the ultimate responsible party. A waiver may require additional prevention resources (e.g., water, hose).

What should you be prepared to do if a fire starts?

Under Oregon law, unlike other states, forest landowners are responsible to control and extinguish wildfires that occur on their land. You must be prepared with equipment and personnel to control and extinguish:

- any fire that starts in an operation area while the operation is active
- any fire that results from an operation activity
- any fire that spreads from burning activities

These responsibilities are required by law, and are termed as providing "every reasonable effort." The specific level of landowner or operator effort is based on the amount and type of resources available. ODF or the local fire protection association will respond to every fire, but firefighting resources must be available and used at the operation site. Without this effort additional liability falls on the landowner and operator.

What can happen if a fire is left uncontrolled?

If a fire on Oregon forestland burns uncontrolled and threatens life, forest resources or property, and proper action is not taken to prevent its spread, the fire is considered an illegal public nuisance. This "uncontrolled fire declared nuisance" designation can dramatically increase landowner/operator liability.

How serious can the liability be for a landowner or operator?

Depending on the circumstances of an uncontrolled fire, a landowner/operator can be subject to either limited liability or total liability for firefighting costs:

Limited Liability: When a forest operation causes a fire and an investigation finds that all applicable regulations were fully followed, the landowner/operator may be required to reimburse up to $300,000 of state-provided fire suppression costs. This liability limit for suppression costs only applies if all required prevention measures are met, and no willful, malicious or negligent actions are found to have caused the fire. The landowner/operator may have no liability if the official investigation identifies a fire cause unrelated to the operation.

Total Liability: If there is any "willful, malicious or negligent" action or lack of preparedness found in an investigation, there can be an unlimited liability for paying all firefighting costs. If an investigation reveals that the rules were not followed — such as not meeting fire watch requirements, or failing to file for a PDM permit — the landowner/operator may be billed for the total state-provided costs to put out the fire. This liability for large wildfires can be millions of dollars. Additional fire liability information is available from ODF or forest protective association offices.

Some important definitions in the fire prevention rules:

FIRE SEASON means the legally declared period of time each summer, determined by the State Forester, when Oregon forest operations are subject to forest fire prevention restrictions and Industrial Fire Precaution Levels (IFPL). The state is divided into local areas where fire season and fire restrictions can be tailored to match local fire hazard conditions on a daily basis by ODF.

FORESTLAND means any woodland, timberland, grazing land or clearing that contains enough forest growth or slash to constitute a forest fire hazard, regardless of how the land is zoned or taxed.

LANDOWNER means the legal holder(s) of a forest property title. Oregon law considers the forest landowner and the operator as one entity, and it refers to either or both as landowner/operator.

OPERATION means any industrial or commercial activity on forestland inside or within one-eighth mile of a forest protection district, including but not limited to timber harvest, land clearing, use of power-driven machinery, and prescribed burning as a management tool (excludes agricultural crop activities). Examples include forest thinning, road construction or repair, herbicide spraying and prescribed burning of logging slash.

OPERATOR means any person who, either personally or through employees, agents, representatives or contractors, conducts any operation, as defined above. Oregon law considers the forest landowner and the operator as one entity, and it refers to either or both as landowner/operator.

PRESCRIBED BURN means the deliberate burning of wildland forest fuels under carefully managed conditions of weather, fuel moisture, wildfire hazard, proximity to designated populated areas and time of day. Purposes for burning may include fire-hazard reduction, reforestation success, habitat improvement, invasive or unwanted vegetation control, and aesthetic enhancement.

How do fire precaution levels affect forest operations?

During legally declared fire season, forest operations are subject to different levels of fire prevention restrictions, which can change daily depending on the local wildfire potential within each regulated use area. Landowners and operators engaged in active forest projects must daily check the local closedown level — known as "industrial fire precaution level" or "IFPL" — to be sure the proper fire prevention restrictions are followed each day.

Western Oregon: Four IFPL closedown levels are used during the fire season for private and other lands under ODF fire protection in western Oregon. IFPL closedown levels are based on fire danger, current fire activity and available resources in each local "regulated use area." Check with your local ODF office for specific equipment closedown times, locations and requirements.

Eastern Oregon: The IFPL system does not apply on ODF-protected forestlands east of the summit line of the Cascade Mountains. However, additional fire prevention measures may be required — landowners/operators should always check with ODF for current requirements in their local district. During legally declared fire season, industrial fire restrictions in eastern Oregon are similar to the IFPL Level I (described below) for western Oregon. Operators on federal lands in eastern Oregon should be aware that the IFPL system is used by the U.S. Forest Service and BLM in that region.

Log on to gisapps.odf.oregon.gov/firerestrictions/ifpl.html for specific industrial fire restrictions in your area.

Level I. Fire Season

This initial level of fire hazard is announced by ODF and puts basic precaution requirements (water, tools and other equipment) in effect. A fire/security watch is required at this and all higher levels unless waived by ODF.

- For up to three hours during breaks and after power-driven machinery has been shut down for the day, a fire watcher must conduct a continual visual observation of the operation area on which the machinery was used.
- If the fire watcher detects any fire in the operation area, he or she must first report the fire, summon assistance and describe intended fire suppression actions, determine safety zones and escape routes, then proceed to extinguish the fire consistently with firefighting safety and training. The fire watcher must have adequate transportation and communications to summon assistance.

Level II. Limited Shutdown

In addition to the Level I requirements, the following activities are allowed only between the hours of 8 p.m. and 1 p.m. (local time) the next day:

- power saws, except at loading sites
- feller-bunchers with rotary head saws
- cable yarding
- blasting
- welding, cutting or grinding of metal

Level III. Restricted Shutdown

In addition to the Level II requirements, the following are prohibited except as indicated:

- Cable yarding — except that gravity-operated logging systems using non-motorized carriages or approved motorized carriages may operate between 8 p.m. and 1 p.m. the next day when all blocks and moving lines are suspended 10 feet above the ground except the line between the carriage and the chokers and during rigging.

The following are permitted to operate between 8 p.m. and 1 p.m. where mechanized equipment capable of constructing fireline is immediately available to quickly reach and attack a fire start.

- ground-based operations
- power saws on ground-based operations
- rotary head saw feller-bunchers with a continuous fire watch
- non-rotary head saw feller-bunchers;
- tethered logging systems

In addition, the following are permitted to operate between the hours of 8 p.m. and 1 p.m. local time:

- power saws at loading sites
- mechanized loading or hauling of any product or material
- blasting
- welding, cutting or grinding of metal
- any other spark-emitting operation not specifically mentioned

Level IV. Complete Shutdown

All operations are prohibited.

What about hauling through more than one shutdown/ regulated use area?

The precaution level at the woods loading site shall govern the level of haul restriction, unless otherwise prohibited by factors other than the IFPL system.

Summary of key requirements during the fire season

During legally declared fire season, in addition to restrictions under the daily local fire danger level (described above), landowners and operators are required by law to follow the basic fire prevention measures summarized here. ODF can provide more detailed information and guidance.

PERMIT FOR POWER MACHINERY/ TOOLS: A "PERMIT TO USE FIRE OR POWER-DRIVEN MACHINERY" (PDM) must be obtained from the local ODF office before starting any operation that uses motorized equipment or tools.

FIRE WATCH AFTER DAILY OPERATIONS: For up to three hours after power-driven machinery (including saws) has been shut down for the day, a fire watcher must continually observe the operation area where the motorized equipment was operated. If a fire is detected, the fire watcher must immediately summon firefighting assistance from ODF ***and*** must also safely try to control the fire as described under Level 1 on page 88.

WATER SUPPLY AND PUMP ON-SITE: For most motorized operations (see chainsaw exception below) lasting more than two days, a water tank, delivery pump, hose and nozzle must be maintained and ready for immediate firefighting use. The water supply tank must have at least 300 gallons of water for a self-propelled fire truck, or at least 500 gallons of water for a non-propelled tank/trailer. The pump must be capable of at least 20 gallons/minute at 115 psi at pump level. Additionally, the required water supply must include enough serviceable hose, of not less than 3/4 inch inside diameter, to reach from the water supply to any location in the operation area affected by power-driven machinery, or 500 feet, whichever is greater. The water supply, pump, not less than 250 feet of hose, and the nozzle, as required by this rule, shall be maintained as a connected, operating unit and kept ready for immediate use.

FIREFIGHTING HAND TOOLS ON-SITE: Every operation with five or more workers must have a tool box that contains a number of firefighting tools equal to or greater than the number of persons working on the operation. Workers on operations with four or fewer workers must each have a shovel suitable for firefighting.

FIRE EXTINGUISHERS ON MOTORIZED EQUIPMENT: All equipment powered by an internal combustion engine (other than chainsaws) must be equipped with a 5-pound chemical fire extinguisher with a minimum rating of 2A, 10BC or equivalent protection. The extinguisher must be approved by a nationally recognized testing laboratory, ready for immediate use, fully charged, and equipped with a pressure gauge or other measuring device.

FIRE TOOLS AND EXTINGUISHERS ON TRUCKS: Each truck, including crew vehicles, used on an operation must be equipped with a 5-pound fire extinguisher, as described above for motorized equipment. Each truck also must have a round-pointed shovel with an 8-inch face and a handle more than 26 inches long, and a Pulaski or axe with a handle longer than 26 inches. All must be ready for immediate use.

ENGINE EXHAUST SPARK ARRESTER: All engines must be equipped with a spark arrester. Exceptions are allowed for fully turbocharged engines, for engines under 51-cubic-inch displacement, and for trucks and pumps used exclusively to fight fire. Those excepted engines must be equipped with a muffler and exhaust in good operating condition.

CHAINSAW REQUIREMENTS: Each power saw must be equipped with an exhaust screen that retains at least 90 percent of carbon particles and meets exhaust temperature standards. Saws meeting these requirements are listed in a "Spark Arrester Guide" publication available at ODF offices. Additionally, the following must be immediately available to the power saw operator: an 8-ounce or larger fire suppressant and a round-pointed shovel with an 8-inch face and a handle more than 26 inches long. Power saws must be stopped during fueling and moved at least 20 feet away from the fuel supply before restarting. A water supply is not required for operations using only a chainsaw.

CABLE LOGGING PRECAUTIONS: Operations using cable systems must conduct additional fire precautions, including clearing flammable debris from near blocks; having a water supply and shovel stationed at each block; and preventing cables from rubbing on rock or woody material.

FLAMMABLE DEBRIS REMOVAL: Power-driven machinery must be kept free of excess flammable material — such as needles, bark or slash — that may create a fire risk.

FALLING HAZARD SNAGS: ODF may issue a written order that certain snags, which are a fire hazard, be felled either before or concurrent with the operation.

WAIVER FOR ALTERNATE METHODS: The ODF district may provide a written waiver for alternate methods or equipment proposed by the operator, when those methods provide fire prevention equal to or better than other requirements.

NO SMOKING: Smoking is not allowed while working in an operation.

IMMEDIATE CONTROL OF ANY UNWANTED FIRE: The landowner and operator must immediately act to control and extinguish any fire started in an operation while the operation is active, any fire that results from operation activity, and any prescribed burn that has escaped control.

QUESTIONS: If you have questions about operation requirements during fire season, contact ODF or your local forest protective association.

Can you do anything more to prevent a wildfire?

Yes. There are several voluntary practices that have proved effective in minimizing accidental fire starts and the spread of an unwanted fire. Landowners and operators are encouraged to consider these added fire preparedness and prevention measures that go beyond those required by law.

VOLUNTARY MEASURES DURING CRITICALLY DRY OR HAZARDOUS FIRE PERIODS include: early shutdown when low relative humidity is measured, early shutdown when high winds occur, minimizing tracked-vehicle operation in rocky areas (sparks!), providing additional water volume and hose length to reach all operation areas, extra precautions tailored to site and job conditions, and conducting "fire drills" to ensure crew preparedness.

For other information sources, see the Appendix, pages 197-198.

ODF Fire Protection Web Pages:

www.oregon.gov/ODF/Fire/Pages/Restrictions.aspx
(general page for public and industrial restrictions)

gisapps.odf.oregon.gov/firerestrictions/ifpl.html
(industrial fire restrictions map)

Using fire: Prescribed burning for forest management objectives

Controlled burning can be a valuable management tool, but forest landowners and operators must follow some important steps to control smoke and the risk of fire escape.

Why burn?

A prescribed burn is a controlled fire that consumes tree harvest slash, unwanted vegetation or other wildland fuels. It can be an efficient and effective forest management tool when used under carefully monitored conditions of local wildfire hazard, weather, fuel moisture, proximity to populated areas and time of day. Burning is prescribed for specific purposes, and should be conducted by skilled professionals experienced in lighting, controlling and extinguishing such fires.

Purposes for burning may include fire-hazard reduction, invasive species or unwanted vegetation control, and improvement of reforestation, habitat, forest health and/or aesthetics. Prescribed burns are often scheduled after timber harvest, and the risk of wildfire can be reduced by burning the slash and other excess flammable material. Burning removes fuels that otherwise could make a future wildfire far more destructive when they have accumulated to hazardous levels. Prescribed burning also can prepare sites for reforestation, by adding nutrients and removing thick logging slash and competing vegetation.

Burning is commonly integrated with mechanical thinning or tree harvest operations that redistribute and reduce excess woody fuel loading — keeping prescribed burning feasible and safe. Burning cannot be done safely without careful attention to forest fuel loads and location, and removal of a portion of the fuels through harvest is a common part of an integrated management strategy.

Options for treating excess fuels and unwanted vegetation by burning include:

- piles at the roadside or log landing
- "jackpot" or windrow piles in the harvest unit
- broadcast burning of slash in the harvest unit
- spot-burning of un-piled slash concentrations
- under-burning below a well-spaced tree canopy

CONTROLLED BURNS VERSUS WILDFIRE

Although prescribed burning generates smoke and carries some risk of escape, the catastrophic wildfires they help avoid by reducing fuels can cause much greater problems. Wildfires are destructive, polluting, unpredictable, dangerous and costly to control. Prescribed burning uses small, controlled fires during non-summer months when smoke can be reduced and kept away from communities. Burning is allowed only when weather conditions favor good fire control and smoke dispersal to maintain air quality. In areas such as central and eastern Oregon, carefully prescribed forest thinning and prescribed burning can mimic the natural, low-intensity wildfires that historically "managed" many forests.

HOW ARE SMOKE PROBLEMS AVOIDED?

ODF regulates burning on forest lands throughout the state under Oregon's Smoke Management Plan (see box at right), drawing from decades of experience. The agency monitors weather conditions and provides daily forecasts, and it issues burning instructions to landowners who have registered to conduct burning projects. During the non-summer months, ODF coordinates thousands of burning requests from private and public forest owners and managers statewide. ODF's strict oversight and regulation of forest burning projects help minimize air quality impacts and smoke intrusions into populated areas.

Oregon's Smoke Management Plan is widely regarded as the most successful forest burning program in the Western U.S. This success is defined as meeting both air quality objectives ***and*** landowner management objectives. Accomplishing these dual needs requires diligent understanding and cooperation by all parties involved in forest prescribed burning.

Oregon's Smoke Management Plan goals:

- Protect public health and reduce long-term air pollution from wildfires.
- Minimize burn smoke intrusions into designated cities and wilderness areas.
- Maximize burning opportunities while minimizing smoke emissions.
- Help accomplish forestry fuel reduction and reforestation objectives.
- Actively monitor and report accomplishments for continuous improvement.
- Self-fund the program with burning registration fees.

The ODF administers the Plan, including handling burn permits and fees, burn conditions monitoring and approvals, and annual reporting. A "Smoke Management Reference Manual" is available from ODF offices.

What should you know about requirements for burning on forest lands?

Plan ahead, and carefully! A prescribed burn must be well-planned and conducted under strict environmental and meteorological conditions, meant to keep the fire fully confined. Prescribed burning involves some risk, and burn managers must prevent the burn from escaping uncontrolled. Precautions are necessary, as are skilled burn crews. Fire trails must be installed, and equipment and personnel must be available to ensure containment.

Be aware that the potential liability for suppression costs and damage to adjoining property may deter some landowners from burning projects, as the same liability from fires from other forest operations also applies to prescribed burning. In addition, allowable burning days and other restrictions can be more stringent for forestlands near population centers and locations where smoke disperses more slowly, such as the Willamette Valley and the Medford area.

Burning projects on forest lands must address the following:

- Any burning activity must be registered with ODF by obtaining a burning permit at least seven days before the planned ignition; a written burn plan is required in some situations.
- Fees are due with burning permit registration, calculated on a per-acre basis that varies with site location, burn acreage and burn type (i.e., landing, piles, broadcast).
- Burn plans and implementation must consider protection of air, water quality, and fish and wildlife habitat.
- Burning must protect trees left after harvest, riparian buffers and soil productivity.
- Burning must maintain vegetation required under the forest practice rules, including RMAs for streams, lakes and wetlands (see below).
- Burn area and intensity should be limited to only what are needed for reforestation or fuel hazard reduction.
- At least one day before igniting the burn, the landowner/operator must call the local ODF office for clearance to burn, subject to favorable conditions.
- Those requesting ignition approval should be prepared to provide specific information about the burn, including fuel load amounts and the planned ignition time.
- Ignition activity must not start, or if begun must be discontinued, if weather or other conditions change and are no longer within ODF-approved limits.
- Burn accomplishment must be reported to ODF within a week for all prescribed burning.

What about burning near streams, lakes and wetlands?

Burning near streams, lakes and wetlands involves some additional resource risks. Thus, a written plan is required when burning is expected within:

- 100 feet of Type F, SSBT and D streams
- 100 feet of large lakes
- 300 feet of significant wetlands

The written plan should describe, as needed, how detrimental effects will be minimized:

- in RMAs
- on highly erodible soils
- for any required wildlife trees, snags, down logs and understory vegetation

What about using water to help control the slash burn?

If you need to draw water from a stream, lake or other water body as part of the burn operation, you must notify both the Oregon Water Resources Dept. and the Oregon Fish and Wildlife Dept. This notification must be submitted to the local offices of these agencies at least 15 days before the water is drawn. Copies of the original ODF Notifications of Operation forms are used, but specific information about the water use must be included.

Tips for burning slash piles

Use pile covers: During the dry season, cover a portion of the pile with a waterproof barrier. Such covers have been shown to reduce pollutants by allowing rapid ignition and more complete combustion when burning is allowed. Covered piles allow for safer burning during more desirable wet periods. Drier woody material within the pile favors more rapid and complete combustion, which has fewer pollutants and improves smoke dispersal.



On steep slopes, prescribed burning can be an effective way to limit soil disturbance while controlling fuels and enhancing reforestation.

Burn only approved covers: The only inorganic cover that may be legally burned with a pile is a **plastic sheet (polyethylene)**, which may not exceed 100 square feet and a thickness of 4 mil. Other covers may be used to keep piles dry, but they must be approved by the ODF forester or removed prior to burning.

Well-built piles burn better: Properly constructed burn piles (or windrows) burn more completely with less smoke and air pollution. Piles that burn best are compact, tall and relatively clean of dirt. They can be constructed by a log loader, excavator, dozer with a brush blade or by hand.

Burn under proper fuel weather conditions: Conduct burning and light piles only during weather periods approved by ODF for safe burning and good smoke management. Burning during wet weather can achieve project objectives while reducing (but not eliminating) the need for fire control measures, because of less risk of escape.

Sometimes, not every pile or downed log needs burning: Small, scattered piles can be left unburned for use as wildlife habitat, unless mountain beaver (boomer) or other pests are a problem. Also, Oregon forest law requires larger clearcut harvests to retain two pieces/acre of down wood — this wood must not be piled or burned.



It is possible to practice prescribed burning and save down logs.

Are there ways to avoid burning slash and other forest fuels?

Yes. There are a number of alternatives to burning that may be used to reduce, consume or otherwise eliminate harvest slash and other forest fuels. They may be attractive when considering burning costs, unpredictable timing (smoke management) and the risk of fire escape. However, the alternatives can involve their own costs and other concerns, which should be carefully weighed against the advantages of a well-planned burn project.

Non-burning alternatives to treat excess forest fuels include, but are not limited to:

- do nothing: leave woody fuels onsite
- cut-to-length or whole-tree harvesting (see the appendix, pages 152-153)
- pre-commercial thinning of smaller/ excess trees
- skidding/yarding of unmerchantable wood/tops to the landing
- lopping and scattering of slash on the forest floor
- chipping or grinding on-site or at the log landing
- debarking and/or chipping of pulp fiber at the landing
- mechanical crushing of slash
- cutting/digging tree planting spots prior to reforestation
- herbicide treatment to kill unwanted and competing vegetation
- pile/windrow/concentrate slash, without burning



Biomass harvest operation.

Biomass utilization

Biomass utilization is a forest operation where slash — and other excess woody debris —is removed from forest land and chipped/ground into fuel for renewable energy generation. Although interest and activity in biomass utilization has been growing, tonnage prices paid to landowners may not cover the costs of biomass collection, processing and transport. As such, plans for biomass utilization should be integrated with other timber harvest and management objectives. With new biomass energy facilities that reduce transport costs and other related efficiencies and market incentives, biomass utilization can become a more attractive option for landowners.

For other information sources, see the Appendix, pages 197-198.

What are the pros and cons of burning harvest slash?

PROs

- Burning can reduce fuel loads and related fire hazards.
- Burning can be used on steep slopes where vehicles cannot work.
- Burning can reduce habitat for unwanted mountain beaver, rabbit and mice that may damage new tree seedlings.
- Burning can control brush that may compete with new tree seedlings.
- Burning is a way to provide adequate tree planting spots.
- Burning can release some nutrients and improve soil fertility.

CONs

- Burning can be risky and costly – the landowner has liability if the fire escapes.
- Burning in winter or spring reduces risk but requires planning and flexible scheduling.
- Burning and the smoke it creates can be unpopular with neighbors and communities.
- Piles burn best, but extra work and accepted coverings are required to burn during the wet season.
- Burning requires initial ODF Notification, a Burning Permit, a Burn Plan, and a fee before lighting a prescribed fire.



Prescribed burning with a helitorch has become less common as whole-tree cable harvesting and other approaches have reduced the need.



Parts of these machine piles will be covered with acceptable waterproof barriers and be ready for burning during the winter months.

Fire protection for homes on forestlands

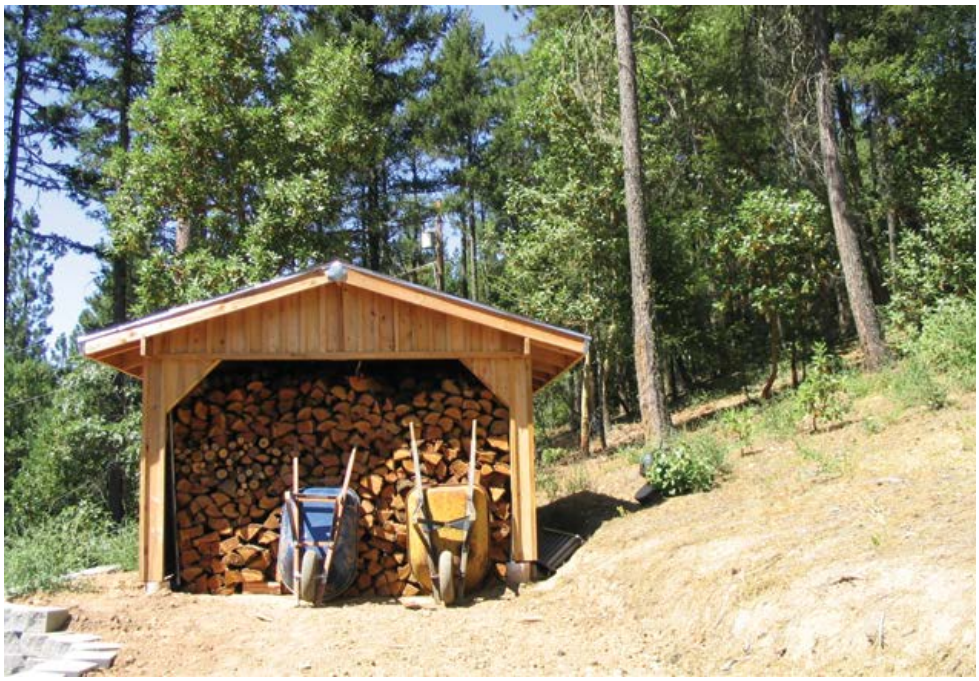
Taking steps to reduce fire hazards around homes on forest ands is not only smart, it's often required by Oregon law **– even when forest operations are not involved**.

What should you know about fire protection for homes on forestlands?

Oregon law (see box on page 97) requires property owners in designated forestland-urban interface areas to reduce excess vegetation, trees and woody material — around structures and along driveways where they could fuel a wildfire. It also may be necessary to create fuel-free openings along property lines or roadsides.

Required fuel-reduction actions may include:

- primary/secondary fuel breaks
- driveway/road/lot fuel breaks
- ladder fuel (smaller trees and shrubs) thinning/removal
- brush removal and green spaces
- tree pruning
- tree thinning
- clearance around roofs and chimneys
- removal of flammable material from roofs and decks
- firewood re-location
- water supply development/access



This firewood shed is located well away from the home.

Oregon's Forestland-Urban Interface Fire Protection Act

The Oregon Forestland-Urban Interface Fire Protection Act (also called the Interface Protection Law) enlists the help of property owners in making fire-vulnerable forest-dwelling interface areas less hazardous and helping firefighters more safely and effectively defend homes from wildfires. The Interface Protection Law seeks to reduce the loss of residences from forest fires, as well as to reduce firefighting costs when wildfires approach residential areas in or bordering the forest.

Under the Act, forestland-urban interface areas within each county are identified by a local classification committee, with a focus on:

- lands within the county and inside an ODF protection district
- lands meeting the state's definition of "forestland"
- lands defined as "suburban," "urban" or "rural" when logical boundaries are needed
- developed lots that are 10 acres or smaller, which are grouped with other lots and have a minimum density of four structures per 40 acres

As forestland-urban interface areas are identified, they are then classified in terms of fire risk. The classifications range from "low" to "extreme," with the category determining the size of the fuel break around a structure that needs to be established by the landowner. After the local committee drafts the area maps and risk classification, public input is sought for potential revisions and final adoption. The forestland-urban interface classifications are reviewed every five years.

Requirements under the Act are being implemented gradually, with three counties initially included in 2003 and other counties being added over a planned 15-year rollout period. Further details about the requirements are found in Oregon Revised Statutes 477.015 to 061, and Oregon Administrative Rules 629-044-1000 to 1110.

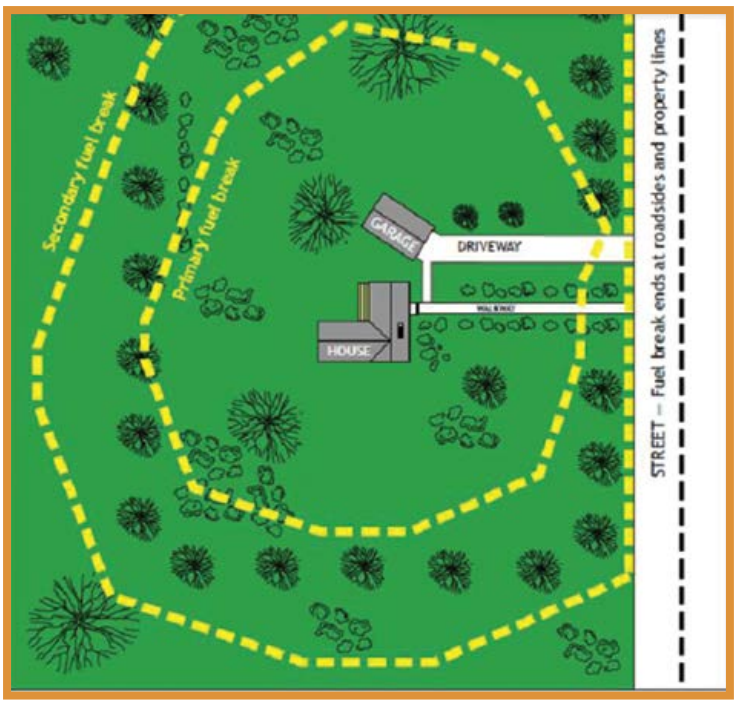
How do you know if your property is in a designated interface area?

The Interface Protection Law is administered on a county-by-county basis (see box above). Within the next decade it will apply to all counties with significant forestlands – meanwhile, you should check with ODF to determine whether your property is in a designated interface area. If your property is in such an area you may have received information about the requirements for reducing fire hazards. If your property isn't currently included but is in or borders forestland, consider using the requirements to reduce the risks to your property as well as for the protection of other people and resources.

How do you evaluate your property and meet the requirements?

In counties that have completed the classification process, ODF notifies landowners within the designated forestland-urban interface areas about the requirements, usually with a mailing. Landowners have two years after receiving the notification to comply with the fuel-reduction standards. ODF provides information to forestland-urban interface landowners about the fuel-reduction standards, along with property evaluation forms. The evaluation forms are designed to help the landowner assess fuel reduction needs and make the property fire-safe. You should use the evaluation form that matches the classification for the area where your property is located, i.e., moderate, high, extreme, or high-density extreme (no fuel reduction is required in locations classified as "low").

Property owners also receive a "certification card" that should be signed and returned to ODF after all the fuel-reduction standards have been met by the landowner. Contact your local ODF office for copies of the evaluation form and certification card.



Is there a penalty if your property does not meet the requirements?

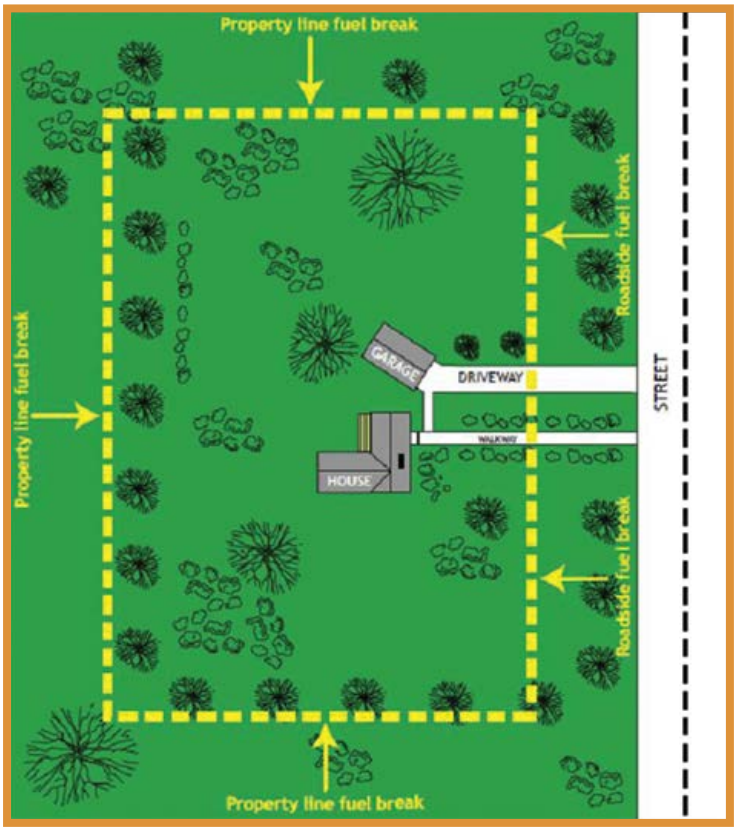
There is no fine for not meeting the requirements. However, the state is empowered to collect up to $100,000 in suppression costs if:

- a landowner does not certify his or her property
- a wildland fire originates on the property
- the fire spreads within the protection zone around a structure and driveway that does not meet the standards **AND**
- ODF has extraordinary costs for suppression

The cost collection may exceed $100,000 if a landowner is found to be willful, negligent or malicious in the origin of the fire.

Returning the certification card to ODF provides an important record that you have met your responsibilities as a property owner in a designated interface area, thereby relieving you of the $100,000 firefighting cost-recovery liability. Note that certification cards become void whenever a property is sold, a structure is added or a county classification committee has reclassified forestland-urban interface lands.

For other information sources, see the Appendix, pages 197-198.



Primary fuel breaks around residences: At least 30 feet wide in this zone:

- Ground cover should be mostly non-flammable; examples include asphalt, bare soil, concrete, rock/gravel, mulches, green grass, succulent ground cover or wildflowers.
- Cut dry grass to a height of less than four inches
- Grass, leaves, twigs and similar cuttings and debris should be broken up to avoid a continuous fuel bed.
- Maintain shrubs and trees in a green condition, mostly free of dead plant material, and without potential “ladder fuels” removed.
- Arrange trees and shrubs so that fire cannot jump from plant to plant; thinning may be necessary to accomplish this.

Using engine fuels, oils and other petroleum products

Forest operations often involve machinery and vehicles that require petroleum products. Careful handling and use of these products can reduce the risk of spills and help protect the environment.

If a spill occurs when using petroleum products or chemicals for vegetation and pest control (see next section), landowners and operators must follow specific rules for handling the spill. ODF oversees most of these handling, use and spill regulations for forest operations.

What types of "petroleum products" are subject to forest practice requirements?

"Petroleum products" often present on forest operations and subject to the forest practice rules include engine fuels, gasoline, hydraulic oil, lubricating oils and greases. The rules distinguish between "other petroleum products" and "chemicals." Refer to next section, "Using chemicals," for more information about proper use of forest chemicals such as herbicides or pesticides.

What are some sources of potential petroleum product leaks and discharges?

Heavy equipment, service trucks, crew vehicles, saws, fuel tanks, fuel supply trucks, fuel transfer, fuel or lubricant containers, waste oil storage, improper equipment repair methods, equipment malfunctions, vehicle accidents and vandalism.

What actions must be taken to prevent and deal with leaks and spills?

Adequate precautions are required to prevent leaks, minor discharges, or "reportable spills" from entering and causing a visible sheen on state waters (streams, rivers, lakes, or wetlands). Operations should be planned to keep petroleum products and chemicals from entering such waters. Be aware that uncontrolled ditch water can be a source of such contamination.

Petroleum and other chemical containers and handling equipment must be maintained in a leak-proof condition. This includes machinery used for transportation, on-site storage or application of chemicals. If there is evidence of leakage, the equipment must not be used further until it is repaired (see "Using chemicals" section). If an accidental leak or spill occurs, immediate action is needed to stop and contain it, and it must be promptly reported (see box).



If a spill occurs: Oregon requirements for petroleum products and other chemicals

Operators must take immediate and appropriate action to stop and contain leaks, minor releases or "reportable spills."

Any "reportable spill" of petroleum product — exceeding 42 gallons onto land, or any amount delivered to state waters — must be reported within 24 hours to the Oregon Emergency Response System (OERS).

Any "reportable spill" of pesticide — exceeding 25 gallons (or 200 lbs.) onto land, or any amount delivered to state waters — must be reported within 24 hours to the OERS.

Smaller quantities discharged onto soil, less than the gallon amounts stated above, should be stopped, contained and prevented from future delivery into state waters.

If a spill enters state waters, operators must also immediately report it to the nearest ODF office. This reporting does not exempt the operator from requirements to notify other agencies.

First response to a "reportable spill" incident is through 9-1-1. Once notified, local public safety agencies should call OERS at 800-452-0311.

For more information, contact ODF, Oregon Dept. of Environmental Quality, the Oregon Dept. of Agriculture, or see the OERS Web page: www.oregon.gov/OMD/OEM/tech_resp/oers.shtml

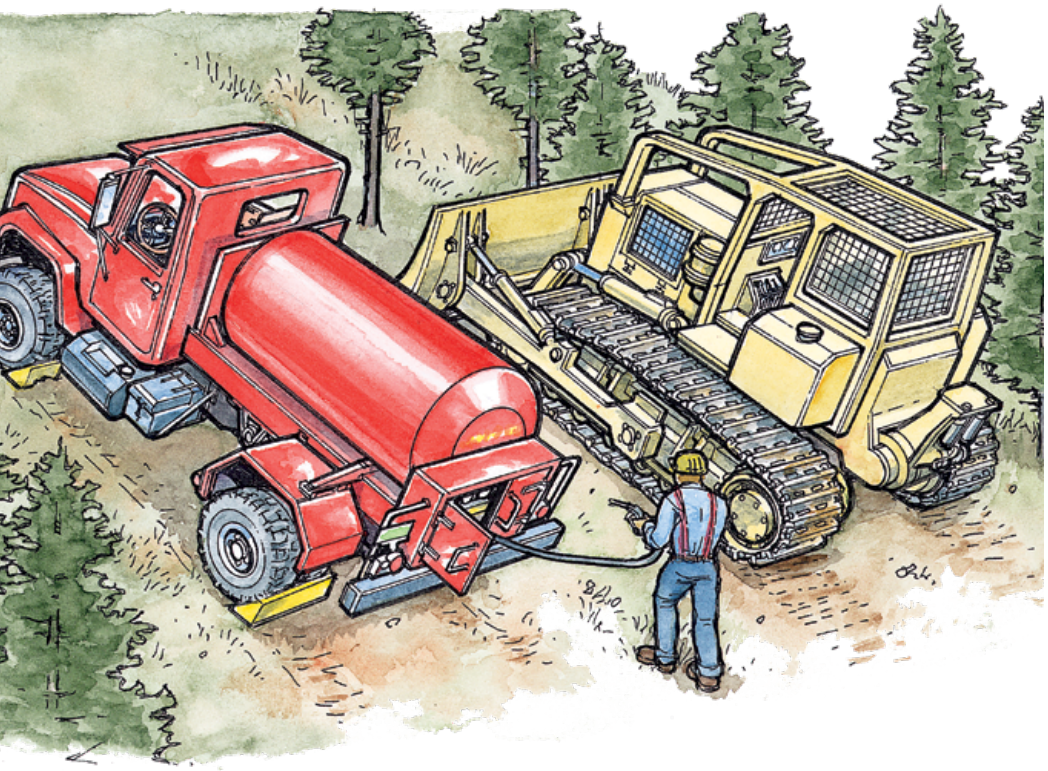
How to manage for minimizing risk of leaks and spills through voluntary prevention?

Forest landowners and contractors often employ voluntary means to assure that there is small likelihood of an operational petroleum discharge occurring, or escaping into waters. Common non-regulatory preventative actions might include:

- Minimize exposure to spills through effective storage, transport, equipment maintenance and housekeeping practices.
- Prepare a company spill plan that identifies prevention and response actions.
- Equip each job-site and vehicle with a spill kit, which includes spill absorbents and response instructions.
- Train supervisors and crew about petroleum spill prevention and response.

What are some "best practices" for preventing spills and unwanted discharges?

- "Good job site housekeeping"– Remove and dispose of used containers and other waste; regularly inspect the job site for risky materials and situations; store fluids in rigid, properly labeled containers.
- Proper handling and storage – Securely store fuel and other chemicals; refuel equipment and transfer petroleum/chemicals in locations where spills/discharges cannot enter water.
- Preventative maintenance – Inspect heavy equipment for leaks; secure equipment to avoid damage and leakage; perform needed maintenance to prevent leaks/discharges; drain engine oil changes into a container; remove used fluids from the forest for proper disposal or recycling.



To avoid fuel truck leaks, chock the wheels. Transfer fuel where a leak cannot deliver into a stream or wetland. Be sure brake and transmission service is current. Fuel truck drivers need a commercial driver's license and a hazardous materials transport license.

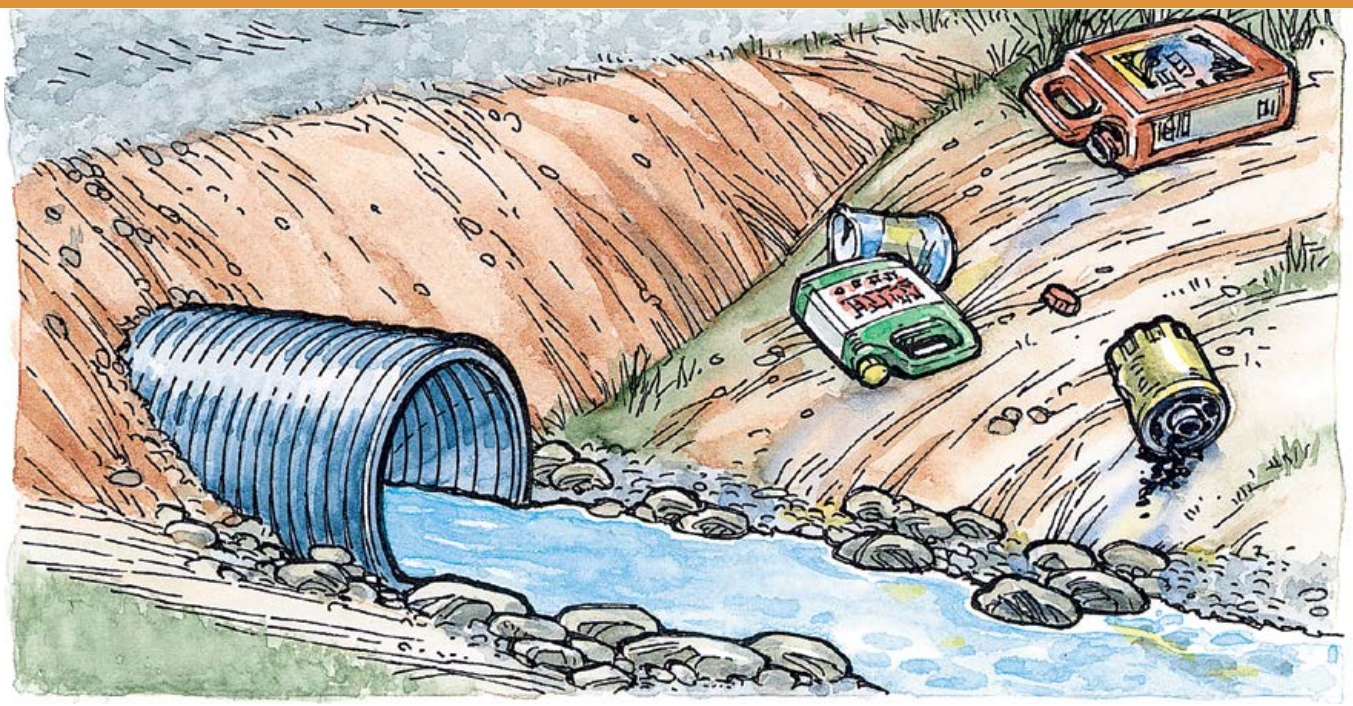
What are some ways to be ready to handle a spill or unwanted discharge?

- Planning – Plan how to deal with a discharge or spill, including the responsible person(s) and how to evaluate the discharge, deploy containment measures, respond to the discharge volume/type, and handle communications and recordkeeping.
- Spill kits – Provide spill response kits on the job-site; kits contain absorbent supplies (pads, socks, booms) to be used for immediate spill containment, cleanup and communication.
- Employee training – Provide for supervisor and key employee training and information for proper spill prevention, planning and responses.

What about disposal of wastes from petroleum and other chemical products?

- Remove from the forest all petroleum product waste, including crankcase oil, filters, used hydraulic oil, grease and oil containers.
- Absorbent supplies (rags, pads, socks, booms) that were used to clean up petroleum leaks should be placed in plastic bags and removed from the forest to an approved waste disposal site.
- Properly dispose of all other mechanical debris — such as machine parts, old wire rope and used tractor tracks — so it doesn't enter state waters.

For other information sources, see the Appendix, pages 197-198.



Never dispose of used motor oil or containers in a pit or near water.

Know all the requirements and who to contact

In addition to the forest practice rules and related ODF administration, landowners and operators who use petroleum products and other chemicals need to know that other requirements and agency oversight may apply. Forest operations involving such products may also be subject to:

- pesticide control laws administered by the Oregon Dept. of Agriculture [see the next section, "Using chemicals"]
- hazardous waste laws administered by the Oregon Dept. of Environmental Quality
- hazard communication rules administered by the Oregon Occupational Safety and Health Division
- water use laws administered by the Oregon Water Resources Dept.

For example, using water from streams or other surface waters to mix pesticides requires prior notice to both the Oregon Water Resources Dept. and the Oregon Dept. of Fish and Wildlife. Notifying ODF of the operation does not satisfy this requirement, but you can send copies of the original ODF operations notification to the other agencies. These must be sent to the other agencies' local offices at least 15 days before the operation begins.

What "other petroleum products" are included in the requirements?

Other petroleum products include fuel, motor oil and hydraulic fluid.

Take precautions to prevent leaks or spills of other petroleum products from entering waters of the state.

Common sources of other petroleum product contamination include:

- vehicle fuel tanks
- fuel supply trucks
- waste oil storage containers
- service lubricant supplies
- diesel used for pesticide mixtures

What are the waste disposal requirements?

Remove from the forest all petroleum product waste including crankcase oil, filters, grease and oil containers.

Dispose of all other debris (e.g., machine parts, old wire rope, used tractor tracks) so it doesn't enter waters of the state.

For other information sources, see the Appendix, pages 197-198.

Using chemicals to control vegetation and pests

Various chemicals, including pesticides and fertilizers, are used to protect and grow healthy and productive forests. If not handled and used properly, including following directions on the product label, these materials can be a health hazard for people and aquatic life. This section describes the requirements for using these products.



Hand-operated backpack sprayers and mechanized ground equipment are widely used.

What are pest control chemicals?

Pest control chemicals are called pesticides, of which there are several broad classes. All are used in the forest, some more than others.

- Herbicides are chemicals used to control plants.
- Insecticides are chemicals used to control insects.
- Rodenticides are chemicals used to control rodents.
- Fungicides are chemicals used to control fungi.

Petroleum products were discussed in the previous section – note that some also are used with pest control chemicals.

- Oils are sometimes mixed with and used as carriers for pesticides.
- "Adjuvants" are mixed with pesticides to control drift and help chemicals adhere to foliage.

Operators are encouraged to use integrated pest management (IPM) strategies. In this approach to pest and vegetation control, chemicals are just one of a variety of pest control methods.

Why are herbicides used on forest lands?

Herbicides are among the most common chemicals used in forestry, although normally they are used only during a few years in the life of a forest. Herbicides control the growth of weeds and other unwanted plants while a new forest is being planted and established. These plants compete with tree seedlings for water, sunlight, space and nutrients. Both biologically and economically, herbicides are often the most effective means of controlling competing vegetation.

What are requirements meant to do?

Pest control requirements ensure that:

- these products are not found in soil, air or water in quantities that could damage water quality, animals or aquatic life
- plants in RMAs and sensitive resource sites are protected



On larger forest ownerships, helicopters are a cost-effective method for applying herbicides.

What about the requirements of other government agencies?

It is not enough to follow forest practices requirements. Chemicals and other petroleum products used on forestlands are also subject to:

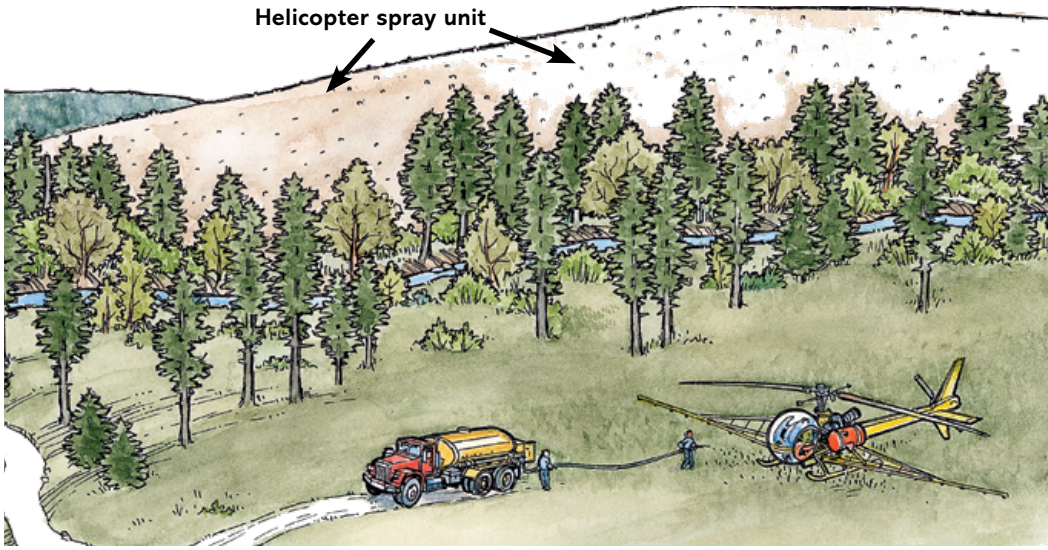
- Oregon Dept. of Agriculture pesticide control laws:
  - Commercial operators must be trained and licensed.
  - Operators must understand and follow product label requirements.
  - Operators must not apply pesticides in a faulty or negligent fashion. This means pesticides must not drift from the target area and must not harm people, their property or the environment.

The Pesticide Use Reporting System has been developed to report pesticide use locations, chemicals, amounts and purposes. Contact ODA or see its website for current requirements.

- Oregon Dept. of Environmental Quality hazardous waste laws:
  - Operators must dispose of containers and other chemical waste properly and report and clean up spills.
- Oregon Occupational Safety and Health Division hazard communication rules.
  - Operators must know and follow chemical handling requirements.
- Water Resources Dept. water use laws:
  - Operators must notify WRD and the Oregon Department of Fish and Wildlife before mixing chemicals with water taken from streams and lakes.

Notify local WRD and ODFW offices by sending copies of the original Notifications of Operation forms when those are turned in to ODF.

Any agency website can be found through www.oregon.gov.



Care must be taken when mixing chemicals, transferring chemicals from containers to equipment, fueling aircraft or heavy equipment, cleaning tanks or equipment, or locating landing/staging areas for aircraft or equipment.

Is planning ahead important?

Yes. That's because:

- No waivers are granted for the 15-day waiting period for aerial chemical application operations.
- Written plans are required for any chemical application within 100 feet of a Type F, SSBT or D stream or within 300 feet of a specified resource site (wetlands, special bird nesting sites, etc.).
- Operators must notify community water-system managers at least 15 days before applying chemicals near Type F, SSBT or D streams used by such water systems (details below).
- Aerial chemical spray operators must adhere to required unsprayed buffer distance of 60 fee (horizontally) from dwellings and school campuses.

How should areas for chemical mixing, transfer and helicopter staging be located?

- Locate these activities only where a spill would not enter waters of the state.
- Do not locate mixing, transfer and aerial staging areas within 100 feet of Type F, SSBT or D streams.
- Protect waters of the state and other forest resources by following chemical product labels.
- Maintain the vegetation left in compliance with the water protection requirements.



Spill kits are used to contain hazardous materials.

How are leaks handled?

- Maintain all equipment in a leak-proof condition during transport, on-site storage and application.
- If leaks occur, stop using equipment until corrected.
- Take immediate action to stop and contain leaks or spills.
- Take precautions to prevent leaks or spills from entering waters of the state.
- Report to ODF immediately any spill that enters or may enter waters of the state.
- Any spill of more than 42 gallons of petroleum or 25 gallons (or about 200 pounds of a liquid or solid) of pesticide should be reported to the Oregon Emergency Response Center at 800-452-0311. Also report to the Center spills of any amount that reach streams or other waters.

What are the required practices and safe distances when mixing and applying chemicals near water?

When using water from a stream or water impoundment for mixing chemicals, prevent chemicals from entering waters of the state by:

- providing an air gap or reservoir between the water source and mixing tank
- using pumps, suction hoses, feed hoses and check valves that are used only for water

NOTES FOR TABLE 5-1

- All distances are measured horizontally, not as slope distances.
- Direct application of chemicals is not allowed within the distances listed.
- Always comply with label requirements. If product labels require greater distances, comply with them.
- Always comply with any forest practices water protection rule that is more stringent than the label and other requirements. Written plans are required for any chemical application within 100 feet of a Type F, SSBT or D stream or within 300 feet of a specified resource site (e.g., wetlands, sensitive bird nesting sites).
- ODF may approve alternate plans for applying fungicides or non-biological insecticides.
- What is considered fertilizer? Fertilizer is plant food added to soil to increase growth, and contains 5 percent or more of nitrogen, phosphorous or potassium. Hay, straw, peat, leaf mold and animal manure are not considered fertilizer.

Table 5-1 describes the distances from water bodies (buffers) that must be maintained when chemicals are used on forestland.

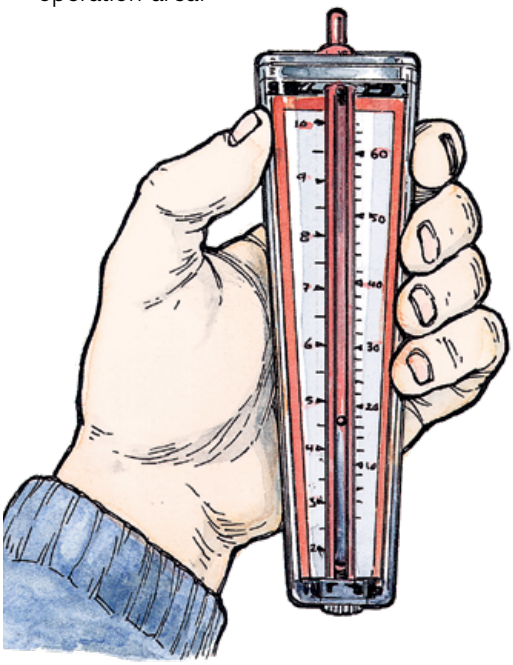
Table 5-1 Distances from Water Bodies, Inhabited Dwellings and Schools when Using Chemicals

Chemical Application Buffers Required for Waters of the State by the Chemical and Other Petroleum Products Rule	Herbicides, Rodenticides, insecticides and all other Chemicals except the next two columns		Fungicides and non-biological Insecticides		Fertilizers (See Table 5-1 Notes above)	
Application (see table notes)	Aerial	Ground	Aerial	Ground	Aerial	Ground
Aquatic areas of fish-bearing streams with no domestic use (most Type F and SSBT streams)	60 feet	10 feet	300 feet	10 feet	No direct application	No direct application
Aquatic areas of domestic-use streams with fish (all Type D and some Type F and SSBT streams)	60 feet	10 feet	300 feet	10 feet	100 feet	100 feet
Inhabited dwelling or school	60 feet	No buffer specified	No buffer specified	No buffer specified	No buffer specified	No buffer specified
Aquatic areas of other streams (Type N streams)	No buffers specified, but protect vegetation noted in Table 2-16	No buffers specified, but protect vegetation noted in Table 2-16	60 feet if flowing at time of application	No buffer specified	No direct application to large and medium streams	No direct application to large and medium streams
Significant wetlands	60 feet	10 feet	300 feet	10 feet	No direct application	No direct application
Aquatic areas of lakes larger than 8 acres	60 feet	10 feet	300 feet	10 feet	No direct application	No direct application
Aquatic areas of other lakes with fish	60 feet	10 feet	300 feet	10 feet	No direct application	No direct application
Other standing water larger than ¼ acre at time of application	60 feet	10 feet	300 feet	10 feet	No direct application	No direct application
All other waters	No buffer specified	No buffer specified	No buffer specified	No buffer specified	No buffer specified	No buffer specified

Note for Table 5-1: For aerial herbicide applications, measure the 60-foot unsprayed buffer next to inhabited dwellings from the dwelling and for schools, from the property boundary of school campuses.

What about disposal of chemical containers?

Follow DEQ requirements. The flushing solution used to clean chemical containers may be applied to the operation area.



Monitoring devices like this wind gauge, along with a wet bulb/dry bulb sling psychrometer to measure relative humidity, are handy for use in the field.

What about weather conditions?

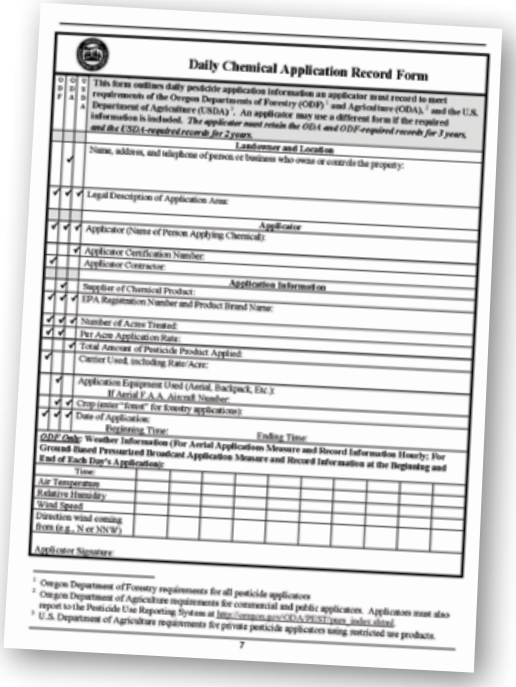
Temperature, relative humidity, wind speed, wind direction, temperature inversions and rainfall may affect the deposition and drift of pesticides during aerial and pressurized, ground-based applications. Landowners must apply chemicals only when weather conditions protect non-target forest resources, and comply with product labels.

What about keeping application records?

Daily records must be kept for broadcast chemical application (applied in a sweeping manner rather than directed at a specific target point), either by aircraft or pressurized ground equipment (backpack sprayer or motorized tank sprayer). Information required for each application day includes:

- legal description of the area treated
- acreage of the area treated
- brand name or EPA registration number of the chemical used, carrier used and application rate
- date and time of application
- air temperature, relative humidity and wind velocity and direction, measured within the operation area and recorded hourly for aerial applications, and at the beginning and end of the day for ground applications
- name of the person making the application
- name of contractor and pilot for aerial applications
- name of contractor and employee for ground-based applications

Daily records also are required for pesticide applications (e.g., hack and squirt) other than those by aircraft or pressurized ground equipment.



Daily Chemical Application Record Form

This form outlines daily pesticide application information an applicator must record to meet requirements of the Oregon Departments of Forestry (ODF)[1] and Agriculture (ODA),[2] and the U.S. Department of Agriculture (USDA)[3]. An applicator may use a different form if the required information is included. *The applicator must retain the ODA and ODF-required records for 3 years, and the USDA-required records for 2 years.*

Landowner and Location

Name, address, and telephone of person or business who owns or controls the property:

Legal Description of Application Area:

Applicator

Applicator (Name of Person Applying Chemical):

Applicator Certification Number:

Applicator Contractor:

Application Information

Supplier of Chemical Product:

EPA Registration Number and Product Brand Name:

Number of Acres Treated:

Per Acre Application Rate:

Total Amount of Pesticide Product Applied:

Carrier Used, including Rate/Acre:

Application Equipment Used (Aerial, Backpack, Etc.):

If Aerial F.A.A. Aircraft Number:

Crop (enter "forest" for forestry applications):

Date of Application:

Beginning Time: Ending Time:

ODF Only: Weather Information (For Aerial Applications Measure and Record Information Hourly; For Ground Based Pressurized Broadcast Application Measure and Record Information at the Beginning and End of Each Day's Application):

Time											
Air Temperature											
Relative Humidity											
Wind Speed											
Direction wind coming from (e.g., N or NNW)											

Applicator Signature:

[1] Oregon Department of Forestry requirements for all pesticide applicators
[2] Oregon Department of Agriculture requirements for commercial and public applicators. Applicators must also report to the Pesticide Use Reporting System at http://oregon.gov/ODA/PEST/pur_index.shtml
[3] U.S. Department of Agriculture requirements for private pesticide applicators using restricted use products.

7

Information needed for each application day includes:

- legal description of the area treated
- acreage of the area treated
- brand name or EPA registration number of the chemical used, carrier used and application rate
- date and time of the application
- name of person making the application

Fertilizer applications require the following records:

- legal description of area treated
- acreage of area treated,
- date and time of the application
- name of person making the application

All these records shall be maintained by the operator for three years from the date of application, and available at the request of ODF.

This form (pictured at left) may be used for your records and is available from ODF.

What about notification of community water system managers?

Chemical applicators shall notify water system managers of planned chemical operations at least 15 days before an operation begin when:

- chemicals will be aerially applied within 100 feet or ground-applied within 50 feet of domestic portions of Type F, SSBT or D streams
- the community water system watershed area is not larger than 100 square miles

The water system manager may request additional information.

ODF maintains a list of community water systems for which notification is required.

For other information sources, see the Appendix, pages 197-198.

ROADS AND STREAM CROSSINGS

The roads on your property need some maintenance. What do you need to know?

Maintenance of roads on forestlands is a key forest practice. Because dirt or rocked roads exist on most forest ownerships, maintenance work is a common need. Some older or heavily used roads also can benefit from improvements, including better drainage or surfacing.

Maintain active and inactive roads in a manner sufficient to both provide a stable surface and keep the drainage system operating as necessary to protect water quality.

WHAT THIS MEANS:

- Road maintenance is the landowner's responsibility.
- Landowners are required to do the maintenance necessary to protect water quality, not drivability.
- Roads should be inspected to maintain water quality protection.
- Landowners have the ability to control access on their roads through the use of gates and by vacating roads (see page 118).
- Notification of ODF is not required for routine road maintenance activities.

Definitions for forest roads:

- ACTIVE ROADS are currently being used and maintained for hauling forest products.
- Inactive roads have been used at some time since 1972. Roads used for any forest management purpose other than timber hauling are considered inactive. Inactive roads may no longer be drivable due to brush, fill washouts, etc.
- VACATED ROADS have been barricaded. They are self-maintaining and erosion is very unlikely (see page 118).
- ABANDONED ROADS constructed prior to 1972 and not used for forest management since that time are not subject to regulatory authority.
- A STABLE SURFACE is one that remains smooth so that water will not erode the surface and traffic will not lead to water running down ruts. Surfacing material does not break down under traffic, and pumping of mud up through the rock surface does not occur during use (see also durable surfacing and geotextiles later in this chapter).

Facts about roads

Fact #1

Roads are an essential part of forest management.

Fact #2

Of all the ownership features and management activities monitored on forestlands, the largest source of sediment has been roads. Road sediment can be significantly reduced with good road maintenance, improvement and construction practices.

Fact #3

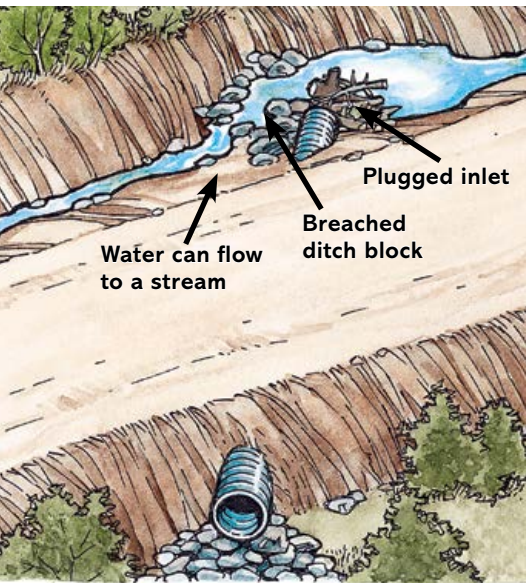
When properly located, designed, built and maintained, roads have a low potential for contributing sediment.

Fact #4

If not well-planned, constructed and maintained, roads located next to streams, on steep slopes or on unstable topography have the potential to produce sediment for a long time.



Not a major sediment problem yet, but when roads become channels for drainage, major sediment pollution can result



This undersized ditch relief culvert resulted in a breached ditch block and sediment flowing directly into the stream. Recommended: 18 inch culverts.



Watch for damaged culverts that need replacement. Repair work should be completed during dry weather.

- AN OPERATING DRAINAGE system means:
  - Water is moved across or under the road before causing erosion.
  - Locations where ditches may be blocked by slides or ravel are identified in advance.
  - Additional ditch relief culverts are added or the road surface changed (inslope, outslope, crown, see page 111) to carry water around the problem.
  - Unanticipated problems are treated as quickly as possible.
  - A functional system, such as undisturbed vegetation, is in place to filter muddy runoff so only minimal sediment enters waters of the state.

Inspect and maintain culvert inlets and outlets, drainage structures and ditches before and during the rainy season as necessary to diminish the likelihood of clogging and the possibility of washouts.

WHAT THIS MEANS:

Someone must be responsible for cleaning all drainage obstructions, including damaged portions of culverts. In-stream large woody debris and beaver dams that do not pose danger to a culvert should not be removed.

Provide effective road surface drainage, such as water bars, surface crowning, constructing sediment barriers, or outsloping, prior to the rainy and runoff seasons.

WHAT THIS MEANS:

Take action to prevent surface runoff from traveling down the road surface. For roads without ditches this means outsloping, removal of unnecessary berms and water barring. For roads with ditches this means crowning and removal of berms.



Soil sloughing off a road cut.



Poor road surface drainage caused this fill slope erosion.

The only berms that should be on the outside of roads are those essential for fill protection. They should seldom exceed 100 feet in length.

What about cut-and-fill slopes?

- In steep terrain, cutslope ravel and slides are common if soils are thick or the rock is fractured.
- Sidecast fill on steep slopes can begin to fail years after initial construction. Tell-tale signs are arc-shaped cracks along the outside edge of the road. An excavator can be used for sidecast pullback, especially if it could move into a creek.
- Debris collects in ditches, and dense vegetation may block water flow. However, light vegetation can stabilize ditches.
- Ditch inspection should be done during storm events when problems are most obvious. Watch for blockage, overflow problems and ditch downcutting.
- Don't delay in cleaning up. Move soil and debris to a location where they will not create additional erosion problems.

- Be aware that these problems may be symptoms, indicating a need for larger ditches or more culverts.
- Reduce erosion by seeding and mulching bare cut-and-fill slopes.
- Ditchline erosion may indicate a need for more or larger culverts or armoring with rock (see ditch gradients, page 112).

Haul all excess material removed by maintenance operations to safe disposal sites and stabilize these sites to prevent erosion. Avoid sidecasting in locations that might become unstable or where erosion will carry materials into a stream.



Roads receive heavy use during logging. Be aware of early signs of damage. Serious damage to road surfaces starts with excess water. Standing water is a sure sign of road-drainage problems. Ruts indicate that road strength is deteriorating.

What about road grading?

- The purpose is to maintain road surfaces – either crown, inslope or outslope (see page 111).
- Grading maintains road surface cross-drain structures.
- Grading corrects road surface damage resulting from vehicle traffic and freeze-thaw cycles that reduce drainage effectiveness.
- Timely road grading and road use restrictions during wet periods can protect drainage on unimproved roads.
- Grade road surfaces only as often as necessary to maintain a stable running surface and adequate surface drainage.



Grader damage to inside ditch toe slopes exposes an easily erodible surface and is a source of sediment.

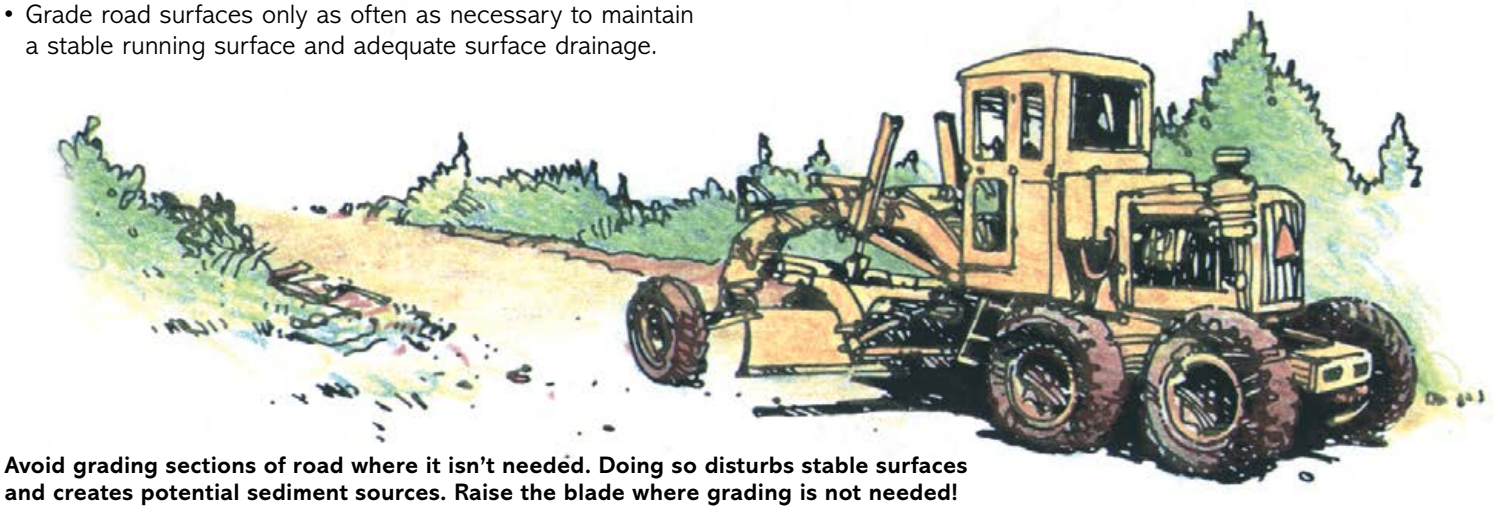


Slow, controlled grader operation is key to reducing culvert inlet and outlet damage. Reduce damage by keeping graders on the road running surface. Never sidecast gravel toward culvert inlets or outlets.

What are precautions for road grading?

- Grading should be done when roads are neither dusty nor muddy. Moist roads are more easily shaped and compacted by grading machinery.
- Watch for steep sections or curves where added wear and rutting takes place.
- Avoid cutting the toe of cut slopes when grading roads, pulling ditches or plowing snow.

When applying road oil or other surface stabilizing materials, plan and conduct the operation in a manner that prevents these materials from entering waters of the state.



Avoid grading sections of road where it isn't needed. Doing so disturbs stable surfaces and creates potential sediment sources. Raise the blade where grading is not needed!

WHAT THIS MEANS:

Waste oil is prohibited on forest roads. Other materials need to be applied so they do not enter or wash into streams, lakes and wetlands.

In the northwest and southwest Oregon regions, maintain and repair active and inactive roads as needed to minimize damage to waters of the state. This may include maintenance and repair of all portions of the road prism during and after intense winter storms, as safety, weather, soil moisture and other considerations permit.

WHAT THIS MEANS:

Landowners are required to take whatever reasonable action is necessary to prevent material from entering waters of the state. Road repair includes replacing or adding culverts, sidecast pullback and removing of debris in the road.

Place material removed from ditches in a stable location.

WHAT THIS MEANS:

Soils and debris removed from ditches during grading and/or cleaning should be placed in a location that does not cause slope instability or where it will wash back into the ditch.

Remove berms on the edges of roads or provide effective drainage through berms, except for those berms intentionally designed to protect road fills.

What do you need to know about road drainage?

Whether old or new, forest roads need effective drainage to remain functional and avoid erosion and sedimentation problems. In addition to better maintenance, road drainage improvements may be needed on roads that show such problems.

Provide a drainage system using grade reversals, surface sloping, ditches, culverts and/or water bars as necessary to control and disperse surface water to minimize erosion of the road.

WHAT THIS MEANS:

Roadway surfaces are normally crowned or sloped to remove surface water. Other key features include road grade changes, adequate ditches and ditch relief culverts that control drainage and ensure water quality.

Most landowners, at least in western Oregon, prefer to use crowned roads with ditches and cross-drain culverts.

Outsloping is most suitable for low-service roads with a gentle grade (less than 7 percent) and where rutting is prevented by more frequent smoothing (grading) of the surface.

Provide effective cross drainage on all roads, including temporary roads.

WHAT THIS MEANS:

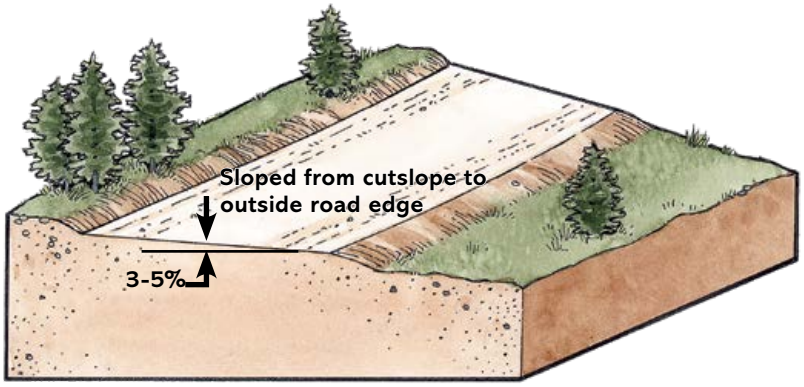
Even for temporary or inactive roads, drainage must be provided that gives the same level of water quality protection as required of active roads.

Drain uncompleted roads, which are subject to erosion.

WHAT THIS MEANS:

When work is stopped on road improvements or new construction and there is an erosion potential, cross drainage with culverts, water bars, dips or other means is required (see following pages for details).

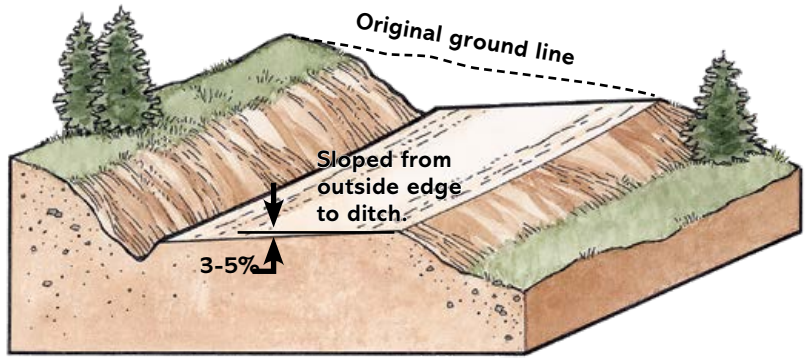
OUTSLOPE ROAD



OUTSLOPE ROAD IS USED WHEN:

- the road grade is gentle or flat (≤7 percent)
- the ditch or cutslope is unstable
- the surface can be kept smooth
- a road is vacated
- rutting can be controlled
- road use is seasonal and traffic is light

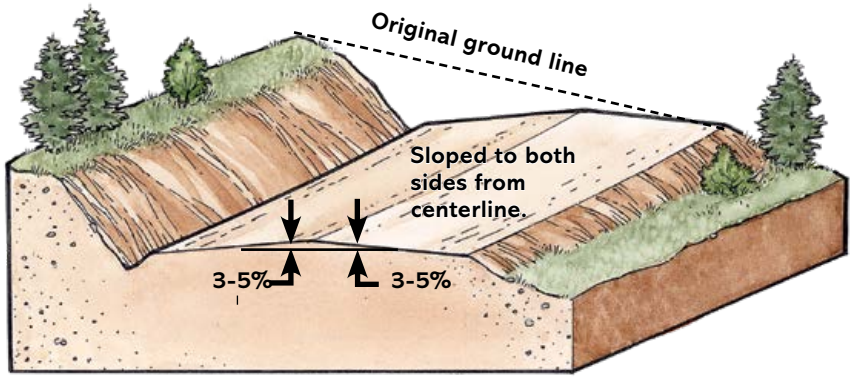
INSLOPE ROADS



INSLOPE ROAD IS USED WHEN:

- the road grade is steep (>7 percent)
- surface drainage is carried to a ditch or surface drain
- an outslope causes fill erosion
- an outslope is ineffective due to ruts
- slippery or icy road conditions are prevalent

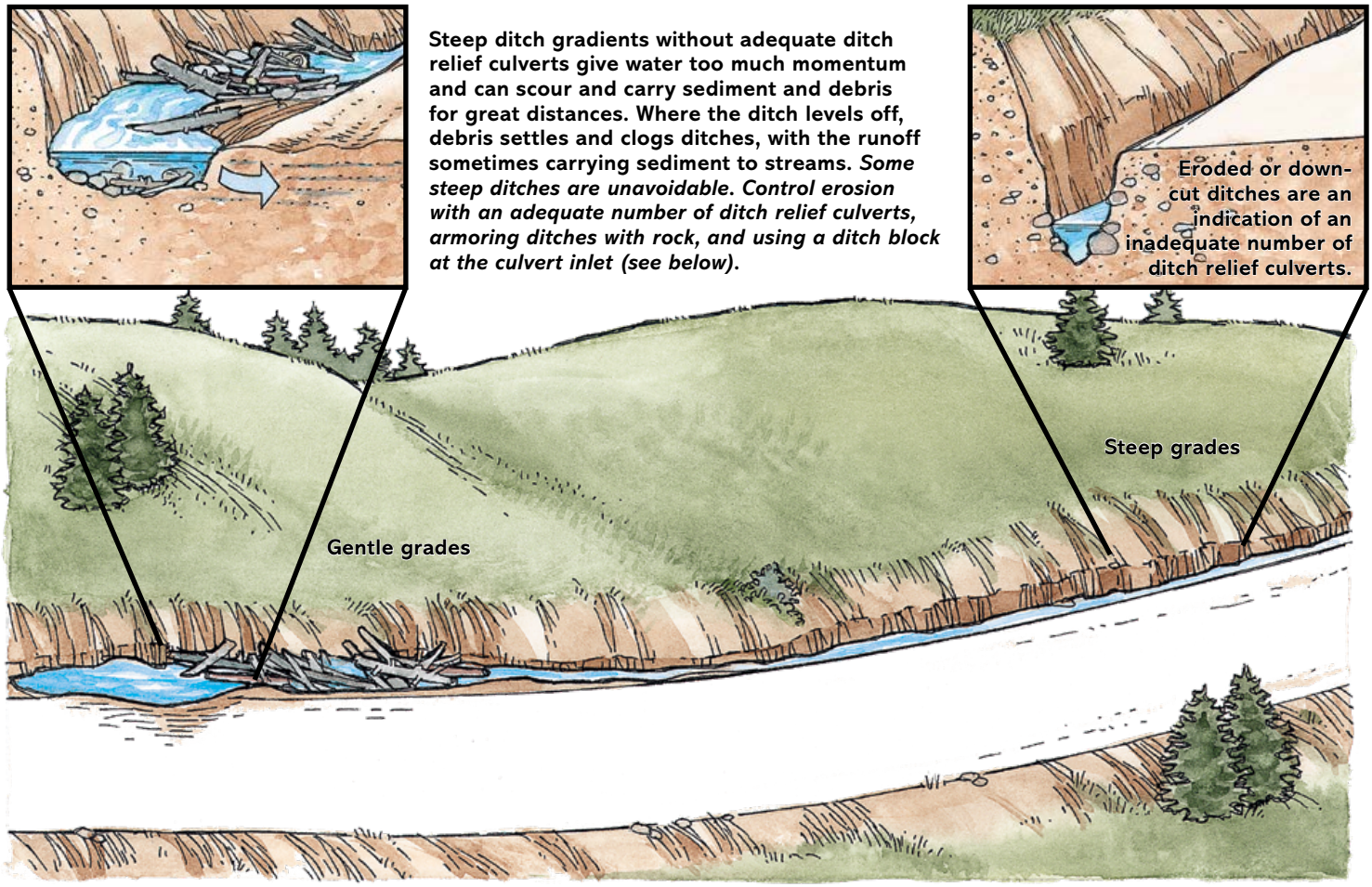
CROWN ROADS

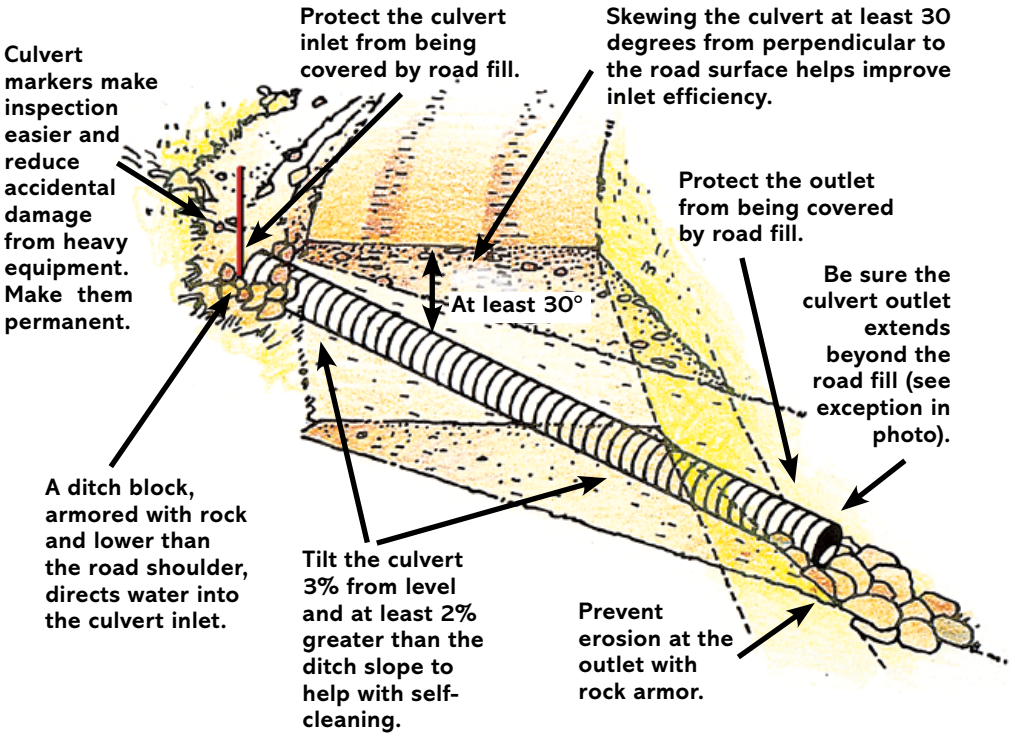


CROWN ROAD IS USED WHEN:

- two traffic lanes are needed
- there is a single lane on steep grade
- regular maintenance of ditches, crown and cross drains is possible
- slippery or icy road conditions are prevalent
- the road grade is flat (crown fill)

What you need to know about ditch grades: TOO STEEP OR NOT STEEP ENOUGH?





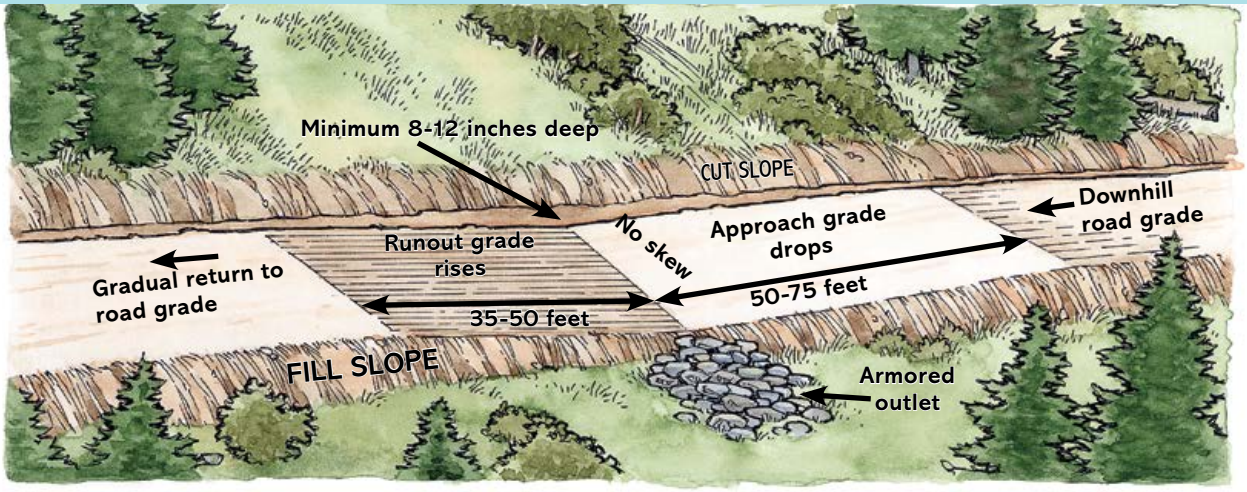
What are ditch relief culverts?

- They move water from the ditch on the uphill side of the road under the road, releasing it onto a stable area on the downhill side.
- They prevent water from crossing the road surface and softening the roadbed.

Eighteen-inch-diameter culverts are recommended where soil and debris plugging is a concern.



It may not always be possible to have the culvert extend beyond the fill. For steep fills, a half-round or flume should carry water beyond the fill.



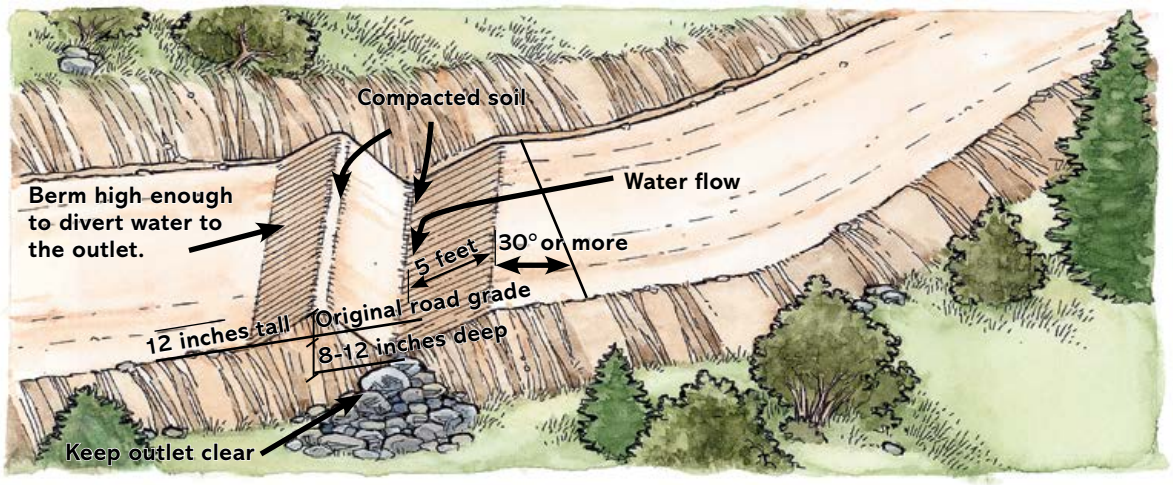
The drain dip bottom is sloped to carry water from the inside to the outside of the road surface, onto natural ground.

What are drain dips?

Gentle rolls in the road surface that are sloped to carry water to the outside, onto natural ground.

- Their approach, depth and runout features provide drainage without being a driving hazard.
- They can be used on ditched or unditched roads.
- They are effective on roads with gentle grades.
- They may be difficult to construct on steeper grades, where ditch relief culverts are preferred.
- Some dimensions and locations may be difficult for log trucks to negotiate.





What are water bars?

Small earth dams or humps built into the road surface, which divert road surface water to where it will not cause erosion.

- They are used on inactive roads and skidtrails.
- They are best constructed with mechanical equipment (better excavation and compaction), but can be built with a shovel.
- Basic spacing guidelines use soil type and slope (see Table 6-1), but other local factors such as road dimensions, aspect (compass direction the hillside faces) and climate also should be considered.

Table 6-1
Water Bar Spacing (feet) Guidelines

Slope	Erodible Soil (sand, ash, etc.)	More Stable Soil
2-5%	400	600
6-12%	200	300
13-18%	100	200
Over 19%	50	150

You are responsible for road drainage near streams.

Locate dips, water bars or cross drainage culverts above and away from stream crossings so that road drainage water is filtered before entering water.

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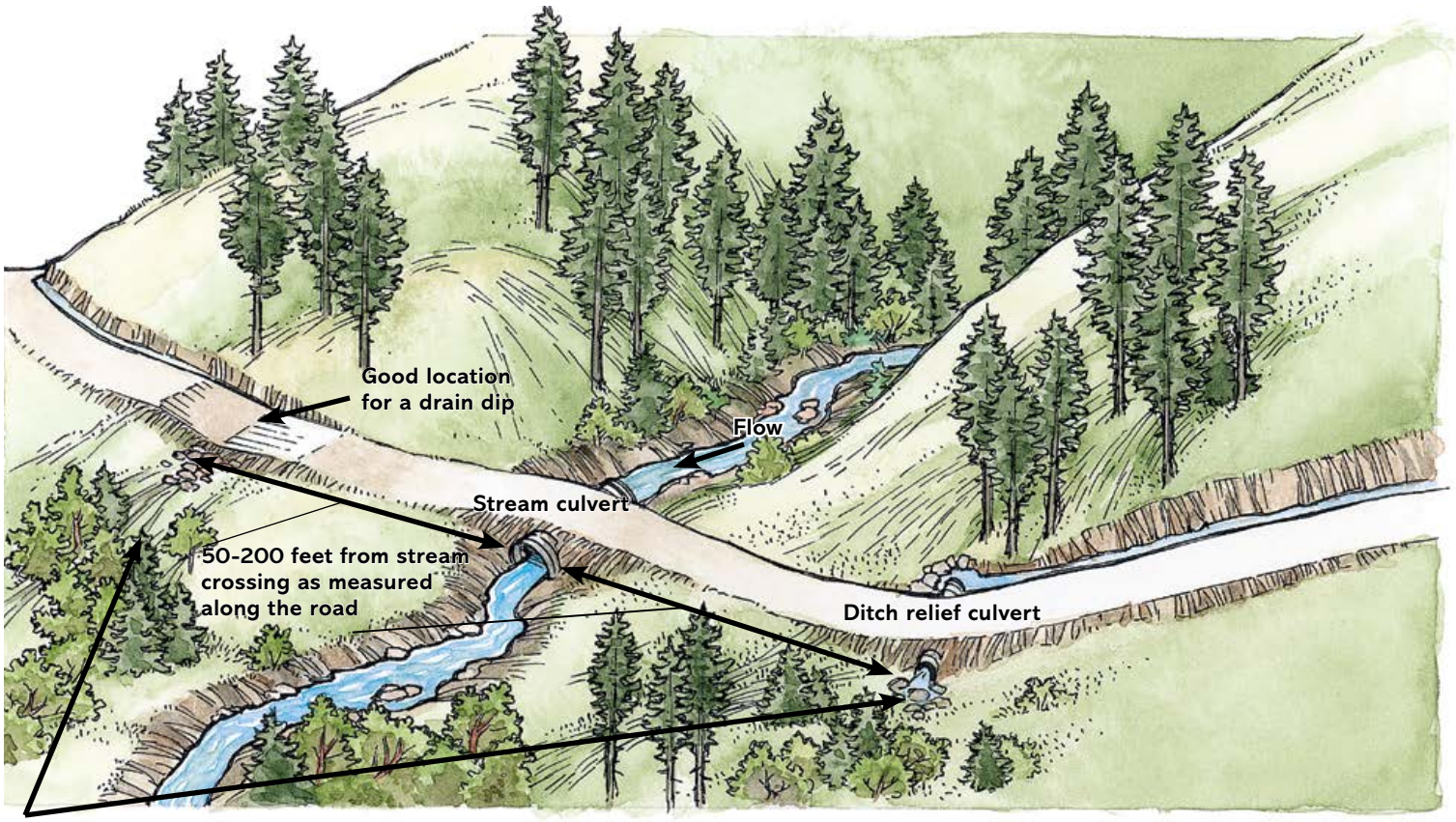
WHAT THIS MEANS:

Install dips, water bars or cross-drain culverts above and away from stream crossings so road drainage water may be filtered through ground vegetation before entering the stream.

Drainage water should be directed onto undisturbed, vegetated soil.



Route ditch drainage through a filter of vegetation and undisturbed soil so sediment can be removed before water reaches the stream.



Ditch drainage should be directed into vegetation and undisturbed soil filter, and not allowed to continue flowing down the ditch and into the stream.

Cross streams at right angles to the main channel. Road grades that drop into the stream can increase sediment in the stream. Grades that dip very gently or not at all toward the stream deliver less sediment. Never allow road ditches or ditch relief culvert drainage to flow into a stream. Culvert drainage and road ditches should always be directed through a vegetation filter before reaching the stream. Be aware of the risk of causing slope failure on steep slopes if water is concentrated into very steep areas or old landslides where water hasn't been flowing.



Hay bales or small slash windrows can reduce stream sedimentation. They slow surface water and trap sediment.





Road surfacing can double the cost of a road. However, gravel roads can provide all-weather access, reduce road maintenance costs and protect water quality by covering the soil with a weather-resistant surface.

What about springs or seeps near roads?

Provide drainage when roads cross or expose springs, seeps or wet areas.

WHAT THIS MEANS:

- This applies to all hillslope wet areas, regardless of whether they were known before construction.
- Road fill should not be placed on top of springs. In areas with high groundwater, it may be necessary to use French drains in the ditch area, or use a free-draining fill.
- Where cut slopes or road surfaces expose flowing water, roads must be graded and cross-drained to remove this water before ditch cutting occurs.

Clear channels and ditches of slash and other construction debris that can interfere with effective roadway drainage.

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WHAT THIS MEANS:

Road work and use can generate debris that can impact both natural and constructed drainages. All floatable material should be removed from ditches for a minimum of at least 25 feet above ditch relief culvert inlets.

What's needed when a road is used during wet weather?

Traffic on forest roads during wet weather can generate fine sediment that, with surface runoff, may reach and pollute streams. Durable surfacing or other effective measures are needed to avoid these problems on roads used for log hauling during wet weather. In some situations, if such pollution occurs, operators are required to cease active road use.

WHAT THIS MEANS:

Wet weather is any period when rain or snowmelt normally occurs. In western Oregon this period typically extends from October through April. In eastern Oregon, this includes wet periods from both snowmelt and individual rainstorms.

Wet-weather road use can be a source of water turbidity and fine sediment to streams from muddy runoff water. Turbidity refers to the very small, dissolved materials that remain suspended in water and prevent light from penetrating. High turbidity levels can cause stress in fish, affect fish feeding rates, impair their homing instincts and reduce growth rates. Sediment can smother fish eggs (redds) and affect aquatic insect life.

A durable surface such as rock is needed for wet weather use of road segments that drain to streams. Not just any rock will do – avoid round or weak rock. Instead, use hard, fractured rock with sharp corners, a mix of sizes and some fines (small pieces). Fractured rock packs, better and the fines help seal the surface from water, which make it resistant under heavy traffic. Sometimes adequate rock, called pit run, can be dug directly from quarries. In other cases, rock should be crushed, sized and mixed to provide the needed quality. Rock surfacing depth should be thick enough to prevent serious rutting.

It is best to use quality rock near stream crossings, because rock quality can affect water quality. Use of quality aggregate can reduce sediment and water turbidity during wet weather road use (see box on previous page).



Durable rock surface on a log hauling road during heavy rain. Notice that the water in the ditch is clean.

What is durable surfacing?

Durable material resists deep rutting or the development of a layer of mud on the road surface.

It may be quarry aggregate or pit run rock (see page 115). It does not include crushed sandstone, decomposed granite or similar material. Durable rock has a small percentage of fines (very small pieces). Too many fines can wash into streams (see sidebar on Page 115).

- Rock is best applied in layers. A base layer of hard, 3-to-12 inch angular rock with no fines provides for good drainage. A surface layer of hard, 3/4" and less angular rock with some fines

Where Snow and Freezing Weather Occur



Snow berm breaks allow for drainage during snowmelt without damaging the road surface. They also serve as escape corridors for wildlife.



During snowmelt periods, water is directed through the snow berm break.

WHAT'S THE GOAL?

Ensuring that the road surface is well-frozen or otherwise stable during use, and that it will drain properly during thaw periods. This helps protect both the road and water quality.

REASONS FOR SNOW PLOWING:

- It enhances deep-freezing of the road surface.
- It keeps water off the road during melt periods.

WHEN PLOWING SNOW, TAKE CARE WITH SNOW BERMS:

- Provide breaks in snow berms to allow for road drainage.
- Locate breaks above a vegetated filter area and away from streams.
- Locate breaks away from steep fills, headwalls or landslide areas.
- Near streams, plow a snow berm along the road edge to keep runoff from flowing directly the into stream.

BE PREPARED TO SUSPEND ROAD USE:

- when thawing occurs and traffic damages the road surface
- at the sign of surface rutting
- when there is potential for road runoff to reach streams

to provide cohesion and stability. Rock must be thick enough to prevent pumping of mud up through the rock. Geotextiles can minimize pumping and reduce the need for a thick rock layer (see below).

- Even durable surfacing may develop ruts that channel runoff and sediment, requiring grading or resurfacing.

Under what conditions must road use cease?

Operators must cease active road use where runoff from a deeply rutted or muddy surface causes a visible increase in turbidity of a Type F, SSBT or D stream. There is also cause for concern when such an increase in turbidity is seen in a Type N stream, as this could reflect inadequate road maintenance or eventually result in sediment reaching a Type F, SSBT or D stream.



Geotextiles are used to reinforce subgrades by spreading the load across a larger area. This reduces the chance of settling and failure. It also allows road construction across wet areas, reducing the need to remove unsuitable roadbed material.

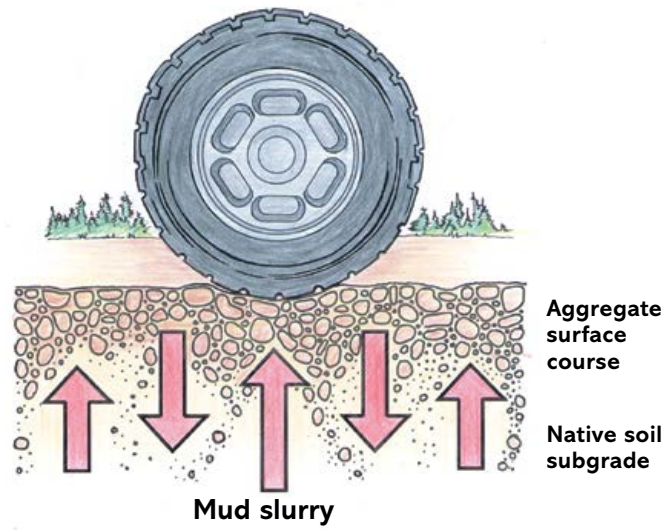
What are geotextiles and what are their uses?

Geotextiles are synthetic, permeable fabrics used to reduce rutting, stabilize the ground and increase the load-carrying capacity of both paved and unpaved roads.

They are used to separate rock surfacing materials from subgrade soils while allowing for water passage.

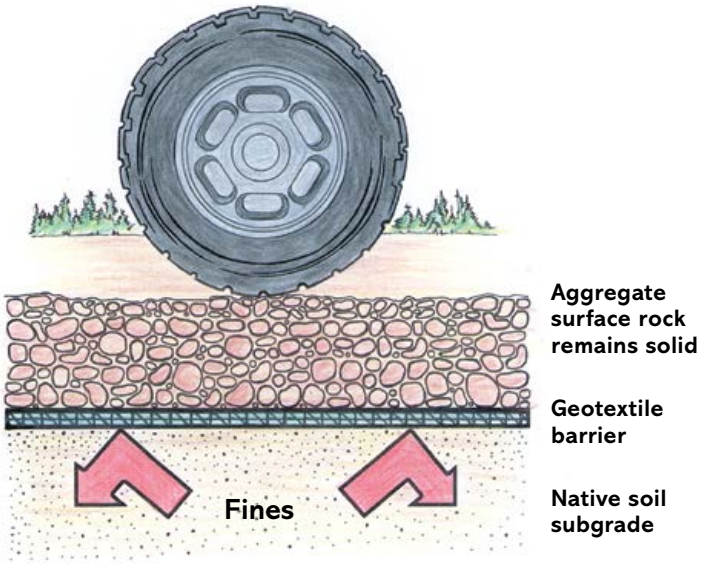
Geotextiles can reduce the amount of rock surfacing needed and reduce overall road costs.

Geotextiles can keep weak or wet subgrade soils from moving into the road base rock layer, reducing its weight-carrying effectiveness.



ROADWAY WITHOUT GEOTEXTILE

Mud slurry mixes with surface aggregate. Mud may pump up through the rock surface.



ROADWAY WITH GEOTEXTILE

Fines are stopped by geotextile.

What about road closures?

Forest roads remain part of the landscape long after harvest, site preparation and reforestation are completed. If access is not needed after successful reforestation, roads may be closed temporarily or permanently, or vacated. A plan for road closure should always consider local wildlife suppression concerns.

Temporary road closure is easiest. Permanent closure, or vacating a road, involves specific actions described below.

Consider gates, barricades or signs to limit use of roads during wet periods. Such barriers also can be effective for reducing the chance of human-caused fires, vandalism and other illegal activities. Develop a plan for allowing timely access to emergency responders (e.g., ODF, sheriff).

How are temporary road closures used?

During wet periods, if road use is likely to damage the road drainage structures. Temporary closures also are useful when roads are not needed for extended periods.

Upon completion of an operation, ensure that drainage structures are fully functional. The road surface should be crowned, outsloped, insloped or water-barred. Remove berms from the outside edge where runoff is channeled.

How do you vacate a road?

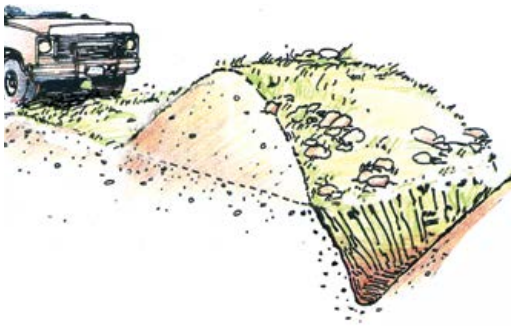
Road vacating is the unbuilding or dismantling of a road to provide a stable, revegetated condition. Vacating a road is more than just blocking the road from traffic. It can solve costly road maintenance requirements, but it requires the most preparation.

Vacated roads must provide adequate drainage and stability without further maintenance, which requires measures such as traffic barriers, frequent cross ditches, and scarification and/or seeding of exposed soils.

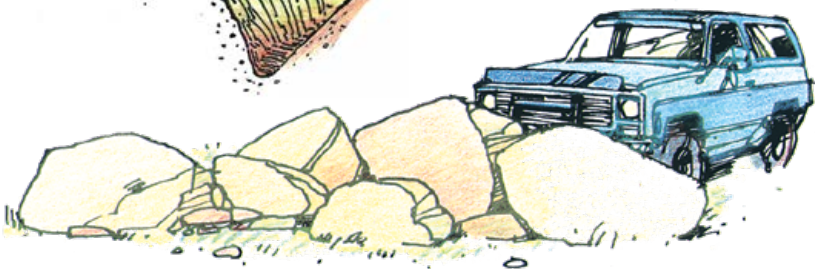


Traffic control is an effective way to reduce road maintenance costs and provide protection of other forest resources. Traffic control can include full road closure, temporary or seasonal closure, or road restricted to only light use. Whichever traffic control option is selected, all require regular maintenance inspections.

Alternatives to gates include large berms or trenches, logs, stumps or large boulders. Never use a suspended cable to block a road, as it can be difficult to see and may seriously injure an unsuspecting visitor. Liability in such cases lies with the landowner, even if signs are displayed.



A tank trap must be deep enough and in a location where vehicles cannot go around. Warning signs for the trap should be displayed well in advance, preferably at a turnaround area.



It may be necessary to physically block road access. Gates provide temporary closure along with quick access if needed. To prevent vandalism, gates and other barriers must be well anchored.





When vacating a road, removal of all stream crossing culverts and associated fill material is required. Non-drivable water bars (cross-ditches) should be installed to drain the road surface. Space water bars more closely, because with time they may fill with sediment.

Remove all steep sidecast fill. Place removed fill and debris away from streams and off steep slopes or old slide areas.

Restore all stream crossings to a stable, self-maintaining condition. This includes reseeding both the road surface and cut-and-fill slopes.

When should vacating a road be considered?

Long-term needs for access should be carefully considered before vacating a road, because the costs of reconstruction can be substantial. However, it may be desirable to vacate a road:

- when the road no longer serves a useful purpose
- when there's a need to eliminate or discourage access
- when you need to reduce erosion and sedimentation from a poorly located road
- when you need to correct unstable road cuts and fills

Where is road vacating used?

It may be necessary to vacate only some road segments, such as recontouring a road junction and its initial stretch of road. Other segments may be stable and can be revegetated as is.

To vacate a forest road, landowners shall effectively block the road to prevent continued use by vehicle traffic and shall take all reasonable actions to leave the road in a condition where road-related damage to waters of the state is unlikely.



Road segment before vacating.



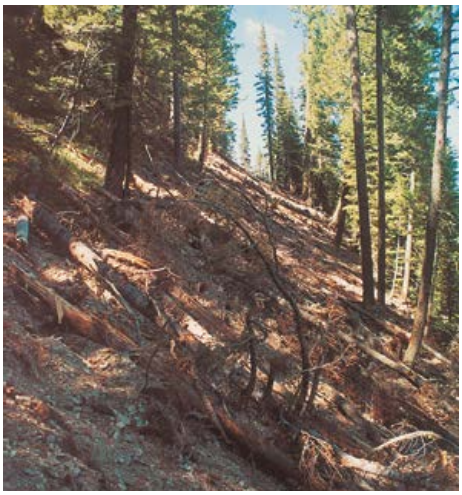
Excavator dismantling the road corridor.

What this means:

In addition to preventing traffic, culverts that might carry flow (including all stream crossing culverts) should be removed and unstable sidecast should be pulled back.

Reasonable actions to vacate a forest road may include:

- removal of stream crossing fills
- pullback of fills on steep slopes
- frequent cross ditching
- vegetative stabilization



Vacated road segment with large wood in place before reseeding the surface with grass.

What about rock pits and quarries?

Development, use and abandonment of rock pits or quarries located on forestland and used for forest management shall be conducted using practices which maintain stable slopes and protect water quality. Rock pits for non-forest management uses are regulated by the Department of Geology and Mineral Industries.

Don't locate quarry sites in channels.

When using rock pits or quarries, prevent overburden, solid wastes, or petroleum products from entering waters of the state.

Stabilize banks, headwalls, and other surfaces of quarries and rock pits to prevent surface erosion or landslides.

When a quarry or rock pit is inactive or vacated, stabilize banks, headwalls, and other surfaces and remove from the forest all petroleum-related waste material associated with the operation and dispose of all other debris so that those materials do not enter waters of the state.

For other information sources, see the Appendix, pages 197-198.

Do you need help?

A consulting forester, road engineer or geotechnical specialist could help with a difficult or complex situation. Getting such help could avoid not only a violation, but also damage to your property and road investments.

You want to build or reconstruct a forest road. What do you need to know?

When do you need a written plan before starting road construction?

A written plan is needed for road construction that involves:

- a risk of material entering water from direct placement, rolling, falling, blasting, landslide or debris flows
- conducting machine activity in Type F, SSBT or D streams, lakes or significant wetlands
- operations in an RMA
- a stream crossing with a fill more than 15 feet deep
- placement of logs or boulders in a channel for stream enhancement
- a high landslide hazard location (see page 52)

What else do you need to know about road location?

Locate roads where you can minimize the risk of materials entering water and where you can minimize disturbance to channels, lakes, wetlands and floodplains.

Avoid locating roads on steep slopes, slide areas or high landslide hazard locations (page 52) and in wetlands, RMAs, channels or floodplains if alternatives exist. Minimize the number of stream crossings.

Reduce the duplication of roads by making use of existing roads where practical. Investigate agreements to use or tie into roads on adjacent ownerships before constructing new roads.

WHAT THIS MEANS:

Your road location is very important. Roads should be avoided in certain locations. Reduce the amount of road in the following locations to the maximum extent possible:

- RMAs
- parallel and next to a stream of any size
- on a high landslide hazard location, especially when rock is fractured
- on steep, granitic slopes or other high gully hazard areas
- across the toe of old landslide deposits

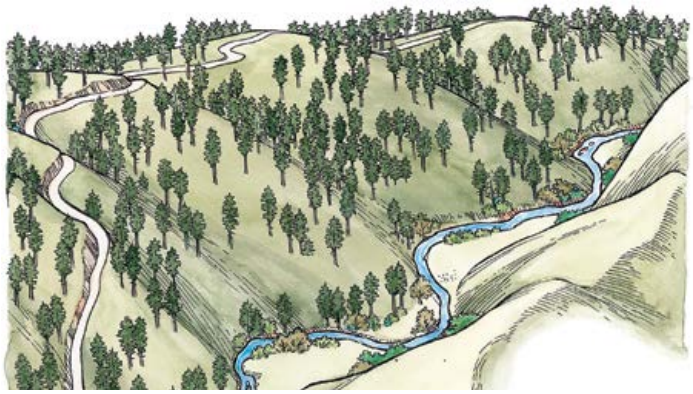
In a few locations roads cannot be constructed without causing significant impacts to streams and water quality. One example is a road constructed in the bottom of a very narrow canyon. This cannot be done without filling in part of the stream channel. Another example is some slopes that are too unstable for safe road construction. Road construction in these and other critical locations is not allowed.



UNACCEPTABLE OPTION. Roads built or reconstructed next to a stream channel with multiple crossings are not allowed. Note: Many older roads and highways are in such locations.



ACCEPTABLE OPTION, if no other alternative. Road built up on the 45 percent sideslopes. This option might be more difficult to build, but it is better.



BEST OPTION. Build road on ridge top and plan for cable harvesting.

What about road construction on steep slopes?

Rapidly moving landslides can be triggered when road fill or sidecast material is pushed or placed onto steep slopes below the road. Movement may occur with the next major storm or it may not occur for decades. For this reason, always end-haul excavated material if there is a risk of a landslide reaching a stream, a home or a paved public road (see illustrations, page 53).

Design and construct roads to limit the alteration of natural slopes and drainage patterns to those that will safely accommodate the anticipated use of the road and will protect waters of the state.

WHAT THIS MEANS:

If the road you want to build is on gentle terrain and away from streams, the design and reconnaissance is less detailed. But if the road you want to build is on steep slopes or crosses Type F or SSBT streams, the design is more complicated. You've got to know:

- how to minimize disturbing erodible slopes next to stream channels
- how to avoid damage to side channels
- how to allow for large flood flows without crossing structures washing out
- how to pass juvenile trout and salmon upstream and downstream at crossings
- how to allow fish access to side channels
- how steep grades (more than 20 percent) can create drainage, traction and safety problems; assist vehicles may be needed

Do not concentrate road drainage water into headwalls or high landslide hazard locations.

WHAT THIS MEANS:

If possible, place cross drain culverts away from high landslide hazard locations. If this is not possible, use numerous cross drain culverts to handle runoff.

Design roads no wider than necessary to accommodate anticipated use.

WHAT THIS MEANS

Narrow road widths reduce erosion, protect water quality and can reduce costs. Use the preferred width in Table 6-2 when possible. To allow for two-way traffic, turnouts are required in narrow roads in strategic and stable locations.



When constructing a full-bench road, the entire road surface is excavated in the hill. The excavated material is end-hauled, meaning the material is removed by truck to an area needing fill or to a stable disposal area.

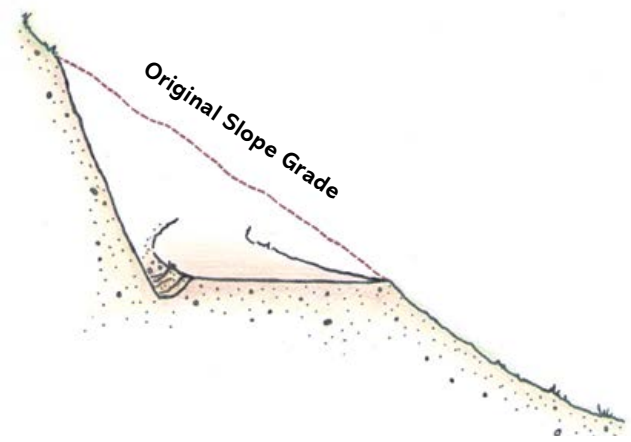


Table 6-2 General Guidelines for Road Widths

Road Use	Maximum Width	Preferred Width
Minor spur & temporary	18 feet	12 feet
Collector road	22 feet	16 feet
Mainline haul road	30 feet	24 feet

When constructing a full-bench road, the entire road surface is excavated into the hill. The excavated material is end-hauled, meaning the material is removed by truck to an area needing fill or to a stable disposal area.

Use variable grades and alignments to avoid less suitable terrain so that the road prism (its cross section) is the least disturbing to protected resources, avoids steep sidehill areas, wet areas and potentially unstable areas as safe, effective vehicle use requirements allow.

End-haul excess material from steep slopes or high landslide hazard locations.

WHAT THIS MEANS:

Roads built with sidecast construction across steep slopes can trigger landslides. If there is a risk of a landslide reaching a stream, home or paved public road, the road must be full-bench constructed and excavated material must be end-hauled.

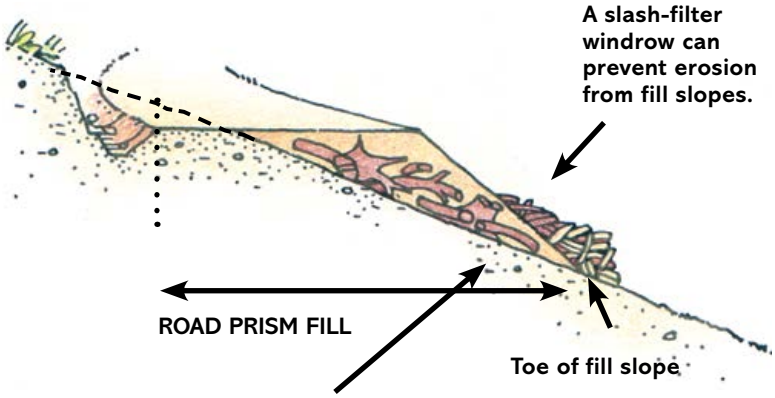
Design cut-and-fill slopes to minimize the risk of landslides.



Cut-and-fill construction is common for gentle terrain. Soil is taken from cuts and pushed or "drifted" to where fill is needed to build up flat areas or cover culverts. Never let sidecast or waste material enter streams, and never place it on unstable areas where it might erode or slide.



Slash-filter windrows are compacted logging slash, installed along the base of fill slopes during road construction. Built by excavators, these 3-by-3 foot barriers are very effective at slowing surface runoff and keeping sediment from entering streams.



Always avoid mixing stumps and other vegetative debris into the road fill. Over time, it can lead to road slumping and failure.

WHAT THIS MEANS:

Select slope angles that are unlikely to result in landslides. Consult a geotechnical specialist for roads needed in high landslide hazard locations.

Stabilize road fills as needed to prevent fill failure and later damage to waters of the state-using compaction, buttressing, subsurface drainage, rock facing or other means.

How do you dispose of road waste materials?

During road construction, don't put debris, sidecast, waste and other excess materials in locations where they may enter waters of the state during or after construction.

WHAT THIS MEANS:

Never place end-haul material, clearing and grubbing debris, or other soil or rock where it could cause slope instability or be eroded by a flood.

Select stable areas for disposal of end-haul materials. Prevent overloading areas, which may become unstable from additional material loading.

WHAT THIS MEANS:

You must submit a written plan for waste disposal areas, which have a risk of slope failure and also a risk of material from that failure entering water.

The weight of waste fill can trigger landslides, even when placed on a gentle sloping bench. Before placing waste on a midslope bench, or a slope steeper than 50 percent, consult a geotechnical specialist. Be cautious using midslope areas that already contain waste. Additional waste can lead to a landslide.

Stabilize exposed material that may be unstable or erodible by seeding, mulching, riprapping, leaving light slashing, pull-back or other means.

You want to build or improve a stream crossing. What do you need to know?

Forest roads that cross or come close to water can affect:

- water quality
- aquatic habitats
- fish migration
- stream and wetland characteristics
- riparian habitats

Stream crossing structures include culverts (both closed and bottomless arch), bridges and fords. Each is designed to allow water to pass the structure without causing erosion and provide a safe vehicle crossing.

Some crossings require a written plan for review by ODF. On Type F and SSBT streams, structure designs must allow juvenile and adult fish to migrate upstream and downstream.

What does the choice of stream crossing depend on?

STREAM SIZE: Bridges are best for streams more than 10 feet wide and those with high gradients.

WHETHER IT'S A TYPE F OR SSBT STREAM: Bottomless arch culverts and bridges protect the natural streambed with less impact on fish.

CONSTRUCTION AND MAINTENANCE COSTS: Structures ranked in order of increasing cost are:

- ford
- round culvert
- squash culvert
- bottomless arch culvert
- bridge

FUTURE YEARS OF USE: Culverts provide year-round access with a rock surface. However, a ford used once in the length of a forest rotation has less impact than a permanent stream crossing.

SOIL FOUNDATION CONDITIONS: Bedrock crossings may require bottomless arch culverts, bridges or fords.

AVAILABLE EQUIPMENT AND MATERIALS: Culvert installation can include the use of a dozer, backhoe or excavator, portable compactor, bedding gravel, armoring material, culvert outlet downspout and sediment filter.

Bridges sometimes require cranes, concrete truck access for abutments, piledrivers, and high-service-level roads for steel or pre-stressed concrete delivery.

Fords require armoring of approaches and stream bottom, and possibly geotextile and excavation equipment.

OTHER REQUIREMENTS: Some crossings, especially bridges, require qualified engineers. Hydrologic and fisheries needs may require additional consultation. Written plans and review by ODF may be needed.

Are written plans needed for road building projects across a stream or wetland, or near a lake?

Yes. Written plans must be submitted to ODF before:

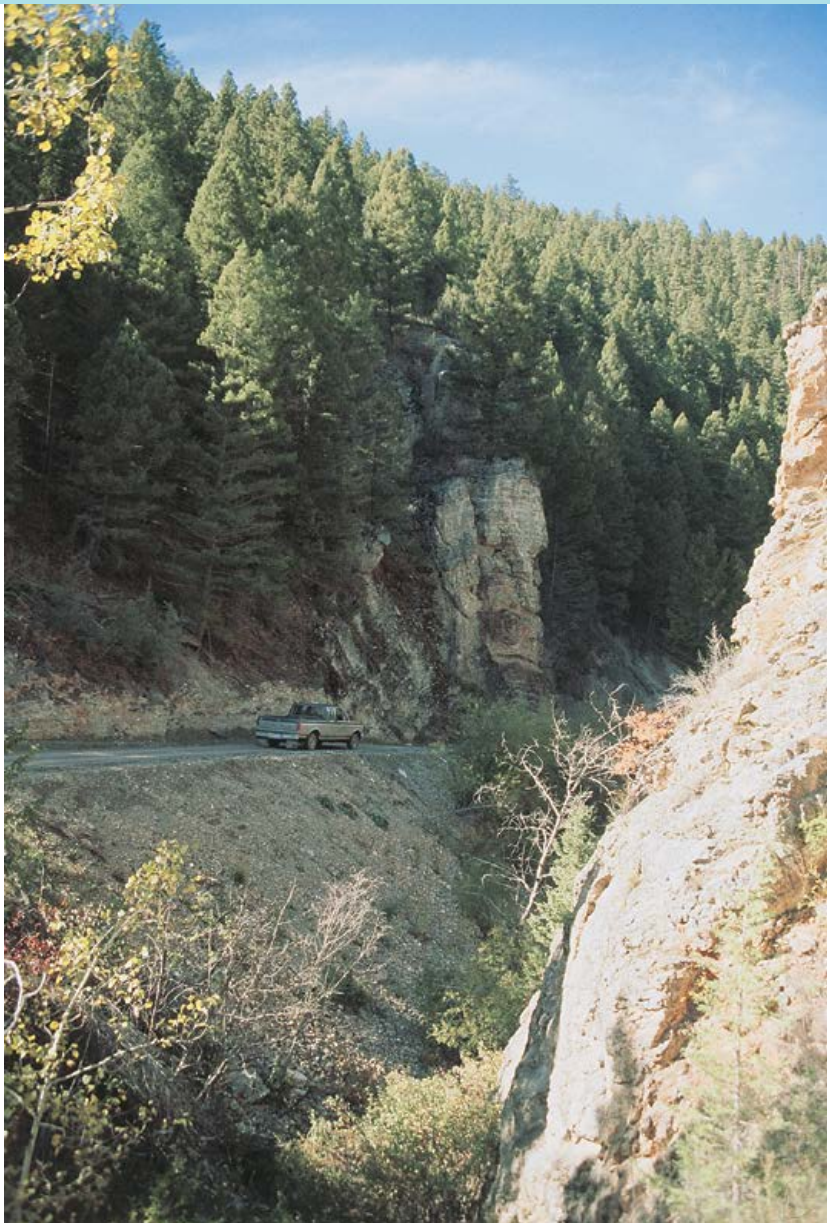
- any road construction where there is a risk of material entering a stream, lake or wetland
- road construction or reconstruction in any RMA
- conducting machine activity in Type F, SSBT or D streams, lakes or significant wetlands
- installing a stream crossing with a fill more than 15 feet deep
- placing logs or boulders in stream channels for stream enhancement

What do you need to know about stream crossings?

- They must be designed to handle 50-year peak flows.
- Crossing structures (e.g., culverts) must be passable by adult and juvenile fish for Type F and SSBT streams.
- Fish must be able to access side channels.
- The channel, any side channels and the floodplain must be protected.
- There are restrictions on the sizes of stream crossing fills.

• What is involved when locating a road near waters of the state?

- Minimize the total area disturbed by road fill.
- Minimize the excavation of stream-adjacent side slopes.
- Minimize the risk of materials entering water.
- Minimize disturbance to channels, lakes, wetlands and floodplains.
- Avoid locating roads in wetlands, RMAs or floodplains if alternatives exist.
- Minimize the number of stream crossings.



Avoid locating stream crossings in steep narrow canyons. If there is no alternative, a written plan must be submitted to ODF. Roads in these locations normally are not allowed unless there is no other way to manage the land.

Install drainage structures on flowing streams as soon as feasible.

fpa

WHAT THIS MEANS:

Install structures quickly and keep equipment out of the stream, except the minimum necessary to build the road.

Basic stream culvert installation from start to finish.



Construction of culvert stream crossings has the greatest potential to cause immediate sediment pollution. Installing culverts is more than just placing a pipe in a stream. Complete the work promptly, at a time when the least damage will occur. A portable pump can be used to carry stream water around the construction site. The channel foundation and trench walls must be free of logs, stumps, limbs or rocks that could damage the pipe.



The culvert bed must conform with the natural streambed. The bed should be either rock-free soil or gravel. Bedding should provide even distribution of the load across the length of the pipe. All stream crossings on Type F or SSBT streams must be designed to provide fish passage. (See Page 131).



Secure each end of the culvert with backfill. Pour backfill material on top of the pipe. This allows finer soil particles to flow around and under the culvert sides. Larger particles roll to the outside. Fine soil particles, close to the culvert, compact more easily. Once the ends are secured by backfill, the center of the culvert is covered.



Tamping fill material throughout the entire backfill process is important. The base and sidewall material should be compacted first. This reduces any chance of water seepage into the fill.



Armor the culvert inlet and outlet. Rocks, logs or grass seeding can be used to protect these locations against erosion. Check the area upstream and downstream from the culvert. Clear the upstream area of woody debris that might plug the culvert.



The road approach to the new culvert is the next phase of construction. Be sure that the culvert fill above the top of the pipe is at least 18 to 24 inches, to protect the pipe from damage by traffic.



Layers of fill are pushed into place and carefully compacted to build up and maintain a consistent road grade. The crossing should be rocked to minimize the risk of sediment washing off the road and into the stream.

What are other best management practices for stream culvert installation?

- Install during low flows.
- Excavate the culvert bed as quickly as possible.
- Use a temporary dam, or pump stream water around installation, if the culvert bed is silt or clay material.
- Use clean gravel for the culvert bed when needed.
- Backfill around the culvert with native soil or gravel.
- Compact the backfill.
- Cover the fill with a gravel surface.
- Seed and mulch the area.

What are the different kinds of culverts, and how are they used?

Three styles of pipes, described below, are among the most common stream crossing culverts.

The style of pipe used is based on what will provide fish passage and handle peak flow.

1. Round Culverts

Round culverts are available in metal, plastic and concrete (metal and plastic are most common). They are used for small streams.

- Galvanized metal culverts, sometimes called CMPs (corrugated metal pipes), are most common.
- Plastic culverts, sometimes called CPPs (corrugated polyethylene pipes), are a popular alternative.



Round, galvanized corrugated metal pipe sunk into the streambed to allow for fish passage.

ADVANTAGES OF CMPS

- more crush-resistant
- fire-resistant
- more easily backfilled with a variety of backfill materials
- available in different lengths and shapes
- easily transported, one inside the other

DISADVANTAGES OF CMPS

- heavy, larger sizes require mechanical placement
- difficult to cut without cutting torch or power saw

ADVANTAGES OF CPPS

- light weight, easier to transport and install
- can be cut and joined with hand saw or chainsaw
- flexibility favors its use as downspouts (see photo at right)

DISADVANTAGES OF CPPS

- susceptible to melting in a forest fire
- prone to failure if not properly backfilled and compacted
- prone to puncture if coarse material is used for backfill



Arch culvert on a low clearance road, sunk into the streambed to allow for fish passage.

2. Arch (Squash) Culverts

- Arch culverts are used for stream crossings with low road clearance.
- Their larger bottom offers fish passage advantages.
- They require less road fill.
- They are more costly than round culverts.

3. Bottomless Arch Culverts

(Pictured On Page 131)

- They are the most expensive culvert installation.
- They require a concrete or rock foundation for support.
- They leave the stream bottom undisturbed.



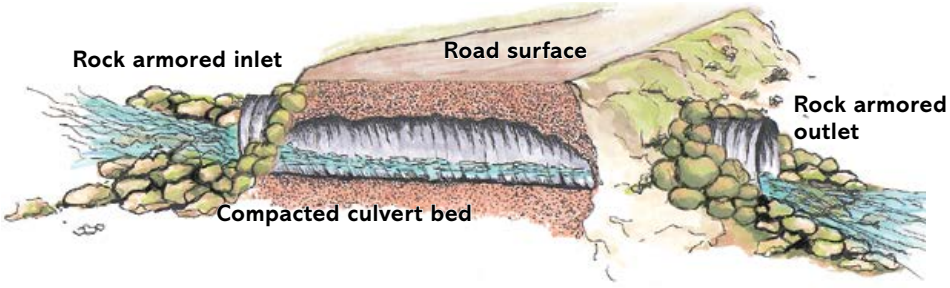
The flexibility of a plastic pipe makes it a popular alternative to a metal culvert.

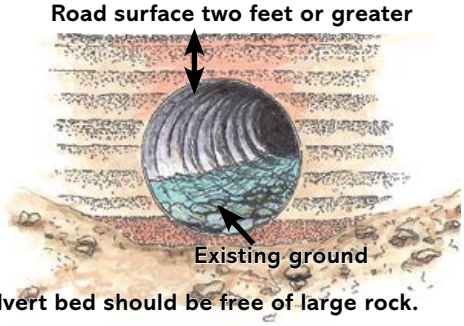
Minimize fill material by restricting the width and height of the fill to only that needed for safe vehicle use and provide adequate cover above culverts and other drainage structures

fpa

Stream culvert installation details

To provide for fish passage on Type F streams, one option is for culverts to be sunk into the streambed and embedded with streambed materials. This option is most appropriate for streams with up to an 8 percent gradient with deep valley fill. For streams with a gradient less than 2.5 percent, another option is a bare culvert placed at a zero grade (less than 0.5 percent) and sunk into the streambed a minimum of 6 inches.





Culvert bed should be free of large rock.

For an arch pipe, the culvert should be countersunk the greater of 20 percent or 18 inches. A round culvert should be countersunk the greater of 40 percent or 24 inches. This partial burial of the culvert into the streambed reduces water velocity in the culvert and allows gravel to deposit in the bottom. The effective width of the culvert should be equal to or exceed the width of the stream.

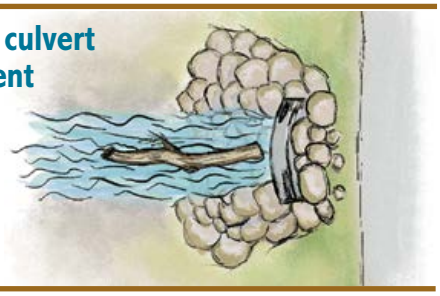
Tamp backfill material at regular intervals. Base and sidewall fill material should be compacted from finer soil particles. Fill height should extend at least 18 to 24 inches above the top of the culvert to protect the pipe from damage by traffic.

Incorrect culvert alignment

Incorrect alignment of culvert with stream results in accumulation of floating debris and eventual inlet plugging (overhead views).



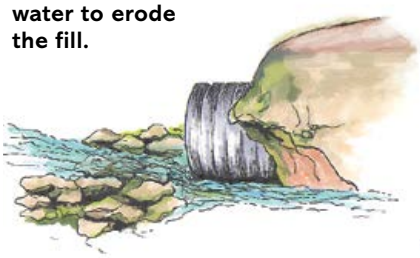
Correct culvert alignment

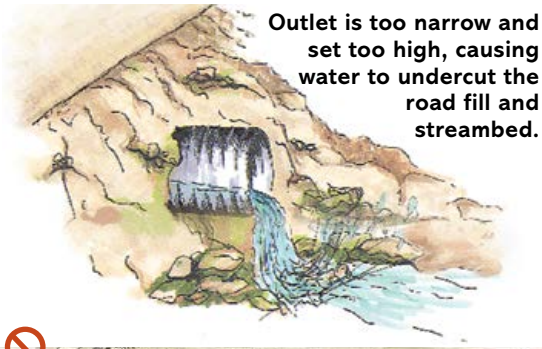


Common culvert installation problems

Culvert alignment is critical for proper culvert function. Culverts set at an angle to the channel can cause bank erosion. Skewed culverts can develop debris problems. Culvert alignment must fit the natural stream channel.

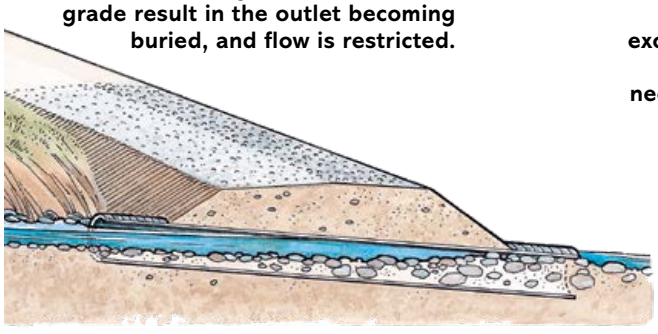
Inlet is too narrow, allowing water to erode the fill.



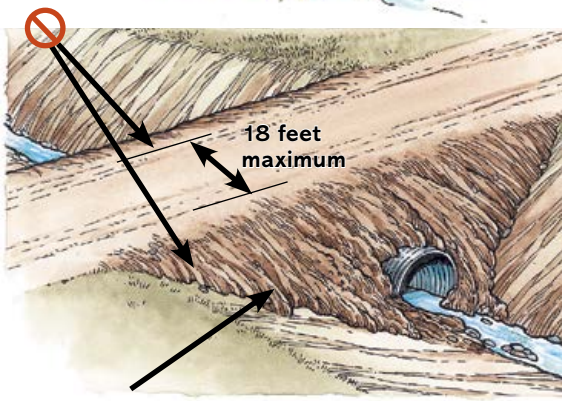


Outlet is too narrow and set too high, causing water to undercut the road fill and streambed.

Culverts installed at greater than stream grade result in the outlet becoming buried, and flow is restricted.



Never use a stream crossing to dispose of excess material. This road surface is wider than necessary and there's the risk of excess material entering the stream.



The slope of the fill slopes should be a maximum of 1½ :1. Soils unstable at such an angle (e.g., clays) should not be used.

How should you excavate side slopes near stream crossings?

Minimize excavation of side slopes near the channel.

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WHAT THIS MEANS:
(See illustration at right)

Use the minimum possible curve radius; about 50 feet for log trucks. This may make it difficult for any future lowboy traffic, which might require more gradual curves. Instead, plan that future logging equipment may have to drive to the site and not be delivered by lowboy.

What are the requirements for fills more than 15 feet deep?

Deep fills present risks if they fail and fill material is carried downstream. Written plans are required by ODF for fills more than 15 feet deep. The design of these fills must minimize surface erosion, embankment failure and downstream movement of fill material.

How do you prevent erosion of stream crossing fills?

Prevent erosion of the fill and channel.

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When stream crossing fills erode, it's likely the eroded material will enter the stream.

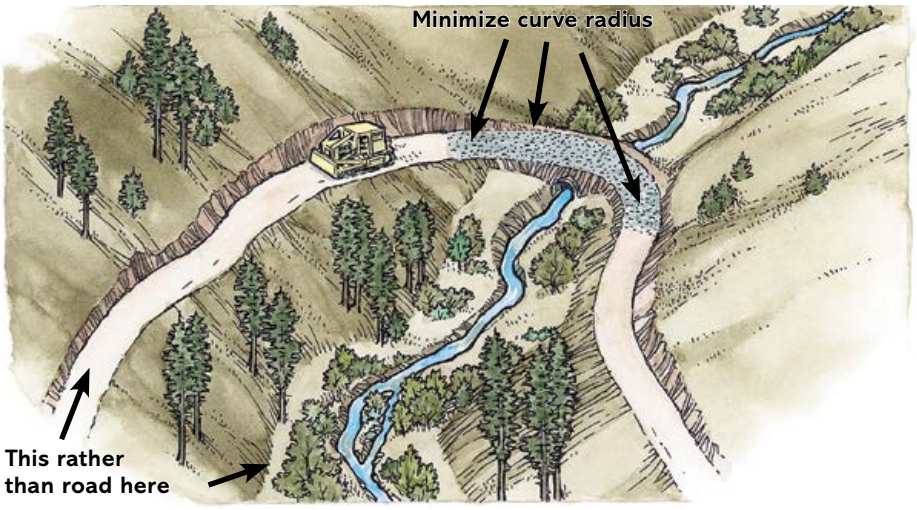
Seed and mulch fill slopes with appropriate species if germination will be successful prior to the wet season.

If not, use a non-erodible cover material such as clean gravel or riprap.

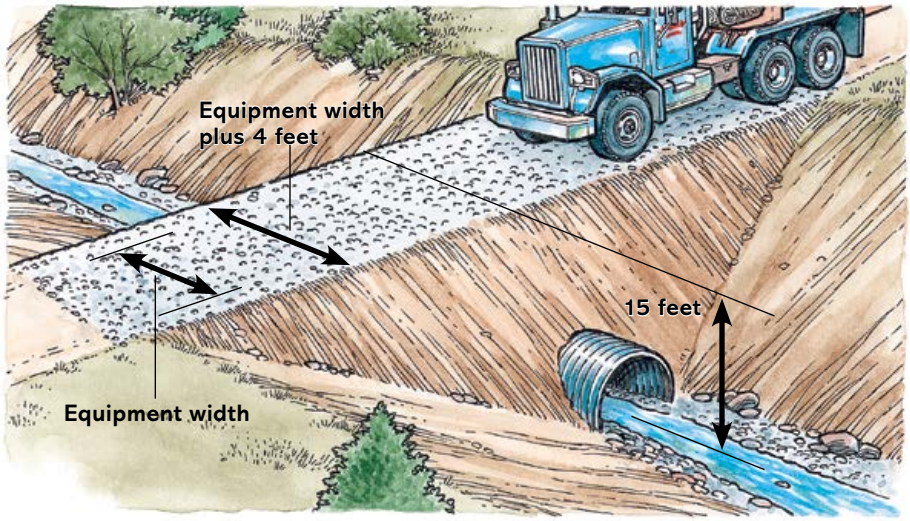
How do you avoid erosion of the stream channel below the culvert?

Install culverts that are equal to or greater than the width of the stream. This will prevent water from increasing in speed as it moves through the culvert and protect the channel below the culvert from erosion.

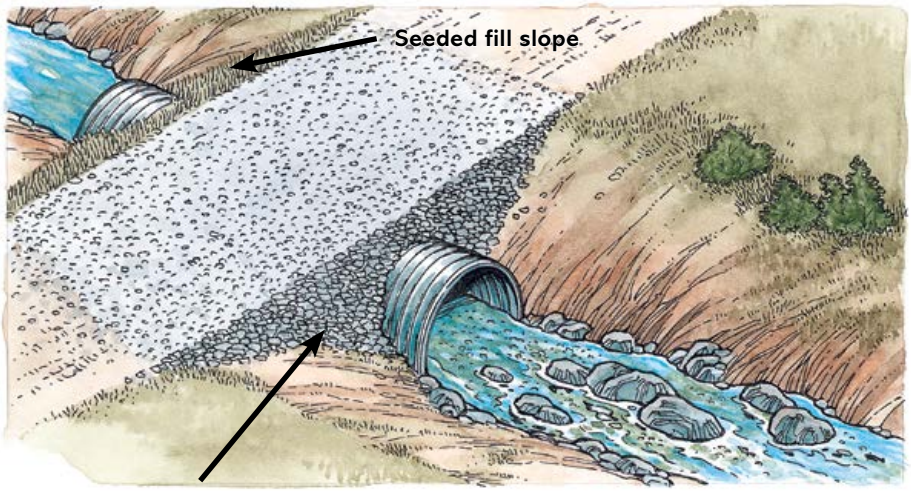
When crossing streams at right angles and where it is not necessary to place a curve in the road, the width of the fill at the top should not exceed 18 feet.



If possible, locate the road on side slopes of up to 50 percent rather than near the channel.



Where is fill depth measured? From the road running surface to the stream bottom at the downstream side.



Use gravel cover on fill slope if seeding may not be effective.

What about equipment restrictions?

Prior approval of ODF is required for machine activity in Type F, SSBT or D streams, lakes and significant wetlands.

Keep streambed machine activity to an absolute minimum.

Acceptable machine activity includes crossing the stream as necessary to construct the crossing. This activity is restricted to low flow levels.

Clear water and stable flows are indicators of low flow levels.

Do not divert water from channels except when necessary to construct stream crossings.

WHAT THIS MEANS:

Minimize stream channel disturbance and impact on aquatic life. However, sometimes it's helpful to temporarily divert stream water while constructing a stream crossing. Prior approval is needed.

What about flow requirements for stream crossings?

Stream crossings must handle heavy storm flows and also allow for fish passage. Design and construct culverts, bridges and fords to:

- pass a peak flow of at least a 50-year return interval; select a size adequate to preclude ponding of water higher than the top of the culvert
- allow migration for adult and juvenile fish upstream and downstream during conditions when fish movement in that stream normally occurs

WHAT THIS MEANS:

Design all stream crossing structures to pass the 50-year peak flow without washing out (see the Appendix, page 192).



Planning for a stream crossing must include flood calculations. When overlooked, the potential for water-quality damage is enormous. The costs of this plugged culvert road washout repair will far exceed the costs of a properly planned installation.

For Type F and SSBT streams, design all stream crossing structures to pass juvenile and adult fish upstream and downstream.

These requirements are for:

- all new road construction and reconstruction
- reconstruction of any partial or complete stream crossing washout
- replacement of any crossing structure

An exception to the 50-year peak flow requirement is allowed to reduce the height of fills where roads cross wide flood plains. The exception is allowed if all of these apply:

- The stream crossing includes a wide flood plain.
- The stream crossing structure matches the size of the active channel and is covered by the minimum fill necessary to protect the structure.
- Except for culvert cover, soil fill is not placed in the flood plain.
- The downstream edge of all fill is armored with rock of sufficient size and depth to protect the fill from eroding when a flood flow occurs.

WHAT THIS MEANS:

The intent is to reduce filling in channels and flood plains where there is a risk of major washouts.

Use this design when the flood plain at the crossing is many times the width of the active channel.

HERE'S AN EXAMPLE.

If a road is located in a wide flood plain, a very deep and wide fill may be needed for a new or replacement culvert that can handle a 50-year flow. To avoid the risks of such large fills, there is an option to use a smaller (or the existing) pipe with construction of

This vented ford is a cross between a ford and a culvert crossing. Water passes through the culvert during normal flows, but the structure can accommodate peak flows across a ford section during large storms.



an armored depression that can handle storm flows (see illustration below).

What about culverts and fish?

Fish move both upstream and downstream during different seasons to spawn, search for favorable water temperatures and find refuge or food during aquatic insect hatches. On Type F and SSBT streams, new stream crossings or any that are reconstructed or replaced must provide for upstream and downstream passage of both adult and juvenile fish.

If a culvert is used on a Type F or SSBT stream, you may be challenged to provide for adequate fish passage, especially upstream against fast-flowing waters. How the local stream features interact with pipe design, and placement must be carefully considered.

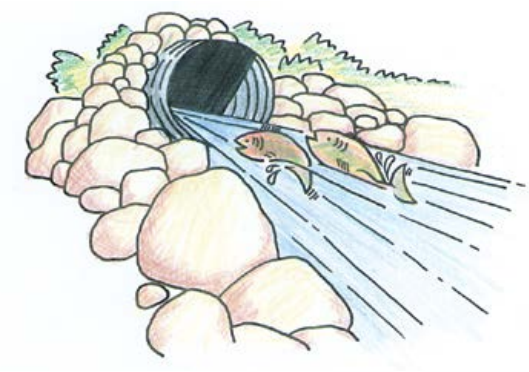
How can you make it easier for fish?

- Don't force fish to jump to enter a culvert.
- Keep culvert openings free of debris.
- Minimize culvert lengths.
- Locate culverts on a straight part of the stream.
- Set culverts below stream grade so streambed gravels can naturally accumulate in the culvert (note: A larger pipe size may be needed to accommodate a 50-year flow).

What's best for fish passage?

Each situation is unique but this is a general ranking of methods:

- re-route road (avoid/remove stream crossing)
- channel-spanning structure (long and short-span bridges; bottomless arches)
- fords (note: These are only suitable for low-traffic roads)
- streambed simulation (sunk and embedded culverts)
- bare culvert placed at a zero grade (culvert at <0.5 percent gradient and sunk for backwatering)
- hydraulic design (weir and baffle culvert designs)

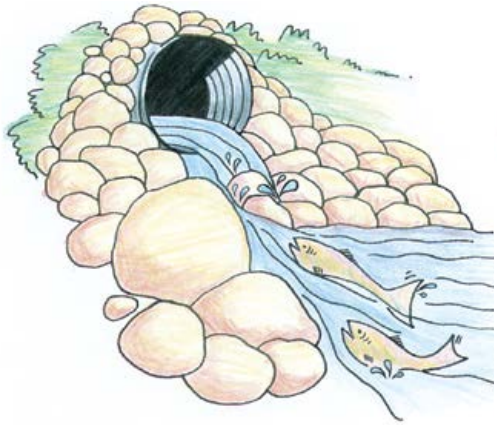


Fish may not be able to swim fast enough to overcome culvert water velocity that develops in narrow culverts that are less than the width of the stream. Rule of thumb: water moving through a bare culvert that is turbulent (uneven water surface or whitewater) is probably a fish passage barrier.



Water may be too shallow for fish to swim. This can be a problem created by bare pipes. Shallow water leaves fish only partially submerged and unable to get maximum thrust from tail and body movements.

Ensure fish movement is not impeded.



There's no pool below the inlet for fish to rest in or jump from.



Hanging culverts can be too high to jump.



Bottomless arches leave the streambed intact, making it easier for fish to pass. Natural streambed roughness creates pockets of low water velocity where fish can move more easily. Footing should be secured to bedrock to prevent the structure from failing.

Install water crossing structures where needed to maintain the flow of water and passage of adult and juvenile fish between side channels or wetlands and the main channel.

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WHAT THIS MEANS:

All road projects involving construction or reconstruction work should address local needs for water flow and fish passage. Such projects include:

- minor road relocation
- replacement of stream crossing structures
- any road widening
- clearing of a road closed by trees growing on the surface
- opening of any old road

What about crossing structures on side channels?

Young fish find protection in wetlands and side channels during high flows. Culverts or bridges, added to old roads, can reconnect these fish habitats.

In some cases relocating the road can be a more effective way to reconnect these fish habitats (see illustration at right). This can reduce the number of stream crossings needed to maintain road access.

What about fords?

A ford is a stream crossing option for low-service-level roads that are private, gated and have infrequent use. Access control is important to avoid damage to the ford approaches when they are vulnerable to damage and erosion. Fords seldom have year-round access.

Unimproved fords, except those on solid rock, are generally inadequate for truck traffic. Traffic breaks down stream gravels and mud is brought into the channel from vehicle tires.

Requirements depend on how much use the ford receives.

Where should a ford be located?

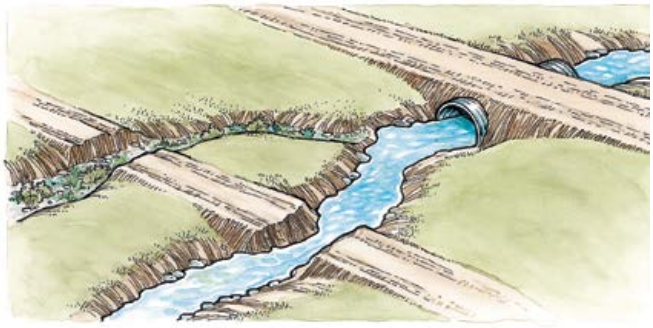
A bedrock stream bottom is ideal for a ford location. Otherwise, the bottom should be armored with suitable rock.

The size and shape of existing in-stream rock can guide the minimum size of armor rock required to resist downstream movement. It should be bigger than the common size in the stream bottom. Angular rock is preferred, because it resists movement by interlocking. Do not restrict fish passage.

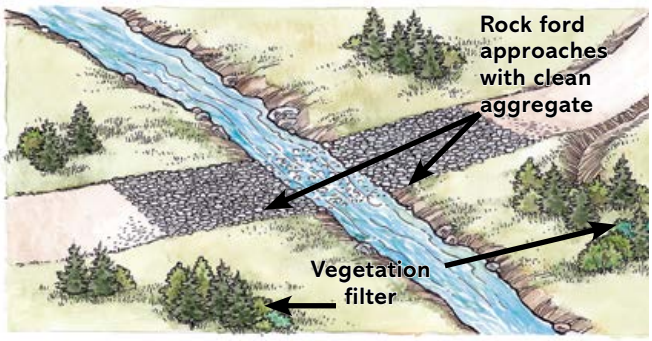
Gently sloping, stable streambank approaches are preferred. Approaches should be rocked to minimize erosion when driving in and out of the ford. Where practical, approaches should be at right angles to the stream. Approaches should dip into and out of the stream, creating a concave shape that ensures the stream cannot be diverted out of its natural channel and down the road.



Early road construction techniques often filled side channels, contributing to the failure of main channel culverts during high water.



In this example, a minor relocation of the road prism resulted in only one culvert reinstalled for road access. This reduces maintenance and allows the side channel below the new crossing to be restored to a more natural condition.



Where there is light road use, fords with rocked approaches can be good alternatives to culverts. Well-designed and located fords can greatly reduce the amount of material at risk of erosion and delivery to streams during high flows.

What about bridges and bottomless arches?

These structures are the stream crossing of choice. They require carefully constructed abutments to avoid erosion and stream damage during high flows.

Avoid mid-span piers if possible. Not only are they costly, they often cause channel scour and are difficult to stabilize.

Use riprap to protect abutment fills from erosion.



Bridges are best for large streams and those plagued with floatable debris problems. Bridges and bottomless arch culverts have the least impact on fish when installed properly.



Keep road drainage under control. Even with grass cover, runoff and sediment have flowed around this abutment and drained directly into the stream.

Are there tips for new permanent bridges?

- Bridges should be sized to accommodate stream channel width and flood risk.
- Bridges and bridge approaches should be constructed to minimize soil or other material from reaching the stream.
- Whenever possible, existing vegetation and organic material should be retained around stream crossings to control erosion. Exposed soil should be covered with slash or other protective material.
- Abutments and wingwalls should prevent material from spilling into the stream.

Consider simple bridges for small Type F and SSBT streams. They can be similar or lower in cost compared to large, complex culvert installations.

What are the advantages of temporary portable bridges?

- handy for stream crossings on temporary low-standard roads
- useful when short-term access to forestland is cut off by a stream
- quick, economical and can be installed with minimal impact
- can be re-used in different locations as needed
- can restore crossings to their original condition

For other information sources, see the Appendix, pages 197-198.



A portable bridge provides access across streams less than 10 feet wide with minimal disturbance to streambanks or bed. Select locations with firm soil banks, level grade and minimal vegetation clearing.



Along with its portability, this bridge is strong enough for all harvesting activities.



This 20-foot portable bridge was hauled into place on a flatbed truck, and set into place in one day. The bridge cribbing is 10-foot timbers laid on the ground four feet from the bank.



A small tractor built the road approaches to the bridge. Over a three-week period, the bridge carried approximately 25 truckloads of logs.



When harvest was completed, the temporary bridge was removed.

OTHER CONSIDERATIONS

Additional requirements may affect some forest operations

This manual was designed to be relatively comprehensive, but operations on forestlands can involve such a wide range of activities that some situations can have other legal requirements and responsible agencies. Here are three examples:

Pond Construction

Unless one already exists, landowners often are interested in developing a pond on their forest property for both practical uses and amenity values. On forest land, a pond can attract unique aquatic and wildlife species, and it can provide a valuable water source if a wildfire occurs.

Constructing a pond requires a permit application and approval from the Oregon Water Resources Dept. (WRD). There is a base permit application fee and an additional fee that varies with the planned size of the pond. Be aware that construction of large ponds (i.e., those with dams over 10 feet high and storage levels over 9.2 acre-feet) require approval of a more detailed and costly application that includes a design by a licensed engineer.

Pond development also requires good planning and coordination between the application process and construction work, due to the many details and time involved. Key steps and timing for the application and permitting process include:

- landowner submits application and pays base plus pond-size fees
- WRD posts a public notice of the application within 60 days
- after this posting, there is a 60-day public comment period
- WRD issues permit decision within 180 days



Ponds are an attractive and often useful feature on forest land. Their construction requires an application and permit from the Oregon Water Resources Dept.

Removal-Fill Permits

Some projects involve the removal or filling of large amounts of soil or rock in or near a water body, activities that fall outside the scope of Oregon's Forest Practices Act and Rules (FPA). In such cases where the amounts involved are much greater than normally moved during forest road and stream crossing construction, the operation requires a removal-fill permit from the Oregon Dept. of State Lands (DSL).

More specifically, a removal-fill permit typically is needed for projects involving 50 cubic yards or more of alteration of streambed, streambanks or wetlands. Moving such large quantities could be part of a major reservoir or irrigation project, or a unique construction situation (see photo below). Beyond forestland, projects located in key salmon habitat waterways or state scenic waterways require a DSL removal-fill permit for any level of alteration.

In reviewing a removal-fill permit application, DSL determines if the project is consistent with the protection, conservation and best uses of the water resources of the state. DSL also assesses whether or not the project would unreasonably interfere with navigation, fishing and public recreation. The following steps are part of this process:

- landowner submits application and pays related fee
- application processing and review can extend up to 120 days
- if acceptable, DSL issues approval of individual permit



Projects that move a lot of material in or near a stream channel or wetland, such as this stream crossing upgrade, may require a removal-fill permit from the Oregon Dept. of State Lands.

Rock Pits and Quarries

Local development, use and abandonment of quarries or rock pits/storage areas for forestland management normally follow requirements under the Forest Practices Act and Rules. However, where quarry operations on forestlands involve large quantities of commercial products sold for non-forest uses off-property, Oregon's mining regulations apply – these are administered by the Oregon Dept. of Geology and Mineral Industries (DOGAMI).

For normal forest management-related rock projects, forest practice rule requirements focus on maintaining stable slopes and protecting water quality. Operators shall not locate quarry sites in streams; they shall prevent overburden or waste from entering waters; and they shall stabilize banks and other quarry surfaces to prevent surface erosion/landslides. Quarries or rock pits that may impact resource sites that require special protection (e.g., sensitive bird nesting, roosting and watering sites) also are subject to all related forest practice rules.

Large, commercial rock quarry operations are subject to mining regulations and DOGAMI oversight. Such operations require a fee-based permit for mining activities that exceed one acre and/or 5,000 cubic yards of new disturbance in any 12-month period, unless the excavated material stays on the property. Under these fee-based permits issued by DOGAMI, reclamation also is required and a related security deposit must be made.

For other information sources, see the Appendix, pages 197-198.

Opportunities to enhance resources through voluntary measures

Oregon offers landowners a variety of voluntary opportunities to maintain or enhance the environment as forest operations are planned and conducted. The following review describes some of the available opportunities for landowners to protect or improve forest resources — encouraging unique and better ways for achieving environmental objectives, including going beyond the standards set in law or rule.

Plan for Alternate Practice

Oregon's Forest Practices Act and Rules provide landowners and operators with an option to modify specific requirements in the law and rules, if comparable or better protection of forest resources can be achieved. This approach requires a "Plan for an Alternate Practice," a document prepared by the landowner, operator or timber owner, submitted to ODF and describing the practices that differ from those specified in the applicable law or rule.

Landowners and operators who are considering alternate forest practices or methods should contact ODF early, as not only can staff provide helpful guidance, a written plan and formal approval are required before operations can begin. The written plan must describe in sufficient detail the alternate practice and how it would yield results equal or better than under the standard rule requirements. Once the written plan is approved by ODF, the alternate practice effectively becomes the rule, and all provisions of the written plan must be met.

These are examples of some situations for which approval of alternate practices with protection standards or methods different than those specified in rule or statute may be granted:

- management actions for reasons of forest health, public safety or safety hazards
- specific practices that will improve soil, water quality, fish or wildlife habitat
- to conduct needed management following a disaster, storm, pest or disease epidemic
- when required forest practices would conflict with a resource site
- to exceed the 120 acre clearcut size limit
- to modify the reforestation requirements
- to modify the retention requirements along streams, wetlands or lakes
- to convert forestland to non-forest use
- to conduct activities unique to a bona fide research project
- to modify the requirements for special resource sites (threatened fish and wildlife, sensitive birds, significant wetlands, etc.)
- to conduct any other specific practice that will result in less environmental damage than if the standard requirement were applied



In the 1960s and '70s, many forest streams were cleared of woody debris with the mistaken idea that it was good for fish. The impacts of this practice persist, and carefully planned additions of large wood are desirable in many locations.

Placing large wood and other stream habitat enhancement

Many fish-bearing (Type F or SSBT) streams in Oregon can be improved with more large wood structure and other key features that enhance spawning and rearing habitat for fish. Landowners are generally encouraged to make such improvements, and the forest practice rules provide further incentive by allowing somewhat greater timber harvest in nearby riparian management areas in exchange for stream enhancement projects that meet certain conditions.

The purpose of placing large wood in streams is to simulate additions from windthrow and other natural processes. The goal is to maintain and restore stream habitat with relatively stable features, although some reconfiguration of the wood is expected with changes in natural stream flow. Wood placement projects often are most efficient when combined with other forest operations, and such projects must meet all applicable forest practice requirements, including preparation of a written plan. Wood placement also must follow standards developed by ODF and the Oregon Dept. of Fish and Wildlife, currently found in the publication "A Guide to Placing Large Wood in Streams."

With an approved wood placement project, landowners may also qualify for basal area "credit" toward the live-tree retention requirements in the stream RMA (see Chapters 1 and 2). This can allow for harvest of more timber from the RMA; i.e., use of the "Active Management Target" for basal area retention. The specific basal area credit amount given depends on both the stream size and the size and number of logs that are placed in the stream.

Other stream enhancement projects also may qualify for basal area credit toward the RMA tree retention requirements. Such projects include creation of backwater alcoves, riparian grazing control measures (e.g., fencing) and placement of other habitat structure (e.g., boulders, rootwads) in stream channels. A written plan is required, and the basal area credit granted is negotiated between the agencies and the landowner/operator.

For both wood placement and other stream enhancement projects, it may be possible to apply the associated basal area credit to an RMA location some distance away from the project or at a later date, as long as resources are adequately protected.

Did you know?

Oregon law gives landowners general protection from liability for injury or property damage that results from trees or large woody debris left to comply with forest practice requirements. This includes approved large wood placement for habitat enhancement, which could move downstream during flood flows.

Stewardship Agreements

Stewardship agreements provide a unique approach for landowners to meet and improve upon the basic regulatory requirements for fish and wildlife habitat and water quality protection. The stewardship agreement program promotes voluntary cooperative partnerships between forest landowners and ODF, with management flexibility, assistance and other incentives for participation. The program also provides a way to more efficiently implement the FPA, as an alternative to traditional forest operations enforcement.

Landowners within the range of the northern spotted owl who wish to manage on long rotations or to create older forest conditions may be interested in seeking regulatory assurances under the northern spotted owl safe harbor program. This program is an optional component of a Stewardship Agreement. Ask your stewardship forester if you are interested.

A stewardship agreement is based on a written plan for resource conservation, which describes how the landowner will manage the property with particular attention to specific concerns for fish and wildlife habitat and soil and water resources. Unlike forest practices notifications or related written plans for individual operations, the plan developed for a stewardship agreement takes a long-term and property-wide perspective. Landowner efforts such as participation in a forest certification program (e.g., American Tree Farm, Sustainable Forestry Initiative) or a habitat conservation plan can help qualify a landowner for a stewardship agreement.

In response to the landowner's added commitment to resource protection, traditional requirements for planning, review, inspection and enforcement under the Oregon Forest Practices Act can be reduced. This benefit requires that the agreement include sufficient detail to address the general needs for operations notifications, written plans, 15-day waiting periods (except aerial chemical applications) and notices for water withdrawals or public subscriptions. Another benefit to the landowner is agency commitment to provide specific help or incentives, such as conservation program information, technical assistance and coordination with other agencies to resolve issues.

Participation in a forest certification program can help a landowner qualify for a stewardship agreement.

Before a stewardship agreement is approved, the process includes a public notice and 21-day period for comment on the proposed agreement. However, there also are provisions for protecting confidential information in the management plan. In addition, ODF access to the property is limited to reviews and audits that the landowner commits to in the agreement.

Afforestation Incentive

There are afforestation incentive rules, administered by ODF, that encourage landowners to convert parcels of idle, non-forested land suitable for forest cover to commercial forest use. The incentive is a one-time exemption from most tree retention requirements under the Oregon Forest Practices Act, which applies to the entire first rotation following afforestation of a parcel. This single, specially exempted rotation can be of any length, determined by the landowner's choice of when to harvest.

The trees exempted from most retention rules include those that are planted and also those naturally regenerated within 10 years (before or after) of when the area is certified by ODF as afforested. Harvest of these trees otherwise must follow all applicable forest practice requirements, and all trees within 20 feet of most streams also must be retained.

To qualify for the incentive, tracts must be at least 5 contiguous acres and determined by ODF to have been idle or exclusively in non-forest uses, or in an understocked condition, since July 1, 1972. Other understocked forestland also may qualify for the incentive, if the stocking was reduced or limited by causes other than a forest operation after July 1972. However, the afforestation incentive cannot be applied to any acre with 25 square feet or more of basal area.



The Oregon Plan for Salmon and Watersheds

Oregon Plan for Salmon and Watersheds

The Oregon Plan for Salmon and Watersheds seeks to restore salmon runs, improve water quality and achieve healthy watersheds and strong communities throughout the state. Adopted in 1997 by the governor's office with the support of the Legislature and broad-based interests, the plan focuses on voluntary contributions and cooperation among private landowners, government agencies and other groups and individuals. These efforts span the state and involve the forest, agriculture and business sectors in rural, suburban and urban communities.

On forest lands, habitat and watershed improvement projects fall into four general categories: improving road drainage and stream crossings; placing large wood in streams; restoring wetlands; and improving riparian vegetation. More specifically, forest landowners have cooperated in planning and implementing many types of projects, including:

- assessing forest road condition to plan for improved drainage and fish passage
- replacing old culverts with fish-passable pipes or bridges
- placing logs in streams to create pools and hiding places for young fish
- improving forest road drainage and surfacing to reduce muddy runoff
- installing fencing and water sources to keep livestock out of streams and allow riparian vegetation to recover

Landowners can receive both technical and financial assistance for such for projects by participating in the Oregon Plan. Funding for this assistance comes from Oregon Lottery funds, federal funds, and proceeds from the sale of salmon license plates, with grant administration by the Oregon Watershed Enhancement Board (OWEB). Local watershed councils, soil and water conservation districts, OSU Extension offices, ODF and other agencies provide technical assistance and help landowners apply for financial support from OWEB and other sources.

An important aspect of the Oregon Plan is the annual collection and reporting of stream and watershed enhancement accomplishments. These records show that forest landowners have conducted a majority of the stream habitat restoration projects completed since 1997 under the Oregon Plan. Between 1997 and 2016, commercial private-forest landowners contributed more than $96 million in private funds toward watershed enhancement. Hundreds of stream crossing were improved by replacing or repairing culverts where fish passage was blocked or threatened.

Assistance for Family Forest Landowners

About About 35 percent of the forestland in Oregon is privately owned, and nearly 5 million acres of that land is in individual "family forest" ownerships that are less than 5,000 acres. Because of the valuable natural resources and broad benefits these lands provide, financial and technical assistance programs exist to support family forest landowners in managing these lands and resources for important forest benefits. Most programs have a resource conservation or enhancement emphasis, with fish and wildlife habitat or watershed benefits as a priority. However, some address concerns such as forest health, noxious weeds and underproductive forestlands.

In Oregon, one-on-one technical assistance, as well as some financial assistance, is available to family forest landowners through unique partnerships between state and federal agencies. Both Oregon Department of Forestry and the Oregon State University Extension Service can provide one-on-one assistance. Locally, soil and water conservation districts, watershed councils, and other organizations may also offer programs for forest landowners. ODF works with the Natural Resources Conservation Service (NRCS), USDA Forest Service (USFS), and Farm Service Agency (FSA) to help make financial assistance available to qualified landowners. Through these programs landowners can receive payments for desired practices, project cost-sharing from 50 to 75 percent, annual land rental payments, tax credits or partial to full land value compensation for easements. Contracts are required for some programs and multi-year commitments may be an option.

The following list provides brief descriptions of some programs available

to family forest landowners, as well as links to other helpful resources. Contact the local ODF Stewardship Forester to determine which programs are available for your property (www.oregon.gov/ODF/Working/Pages/FindAForester.aspx).

FOREST STEWARDSHIP PLANS

Landowners may be eligible for financial assistance with the development of a comprehensive stewardship plan for their forest. Stewardship plans help landowners focus their management goals and are an important step for participating in other cost share opportunities. For more information, visit www.oregonforestmanagementplanning.org.

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP)

EQIP provides cost share to encourage management practices that conserve soil, water and related natural resources on working lands. Both forestry and agricultural landowners may qualify for EQIP funding.

BARK BEETLE MITIGATION FUNDS

ODF has limited cost share available to assist landowners with forest management activities designed to prevent outbreaks and restore areas impacted by bark beetles.

CONSERVATION RESERVE ENHANCEMENT PROGRAM (CREP)

CREP encourages the protection of soil, water, fish and wildlife through plant establishment along streams.

FOREST HEALTH

The ODF Forest Health program helps maintain and improve the health of Oregon's private and state-owned forests. In addition to technical assistance, funding may be available to assist landowners with the identification and control of invasive plant species.

REFORESTATION FOLLOWING NATURAL DISASTERS

Several programs, including the Emergency Forest Restoration Program (EFRP), provide financial assistance to help with reforestation following disasters such as wildfire.



Landowners may be able to receive technical and financial assistance for post-fire restoration.

Oregon Forest Resources Institute

Forest Service U.S. Department of Agriculture

Oregon State University

NRCS Natural Resources Conservation Service

Oregon Department of Forestry

FSA Farm Service Agency

CONSERVATION EASEMENTS

Several programs, including Forest Legacy and the Agricultural Conservation Easement Program, provide financial assistance to help conserve working lands. Such programs typically limit non-forestry or agricultural uses of the land while enhancing specific resources.

TAX CREDITS AND INCENTIVES

Landowners may be eligible for certain local property tax credits based on specific forest or wildlife management objectives.

URBAN AND COMMUNITY FORESTRY

ODF's Urban and Community Forestry Program provides assistance to communities committed to their urban trees, or looking to improve and expand their urban forestry programs.

OTHER RESOURCES AND INFORMATION

Landowners may receive additional information about these assistance programs from:

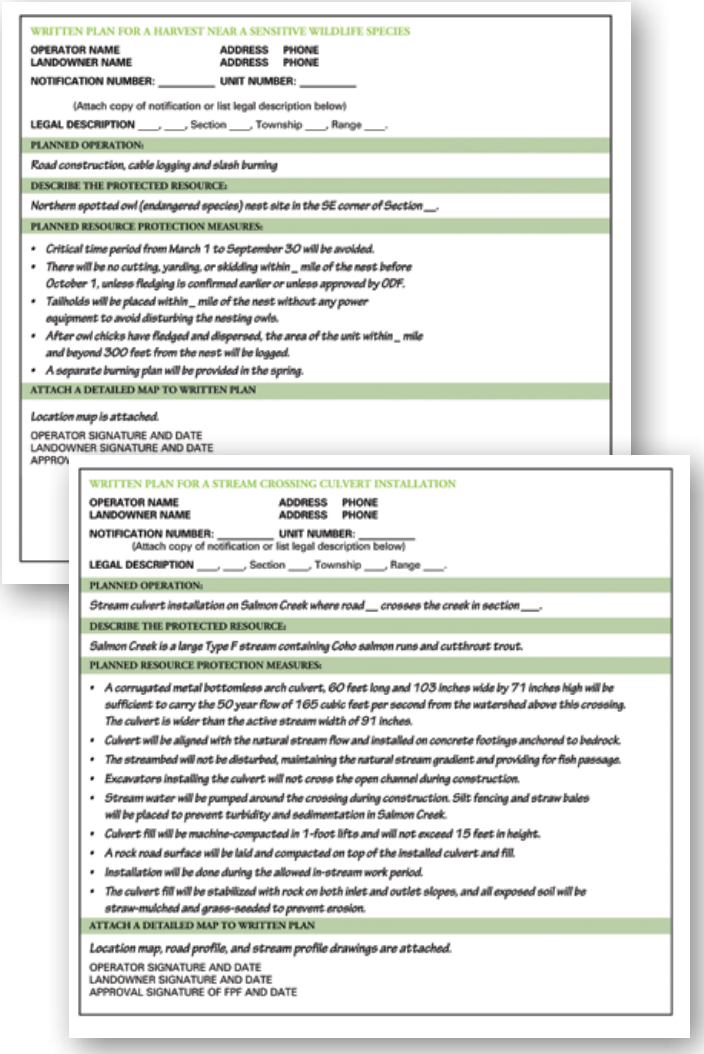
- ODF - www.oregon.gov/ODF
- OSU Extension - extensionweb.forestry.oregonstate.edu
- NRCS - www.nrcs.usda.gov/wps/portal/nrcs/site/or
- FSA - www.fsa.usda.gov/state-offices/Oregon
- USFS State & Private Forestry - www.fs.fed.us/spf

The Partnership for Forestry Education also hosts a website, KnowYourForest.org, which includes resources designed to assist family forest landowners with navigating forest management decisions and connect with other resources in their community.

APPENDIX

What you should know about a written plan

It's a document, submitted by a landowner or operator to the Oregon Department of Forestry. It's more than the Notification of Operations – it describes specifically how an operation will meet the requirements of the Oregon Forest Practices Act and Rules. ODF must review it before the operation begins.



WRITTEN PLAN FOR A HARVEST NEAR A SENSITIVE WILDLIFE SPECIES

OPERATOR NAME ADDRESS PHONE
LANDOWNER NAME ADDRESS PHONE

NOTIFICATION NUMBER: _____ UNIT NUMBER: _____

(Attach copy of notification or list legal description below)

LEGAL DESCRIPTION ___, ___, Section ___, Township ___, Range ___.

PLANNED OPERATION:

Road construction, cable logging and slash burning

DESCRIBE THE PROTECTED RESOURCE:

Northern spotted owl (endangered species) nest site in the SE corner of Section __.

PLANNED RESOURCE PROTECTION MEASURES:

- *Critical time period from March 1 to September 30 will be avoided.*
- *There will be no cutting, yarding, or skidding within _ mile of the nest before October 1, unless fledging is confirmed earlier or unless approved by ODF.*
- *Tailholds will be placed within _ mile of the nest without any power equipment to avoid disturbing the nesting owls.*
- *After owl chicks have fledged and dispersed, the area of the unit within _ mile and beyond 300 feet from the nest will be logged.*
- *A separate burning plan will be provided in the spring.*

ATTACH A DETAILED MAP TO WRITTEN PLAN

Location map is attached.

OPERATOR SIGNATURE AND DATE
LANDOWNER SIGNATURE AND DATE
APPRO

WRITTEN PLAN FOR A STREAM CROSSING CULVERT INSTALLATION

OPERATOR NAME ADDRESS PHONE
LANDOWNER NAME ADDRESS PHONE

NOTIFICATION NUMBER: _____ UNIT NUMBER: _____
(Attach copy of notification or list legal description below)

LEGAL DESCRIPTION ___, ___, Section ___, Township ___, Range ___.

PLANNED OPERATION:

Stream culvert installation on Salmon Creek where road __ crosses the creek in section ___.

DESCRIBE THE PROTECTED RESOURCE:

Salmon Creek is a large Type F stream containing Coho salmon runs and cutthroat trout.

PLANNED RESOURCE PROTECTION MEASURES:

- *A corrugated metal bottomless arch culvert, 60 feet long and 103 inches wide by 71 inches high will be sufficient to carry the 50 year flow of 165 cubic feet per second from the watershed above this crossing. The culvert is wider than the active stream width of 91 inches.*
- *Culvert will be aligned with the natural stream flow and installed on concrete footings anchored to bedrock.*
- *The streambed will not be disturbed, maintaining the natural stream gradient and providing for fish passage.*
- *Excavators installing the culvert will not cross the open channel during construction.*
- *Stream water will be pumped around the crossing during construction. Silt fencing and straw bales will be placed to prevent turbidity and sedimentation in Salmon Creek.*
- *Culvert fill will be machine-compacted in 1-foot lifts and will not exceed 15 feet in height.*
- *A rock road surface will be laid and compacted on top of the installed culvert and fill.*
- *Installation will be done during the allowed in-stream work period.*
- *The culvert fill will be stabilized with rock on both inlet and outlet slopes, and all exposed soil will be straw-mulched and grass-seeded to prevent erosion.*

ATTACH A DETAILED MAP TO WRITTEN PLAN

Location map, road profile, and stream profile drawings are attached.

OPERATOR SIGNATURE AND DATE
LANDOWNER SIGNATURE AND DATE
APPROVAL SIGNATURE OF FPF AND DATE

Statutory written plans are always required for operations:

- within 100 feet of a Type F, SSBT or D stream, large lake or significant wetland (not an estuary)
- within 300 feet of a significant wetland (an estuary)
- within 300 feet of a sensitive wildlife site used by threatened or endangered species or other sensitive birds; written plans may be required for these places when the operations are farther away than 300 feet if they could conflict with site protection

Other written plans **may** be needed for other practices that require ODF review and, in some cases, formal approval. Some of these practices include:

- operations on high landslide hazard locations
- road construction with risk of material entering waters of the state
- burning in a riparian management area
- locating a log landing in an RMA
- road construction in an RMA
- stream crossings with 15 feet or higher fills
- temporary stream crossings with 8 feet or higher fills
- placement of wood in Type F, SSBT or N streams
- vegetation retention modification along Type F or SSBT streams
- vegetation modification along Type D and N streams
- locating a yarding corridor in an RMA
- activities that affect sensitive wildlife habitat
- machine activity in stream channels
- alternate practices
- beaver dam removal
- conversion of forestland to a non-forest use

See sample written plans, which include:

- written plan for a sensitive wildlife site
- written plan for a stream crossing
- written plan for a harvest near a Type F or SSBT stream
- written plan for a harvest near a significant wetland

Here's a list of items needed in every written plan:

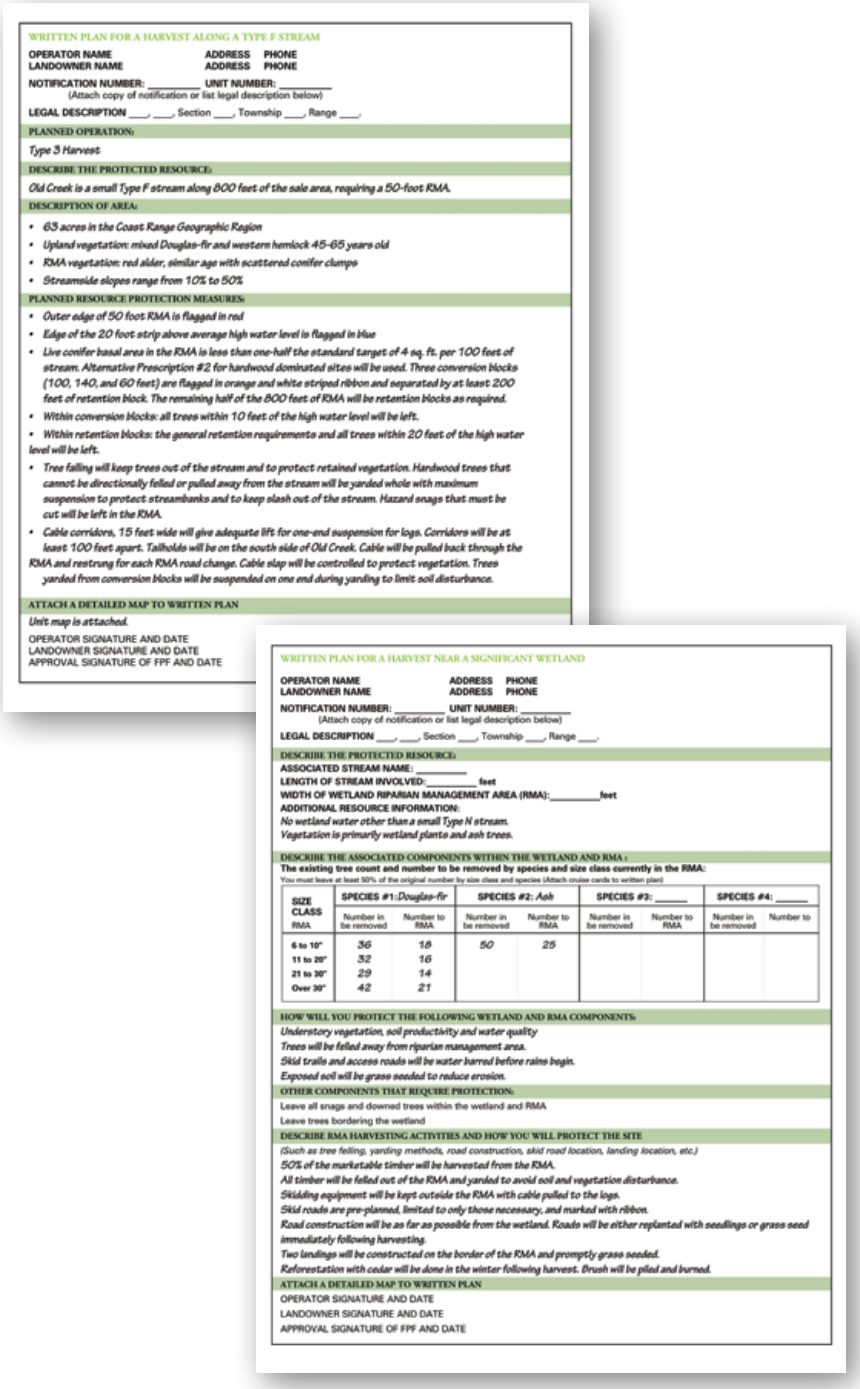
- a legal description or reference to a Notification of Operation and number
- a map showing the operation, the protected resource and section lines, access roads and other important landscape features
- complete description of what's going to be done
- a description of the resource site you are protecting
- a description of how you will do the planned activities to protect the resource site during the operation

Are there fill-in-the-blank forms for written plans?

Yes, they are available from ODF.

When can a written plan be waived?

- A Statutory Written Plan may not be required if the operation activity will not directly affect the physical components of the RMA. For more information check with ODF or see Forest Practices Act Technical Note 10: Statutory Written Plans, at www.oregon.gov/odf



WRITTEN PLAN FOR A HARVEST ALONG A TYPE F STREAM

OPERATOR NAME ADDRESS PHONE
LANDOWNER NAME ADDRESS PHONE

NOTIFICATION NUMBER: _____ UNIT NUMBER: _____
(Attach copy of notification or list legal description below)

LEGAL DESCRIPTION ___, ___, Section ___, Township ___, Range ___.

PLANNED OPERATION:

Type 3 Harvest

DESCRIBE THE PROTECTED RESOURCE:

Old Creek is a small Type F stream along 800 feet of the sale area, requiring a 50-foot RMA.

DESCRIPTION OF AREA:

- *65 acres in the Coast Range Geographic Region*
- *Upland vegetation: mixed Douglas-fir and western hemlock 45-65 years old*
- *RMA vegetation: red alder, similar age with scattered conifer clumps*
- *Streamside slopes range from 10% to 50%*

PLANNED RESOURCE PROTECTION MEASURES:

- *Outer edge of 50 foot RMA is flagged in red*
- *Edge of the 20 foot strip above average high water level is flagged in blue*
- *Live conifer basal area in the RMA is less than one-half the standard target of 4 sq. ft. per 100 feet of stream. Alternative Prescription #2 for hardwood dominated sites will be used. Three conversion blocks (100, 140, and 60 feet) are flagged in orange and white striped ribbon and separated by at least 200 feet of retention block. The remaining half of the 800 feet of RMA will be retention blocks as required.*
- *Within conversion blocks: all trees within 10 feet of the high water level will be left.*
- *Within retention blocks: the general retention requirements and all trees within 20 feet of the high water level will be left.*
- *Tree falling will keep trees out of the stream and to protect retained vegetation. Hardwood trees that cannot be directionally felled or pulled away from the stream will be yarded whole with maximum suspension to protect streambanks and to keep slash out of the stream. Hazard snags that must be cut will be left in the RMA.*
- *Cable corridors, 15 feet wide will give adequate lift for one-end suspension for logs. Corridors will be at least 100 feet apart. Tailholds will be on the south side of Old Creek. Cable will be pulled back through the RMA and restrung for each RMA road change. Cable slap will be controlled to protect vegetation. Trees yarded from conversion blocks will be suspended on one end during yarding to limit soil disturbance.*

ATTACH A DETAILED MAP TO WRITTEN PLAN

Unit map is attached.

OPERATOR SIGNATURE AND DATE
LANDOWNER SIGNATURE AND DATE
APPROVAL SIGNATURE OF FPF AND DATE

WRITTEN PLAN FOR A HARVEST NEAR A SIGNIFICANT WETLAND

OPERATOR NAME ADDRESS PHONE
LANDOWNER NAME ADDRESS PHONE

NOTIFICATION NUMBER: _____ UNIT NUMBER: _____
(Attach copy of notification or list legal description below)

LEGAL DESCRIPTION ___, ___, Section ___, Township ___, Range ___.

DESCRIBE THE PROTECTED RESOURCE:

ASSOCIATED STREAM NAME: _____
LENGTH OF STREAM INVOLVED: _____ feet
WIDTH OF WETLAND RIPARIAN MANAGEMENT AREA (RMA): _____ feet
ADDITIONAL RESOURCE INFORMATION:
No wetland water other than a small Type N stream.
Vegetation is primarily wetland plants and ash trees.

DESCRIBE THE ASSOCIATED COMPONENTS WITHIN THE WETLAND AND RMA :
The existing tree count and number to be removed by species and size class currently in the RMA:
You must leave at least 50% of the original number by size class and species (Attach cruise cards to written plan)

SIZE CLASS RMA	SPECIES #1: *Douglas-fir*		SPECIES #2: *Ash*		SPECIES #3: _____		SPECIES #4: _____	
	Number in be removed	Number to RMA	Number in be removed	Number to RMA	Number in be removed	Number to RMA	Number in be removed	Number to
6 to 10"	36	18	50	25				
11 to 20"	32	16						
21 to 30"	29	14						
Over 30"	42	21						

HOW WILL YOU PROTECT THE FOLLOWING WETLAND AND RMA COMPONENTS:

Understory vegetation, soil productivity and water quality
Trees will be felled away from riparian management area.
Skid trails and access roads will be water barred before rains begin.
Exposed soil will be grass seeded to reduce erosion.

OTHER COMPONENTS THAT REQUIRE PROTECTION:

Leave all snags and downed trees within the wetland and RMA
Leave trees bordering the wetland

DESCRIBE RMA HARVESTING ACTIVITIES AND HOW YOU WILL PROTECT THE SITE

(Such as tree felling, yarding methods, road construction, skid road location, landing location, etc.)
50% of the marketable timber will be harvested from the RMA.
All timber will be felled out of the RMA and yarded to avoid soil and vegetation disturbance.
Skidding equipment will be kept outside the RMA with cable pulled to the logs.
Skid roads are pre-planned, limited to only those necessary, and marked with ribbon.
Road construction will be as far as possible from the wetland. Roads will be either replanted with seedlings or grass seed immediately following harvesting.
Two landings will be constructed on the border of the RMA and promptly grass seeded.
Reforestation with cedar will be done in the winter following harvest. Brush will be piled and burned.

ATTACH A DETAILED MAP TO WRITTEN PLAN

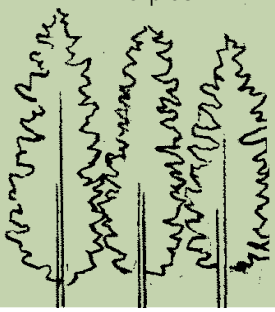
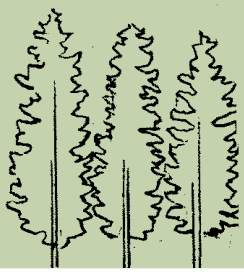
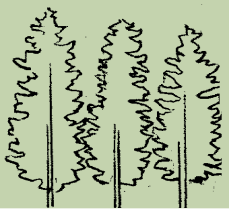
OPERATOR SIGNATURE AND DATE
LANDOWNER SIGNATURE AND DATE
APPROVAL SIGNATURE OF FPF AND DATE

How to determine the site class for your harvest unit

What is site class?

Site class is a way to classify forests according to how well trees grow. Trees grow faster in locations with fertile soils and plenty of moisture – these areas have higher site classes. Trees grow more slowly in rocky soils and drier climates where the site class is lower. The Oregon Forest Practices Act and Rules use six forest site classes, ranging from I, the highest site class, down to VI, the lowest. Site classes are measures of how many cubic feet of wood an acre of forest can grow each year until it reaches maturity and starts to slow down. Table A-1 shows how site classes are grouped according to their wood production for the purposes of the requirements.

Table A-1 Site Classes for Oregon Forestlands

	I, II, III (High)	IV and V (Medium)	VI (Low)
Annual forest growth (cubic feet of wood volume per acre per year)	120 plus 	50-119 	20-49 

Why do you need to know the site class?

Site class is the basis for many specific requirements. It helps determine harvest type and reforestation stocking standards, and also the requirements for harvest unit leave trees, down wood and harvest size limitations.

How can you find the site class for your harvest unit or reforestation area?

- Your ODF office can help you determine the site class of your harvest unit or reforestation area.
- You can hire a consulting forester.
- You can determine site class on your own. To do that, first determine "site index," which can be converted to site class. Site index is a measure of the height (in feet) that forest trees will grow to at a specific age, usually 50 or 100 years. A higher site index value means that the forest is more productive and the trees will grow faster. Site index varies for different tree species, because each species has its own characteristic growth rate.

Here are two ways to find the site index for your property.

1. Check the soil survey published by the Natural Resources Conservation Service for most Oregon counties. Locate your harvest unit on the soil survey map, find your soil type and note the site index for the primary tree species that grows in your area

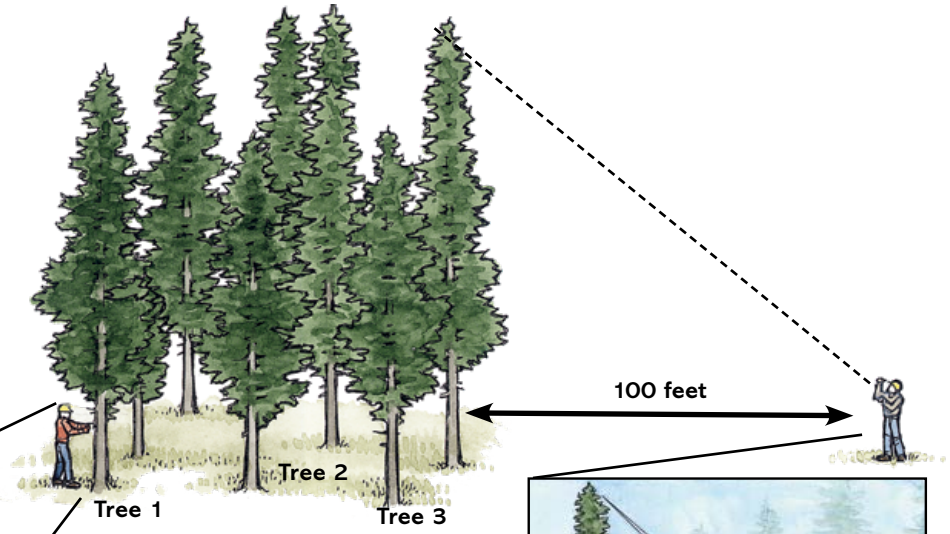
OR

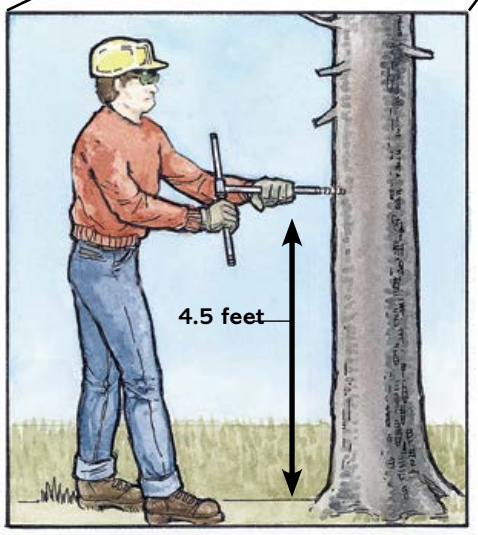
2. Measure site index directly, following this process:

   A. Choose at least three trees, all the same species, that have grown with their crowns in the upper portion of the forest canopy.

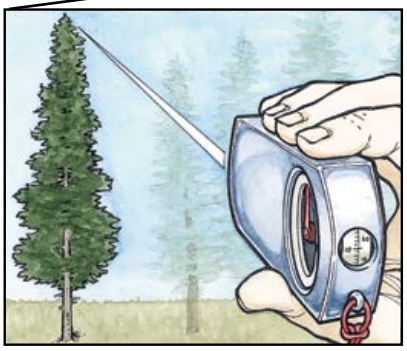
   B. For each tree, measure and record the age and height.

To determine age, use an increment borer to take a core sample from the tree at 4.5 feet above the ground (breast height) and count the growth rings. Add five to 10 years to the ring count to account for the number of years it took the tree to grow to breast height. This is the total age of the tree.





To determine height, use a clinometer or angle-measuring device. Measuring tree height is not difficult, but it takes instruction and practice to be accurate. See "Other information sources below" for a publication on using an increment borer, clinometer and other forest measurement tools.



Clinometer measuring tree height.

C. Use the table for your tree species to figure out the site index for each tree you measure. For example, let's say you measured a Douglas-fir from a forest in western Oregon and found the tree was 70 years old and 110 feet tall. Table A-2 on page 147 shows that the 100-year site index of the tree would be 130. That means that if the tree continues growing to age 100, it is expected to grow to about 130 feet tall. Tables A-2, A-3 and A-4 allow you to find Douglas-fir site indexes (100- or 50-year basis) and ponderosa pine site indexes (100-year basis).

D. The next step is to take the site index figure from Tables A-2, A-3 or A-4 and plug it into Table A-5 (at left) to find out the corresponding site class. For example, the Douglas-fir tree that had a 100-year site index of 130 is in the high category, which includes site classes I, II and III.

For other information sources, see pages 197-198.

Table A-5 Matching Site Index To Site Class

Site Class	I, II, III (High)	IV and V (Medium)	VI (Low)
Douglas-fir site index (100-year basis, westside)	124 or more	80-123	Contact ODF
Douglas-fir site index (50-year basis, westside)	92 or more	70-91	Contact ODF
Ponderosa pine site index (100-year basis)	109 or more	64-108	40-63

Table A-2 Site Index for Douglas-fir, Western Oregon, 100-year Basis														
Total age (years)	Total height (feet)													
20	21	24	26	29	31	34	37	39	42	44	47	49	52	54
30	37	41	46	50	55	60	64	69	74	78	83	88	92	96
40	48	54	60	66	72	78	84	90	96	102	108	114	120	126
50	56	63	70	77	84	91	98	105	112	119	125	132	139	146
60	63	70	78	86	93	101	109	117	124	132	140	148	156	163
70	68	77	85	94	102	110	119	127	135	144	152	161	170	178
80	73	82	91	100	109	118	127	136	145	154	163	172	181	190
90	77	86	96	105	115	125	134	144	153	163	172	182	192	201
100	80	90	100	110	120	130	140	150	160	170	180	190	200	210
Site index	80	90	100	110	120	130	140	150	160	170	180	190	200	210

Table A-3 Site Index for Douglas-fir, Western Oregon, 50-year Basis										
Age (years, at DBH)	Total height (feet)									
10	16	18	20	22	24	27	29	32	34	37
20	30	35	40	44	49	54	59	63	68	73
30	42	49	56	63	70	76	83	90	97	103
40	53	61	69	78	86	95	103	112	120	129
50	60	70	80	90	100	110	120	130	140	150
Site index	60	70	80	90	100	110	120	130	140	150

Note: the first column is based on age at DBH (4.5 feet above ground), not total age of tree as in Tables A-2 and A-4. Do not add any years to the DBH age, unlike total age as noted on page 146.

Table A-4 Site Index for Ponderosa Pine, 100-year Basis													
Total age (years)	Total height (feet)												
20	6	9	12	16	20	25	30	35	40	45	50	55	60
30	11	15	20	26	32	38	44	51	57	64	70	77	84
40	16	22	28	35	42	49	55	63	70	77	85	93	100
50	21	28	35	43	51	58	65	73	80	89	97	105	113
60	26	34	42	50	58	66	73	81	90	99	107	115	124
70	30	39	47	56	64	73	80	89	98	108	116	125	134
80	34	43	52	61	70	79	88	97	106	116	124	133	143
90	37	47	57	66	75	85	94	104	113	123	132	142	152
100	40	50	60	70	80	90	100	110	120	130	140	150	160
Site index	40	50	60	70	80	90	100	110	120	130	140	150	160

Common types of timber harvest systems

Cutting trees, moving logs to a landing and loading logs for transport to a mill are all part of a timber harvest system. It's the way forest owners supply wood products that everyone uses. It also helps them effectively establish new forests. There are different timber harvest systems. Each one has advantages, which are described below. Modifications can make them even more versatile.



What are the harvest systems?

1. conventional chainsaw and tractor/skidder harvest
2. cable logging
3. shovel logging
4. cut-to-length harvesting
5. whole-tree harvesting
6. helicopter logging

The terrain of your harvest unit will influence your choice of a logging system. On gentle terrain, tree processors and forwarders, excavators, tractors and skidders (explained in the following pages) and even horses can be logical choices. On steep terrain, the choice shifts to cable or helicopter systems.

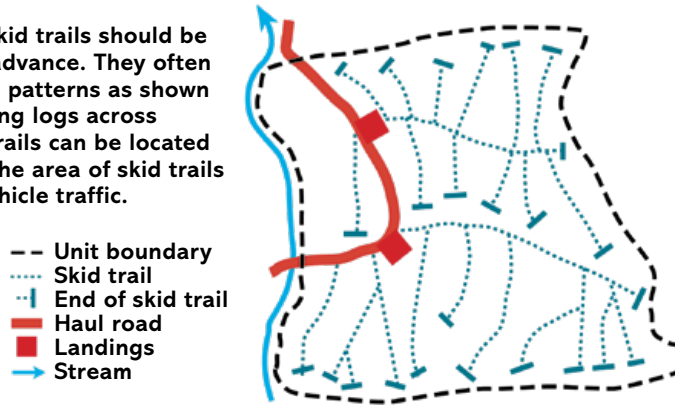
Conventional chainsaw and tractor/skidder harvest

Hand-operated chainsaws are used to cut, delimb and buck trees into logs at the stumps. Skidders or crawler tractors (dozers) drag the logs to landings, where they are loaded onto trucks.



Tree felling, limbing and bucking are done with chainsaws.

Typical harvest layout. Skid trails should be planned and marked in advance. They often follow parallel branching patterns as shown (see Page 64). By winching logs across greater distances, skid trails can be located farther apart, reducing the area of skid trails and soil impacts from vehicle traffic.



Advantages

- adaptable to smaller harvest locations
- generally less costly equipment

Equipment used

- chainsaw
- log skidder or crawler tractor (dozer)
- log loader or self-loading log truck

Topography considerations

- normally restricted to slopes less than 35 percent
- haul roads usually located at the bottom of the logging unit

Soil considerations

- use of designated skid trails keeps machines on planned routes to help reduce soil disturbance
- on weaker soils, heavy traffic may result in trail ruts that require more water bars after logging
- soil disturbance can be reduced with widely spaced trails and pulling a winch line farther to logs – synthetic lines and other equipment features can make this task easier
- tractors and skidders should lift the front end of logs to reduce soil gouging

Forest stand considerations

- provides much flexibility with a variety of stand management goals

Slash disposal considerations

- lop-and-scatter possible with light accumulations of slash
- pile and burn is an option but requires additional steps and costs
- chipping and biomass energy utilization may be possible

Reforestation considerations

- yarding traffic or post-logging treatment can scarify ground and create areas for natural regeneration or hand-planting
- some advance regeneration may be lost or damaged by vehicle traffic

Economic considerations

- often more labor intensive
- generally, more roads are necessary
- least expensive method if road construction is not needed or is budgeted separately

Left: Skidders or dozers drag logs from the forest to the log landing. To reduce soil disturbance, rubber-tired skidders or crawler tractors are kept on skid trails. Winch line and chokers pull logs to the machine. Right: At the landing, a log loader moves logs onto trucks for delivery to the mill.





Cable logging

On steep terrain, this system uses a steel cable to carry either whole trees or logs to a landing after trees are felled with chainsaws.

Advantages

- allows for harvesting on steep ground and other sensitive terrain
- eliminates the need for skid trails
- can reduce construction and less favorable locations of roads

Equipment used

- chainsaw
- cable yarder
- delimber and log loader

Topography considerations

- well-suited for slopes of 35 percent and greater
- concave slopes allow more cable deflection and greater system efficiency
- intermediate supports allow for log lift in uneven terrain
- haul roads usually located at the top of the logging unit

Soil considerations

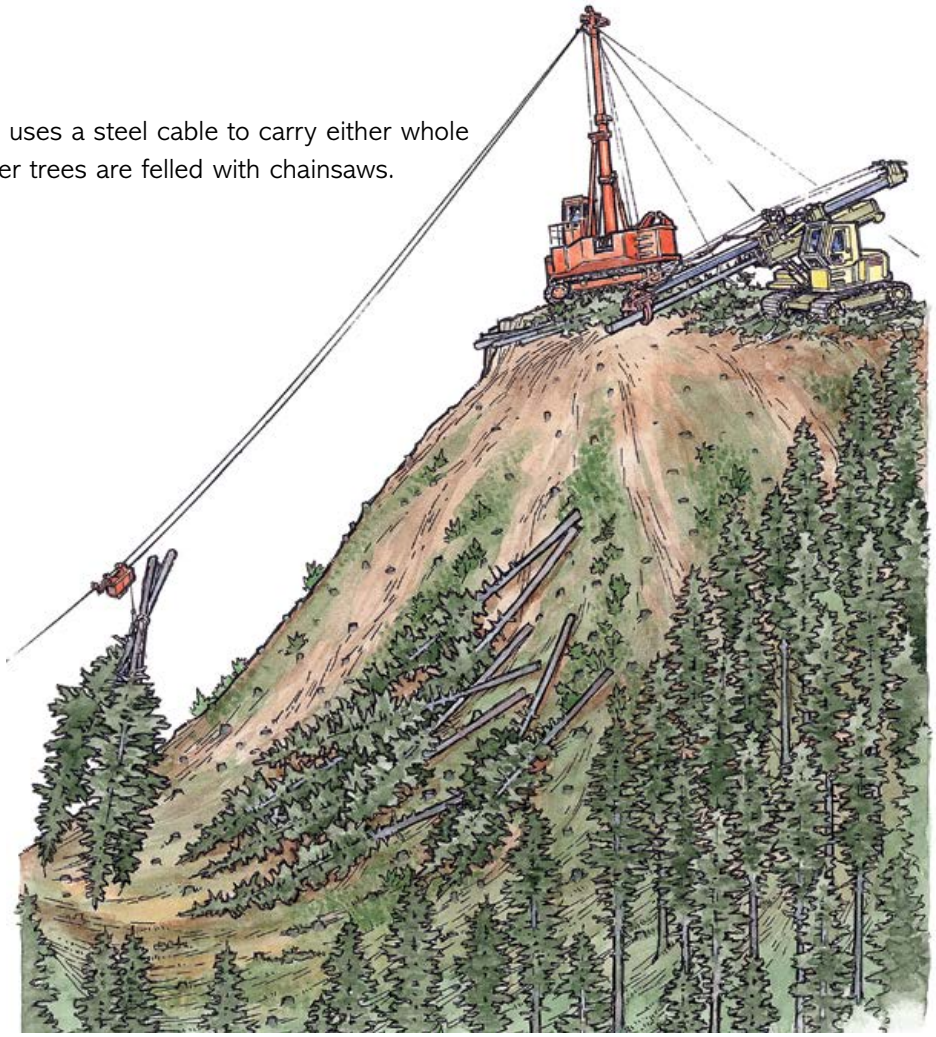
- can significantly reduce soil compaction and disturbance if logs are properly lifted
- heavy equipment is confined to roads and landings

Forest stand considerations

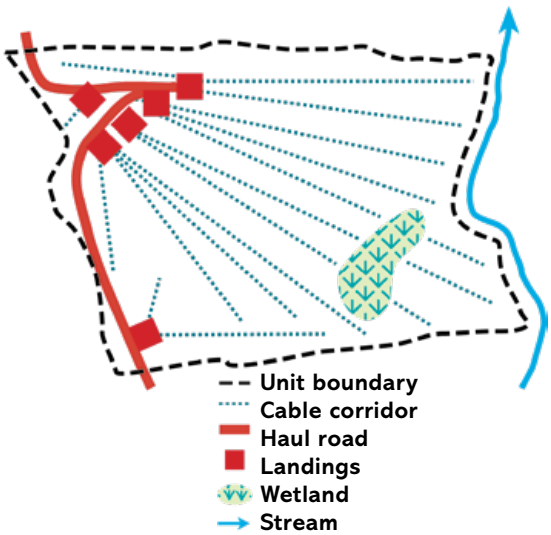
- primarily used with clearcuts and some partial cuts
- a more difficult method for thinning, with potential damage to residual stems

Slash disposal considerations

- if whole trees are brought to the landing, in-unit slash is minimized
- heavy slash piles at the landing must be treated or utilized
- if whole tree yarding is not used, prescribed burning of slash may be needed (see pages 71-74)



Cable yarding systems can reach out 2,500 feet or more, especially with intermediate cable supports. This can help limit road construction needs.



Typical cable harvest layout. Generally logs are pulled uphill, but can also be moved downhill. With a strategic layout, logs can be lifted over streams, wetlands and canyons (see page 67).

Reforestation considerations

- may expose fewer spots for easier planting or natural seeding
- brush control needs also may be greater when scarification is reduced

Economic considerations

- can be more costly and specialized than ground-based systems
- small-scale systems can be competitive in some situations

Shovel logging

This ground-based harvest system uses a log loader (also called a shovel) to move logs rather than a skidder, tractor or forwarder. The shovel moves logs across the unit to locations near the road where they can be loaded onto log trucks. Logs are often picked up and moved ("swung") several times before reaching the road.



The shovel starts at the nearest access point and moves logs until they are within reach of the road. From there they can be loaded on trucks.

Advantages

- requires few people and machines
- few or no skid trails needed; existing roads may be adequate
- brush can be piled during harvest operations.

Equipment used

- chainsaw
- tracked excavator equipped with a grapple to grip and move logs

Topography considerations

- limited by slope due to machine instability on steep side hills
- may allow for harvest of some sensitive areas, with less disturbance than other systems

Soil considerations

- less compaction and disturbance if machine passes are limited

Below: Excavators equipped with grapples are common choices for handling logs and doing other useful tasks.



Forest stand considerations

- used primarily in clearcuts or partial cuts
- requires clearing of roadsides for log decks

Slash disposal considerations

- while moving logs, the excavator can pile heavy concentrations of slash for burning, chipping or other utilization

Reforestation considerations

- while or after moving logs or slash, the excavator can prepare the site for planting or seeding

Economic considerations

- small crew size
- one machine for multiple tasks can reduce costs
- efficiency improves with shorter yarding distances

Cut-to-length harvesting

This ground-based system uses a mechanized harvester (tree processor) and a forwarder. The harvester severs, de-limbs and cuts each tree into logs and stacks them in the forest. The forwarder follows, picking up the logs and carrying loads to log trucks. It is also called a harvester-forwarder system.



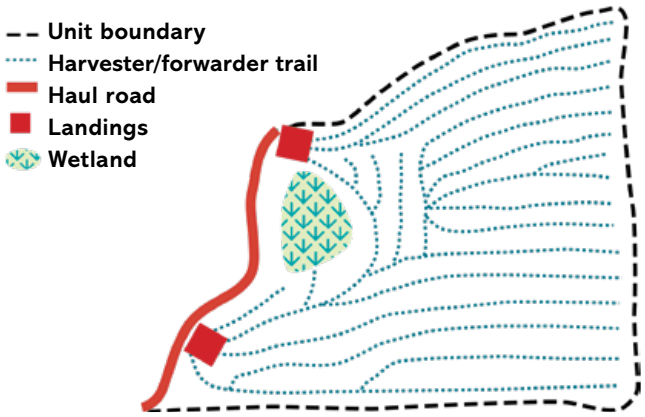
A single grip processor can reach out 30 feet, cut a tree, strip the limbs, cut the stem into pre-programmed lengths and lay the logs on the ground, all in less than a minute. Ideally, they travel over the tree tops and limbs they leave.



A forwarder follows the harvester, picking up logs and delivering them to log trucks. They can travel long distances, reducing the need for log truck roads.



Logs are offloaded from the forwarder directly to log trucks.



Typical harvest layout. Designated harvester/forwarder trails are about 60 feet apart and often follow parallel patterns across the harvest units.

Advantages

- leaves slash (tree branches and tops) in the forest
- reduces the need for log landings and access roads

Equipment used

- harvester/processor (tracked or wheeled)
- forwarder (often wheeled)

Topography considerations

- normally limited to slopes less than 35 percent

Soil considerations

- can reduce compaction and disturbance, especially if the processor moves over duff and slash and if forwarders stay on slash-covered, designated skid trails
- slash left in the harvest unit will recycle nutrients and organic matter

Forest stand considerations

- an efficient method for commercial thinning
- typically used to move short logs out of the forest rather than long logs
- processor efficiency in dense stands is useful for forest health and fuels treatments

Slash disposal considerations

- by traveling over and compacting the slash, the system can reduce wildfire hazards and may meet slash hazard control requirements with no further treatment
- equipment can be used for slash piling for burning, chipping or other utilization

Reforestation considerations

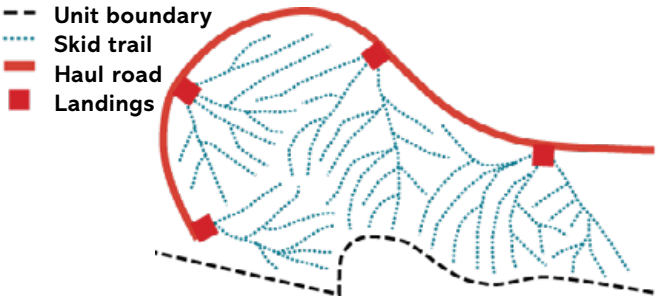
- common for thinnings where residual stocking does not trigger reforestation requirements
- if used for heavier cuts and slash loads, extra steps could create spots for planting or seeding

Economic considerations

- may not require new or improved roads
- relatively expensive and specialized machinery and operators
- may require larger volumes or higher quality timber for efficient use

Whole-tree harvesting

This harvest system brings the entire tree, limbs and tops attached, to the landing or roadside. It can be used for both ground-based and cable applications. When used in ground applications, a feller-buncher often is used to cut and pile bundles of trees in the forest. Then a tractor or skidder drags the tree bundles to the landing or roadside. Finally, a delimber converts the trees to logs.



Typical harvest layout. The feller-buncher and grapple skidder travel over most of the unit. Confining multiple trips to primary skid trails can reduce soil disturbance.

Advantages

- can be relatively efficient, including use of smaller material
- slash is brought to the landing or roadside where it can be burned, chipped or otherwise utilized

Equipment used

- feller-buncher
- crawler tractor or skidder with grapple
- stroke-boom delimber
- log loader

Topography considerations

- normally limited to slopes less than 35 percent
- with ground-based harvest, haul roads are usually at the bottom of the logging area

Soil considerations

- vehicles travel over a larger portion of the area as they cut, stack, gather and drag whole trees
- potential for more soil disturbance and compaction than other ground-based systems
- removal of tops and limbs does not recycle nutrients and organic matter near its source

Forest stand considerations

- efficient harvest and stand conversion when using a clearcut,
- can be used when thinning, but damage to remaining trees can be a problem.

Slash disposal considerations

- slash can be piled and later burned, chipped or otherwise utilized
- slash returned to the harvest area can recycle nutrients and organic matter (see pages 71-73)

Reforestation considerations

- widespread traffic and large tree bundles may damage advance regeneration
- dragging tree bundles can expose areas for planting or seeding

Economic considerations

- costs can increase on steeper ground or with longer skid distances
- bunching trees can help reduce the cost of handling small diameter trees.



A feller-buncher severs trees and lays them in bunches with limbs and tops attached. Bunches are oriented with tree trunks facing downhill.



A crawler tractor or skidder with a grapple picks up bunched trees and drags them to a landing or roadside. Some grapples can swing 180 degrees, making it easier to operate in tight spaces.



The stroke-boom delimber operates at the landing or roadside, removing tree limbs and top, cutting the stem into logs and stacking them.



The loader serves two needs: loading trucks and piling tops, branches and log chunks for later burning, chipping or other utilization.

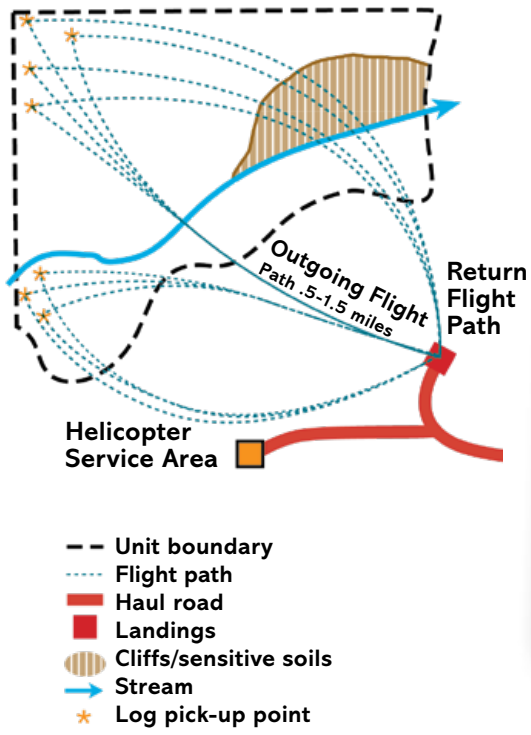
Helicopter logging

This harvest system was once used exclusively for large, high-value timber. Helicopter harvest remains a higher-cost alternative, but it can be used for smaller logs when timber volumes and quality are adequate.

This helicopter has a payload capacity of 6,000 pounds. Flight distances are kept to one-half to 1.5 miles. Longer distances are more costly. Planning to achieve optimum payloads for each trip helps make the operation economic.



Typical harvest layout



Advantages

- can harvest visually sensitive, inaccessible or other areas where other systems are unsuitable
- useful option for locations with high recreational use, special wildlife habitat, riparian/wetlands or geologic hazards
- may reduce or avoid new road construction, including hazardous/sensitive locations

Equipment used

- chainsaw
- logging helicopter
- helicopter maintenance and fueling equipment
- log loader

Topography considerations

- can be used on any type of terrain with suitable landing and helicopter service area locations (i.e., adequate size, safety and efficiency)

Soil considerations

- minimizes in-unit soil disturbance and compaction because logs are fully suspended
- large landings and service areas may require extra drainage or other treatment

Forest stand considerations

- offers efficient, but costly method for commercial thinning
- large landings and service areas can locally impact forest stands.

Slash disposal considerations

- lop-and-scatter methods typically are used to reduce fire hazards
- if further treatment is needed, it can be costly where road access is limited

Reforestation considerations

- slash left on-site and limited yarding disturbance result in fewer exposed spots for easy planting or natural seeding

Economic considerations

- typically the most expensive logging system
- equipment and crew needs can result in costs three to four times those of ground-based systems
- reduced road construction needs may help offset high costs
- without adequate volume of higher value logs, harvest costs may exceed timber revenues

Cultural resources

What are cultural resources?

Cultural resources are archaeological sites or objects that are found on public or private lands.

What do they look like?

Typical indications of archeological sites include stone tools, fire-cracked rock, shells, bone fragments and things like house pit depressions, hearths, fire rings, cairns (heaps of stones that signify memorials or landmarks) and similar items. Glassy rock fragments, along with tools and debris from the manufacturing process -- in an area where they are not normally found -- are a good indicator of archaeological sites.

Stewardship forests inform landowners when an operation may impact a cultural resources site and provide them with the ODF Fact Sheet "Protecting Cultural and Historical Sites."

Why are they important?

The number of archaeological sites is limited. They are irreplaceable and nonrenewable. They are also an inherent part of the cultural heritage of the people of Oregon.

How old is old?

Cultural resources include more than prehistoric or Native American artifacts. Even old logging remains, stumps with springboard notches, camp dumps, railroad grades, homestead cabins, historic irrigation ditches, scribed trees and trails are included in the definition of cultural resources. In addition to artifacts, traditional hunting and gathering sites and "religious" sites may also be historical cultural records.

What are the legal protections?

Archaeological-object and -site laws protect these sites.

Counties may also have regulations related to these sites, and landowners who find cultural artifacts should contact the county planning department.

The State Historic Preservation Office maintains a comprehensive, statewide inventory of sites, structures and objects that are potentially significant in Oregon history, prehistory, architecture, archaeology and culture. This office is part of the Oregon Parks and Recreation Department. Game enforcement officers of the Oregon State Police serve as partners in initial investigation and protection of cultural sites, and thus may provide timely help when needed.

For other information sources, see pages 197-198



Steam Donkey. Photo by Tom Adams, http://www.quercusphotographic.com

How to know the basal area of your harvest, reforestation or riparian management area

What is basal area?

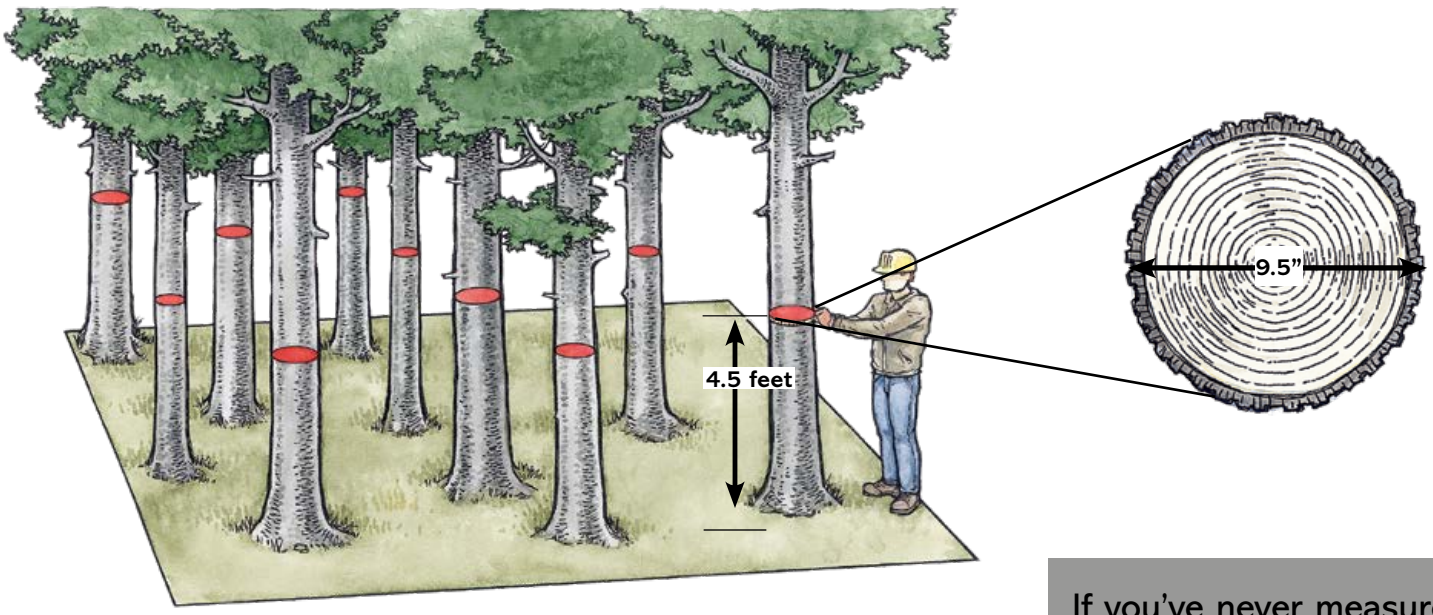
Basal area is the cross-sectional area of a tree stem at 4.5 feet above the ground. The basal area of a tree is calculated by measuring its diameter (see diagram). Tree diameter is measured at 4.5 feet above the ground on the uphill size and is referred to as the DBH (diameter at breast height). Why 4.5 feet? It provides a convenient and consistent point for measuring tree diameter.

To calculate basal area:

Basal area = tree diameter^2 X .005454.

If you know the diameter of a tree, you can calculate its basal area. It's the same formula used to calculate the area of a circle. This tree is 9.5 inches at DBH. Its basal area is 0.5 square feet. Therefore, in our example:

BA = 9.5" x 9.5" x .005454 = 0.5 ft^2



Imagine this to be one acre. The cross-section, at DBH, of each tree is indicated.

Why do you need to know about basal area?

Basal area is an important measurement. When combined with the average diameter of the trees, basal area gives people involved with a harvest a mental picture of the forest. If you know basal area you can calculate the number of trees per acre, another part of the picture.

If you're planning to harvest, reforest, leave wildlife trees or evaluate options for an RMA, you'll need to know basal area. The requirements for each of these activities depend on knowing the basal area measurement.

Basal area is usually calculated on a per-acre basis. That's because we're interested in knowing how much surface area (square feet) the tree stems are occupying on each acre. Add the individual basal area of every tree on an acre and you have the basal area per acre.

Basal area is expressed in square feet per acre. Here's a simple example: 250 trees on an acre, all with diameters of 9.5 inches DBH -- 0.5 square feet each -- would total 125 square feet of basal area. (0.5 x 250 = 125).

If you've never measured a tree's diameter, here's how:

Obtain a diameter tape or a normal household tape to measure the DBH.

- A diameter tape is convenient because it measures the tree's circumference but its scale directly converts this amount and shows the diameter in inches.
- A normal tape can be used to measure circumference of a tree. The circumference is converted to diameter by the formula:

$$DBH = \frac{\text{circumference (inches)}}{3.14}$$

More about basal area

Two separate acres can have the same basal area but a different number of trees. Tree diameters are an important influence on basal area.

For example, these two acres have the same basal area but different numbers of trees. Here's the interesting part. If you know the basal area per acre of a stand of trees, and the average diameter of the trees, you can figure out the number of trees per acre.

If Acre 1 has 24-inch trees and 78.5 square feet of BA, you would need 25 trees to equal 78.5 square feet per acre.

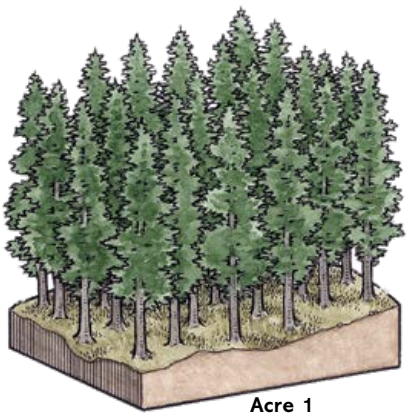
BA = 24" x 24" x .005454 = 3.1

78.5 ft^2 per acre ÷ 3.1= 25 trees per acre (41-foot spacing)

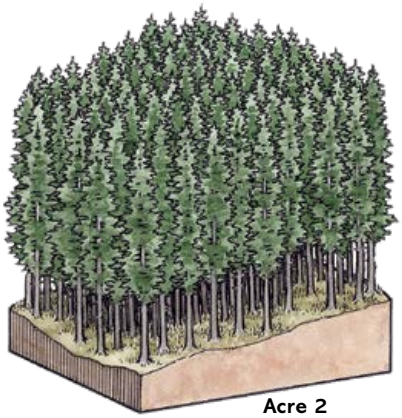
If Acre 2 has 6-inch trees and a basal area of 78.5, you would need 392 trees to equal 78.5 square feet per acre.

BA = 6" x 6" x .005454 = .2

78.5 ft^2 per acre ÷ .2 = 392 trees per acre (10.5-foot spacing)



This acre has a BA of 78.5.



This acre has a BA of 78.5.

How do you measure the basal area of your harvest unit?

The simplest way to determine the basal area of your harvest unit is to sample the stand with plots. Space plots evenly across the unit along compass lines. On each plot, measure the diameter and calculate the basal area of each tree. Circular, one-fifth-acre plots are commonly used.

To calculate the basal area of each tree on the plot, it's easiest to use Table A-6 at right. Or you may find it to your advantage to use Table A-7, which has the basal areas for tree diameters listed in 2-inch increments. A third option is to calculate the basal area for 1-inch intervals using the basal area formula on the previous page. These added options provide greater accuracy in determining basal area. However, in meeting legal requirements you must be consistent – you can't switch back and forth between the tables and the formula.

As an example, the illustration below shows a 20-acre site with 12 one- fifth-acre plots. First record the basal area of each plot. Then calculate the total basal area for all plots and determine the average basal area per plot by dividing the total basal area by 12. Then expand the average basal area per plot to an entire acre by multiplying by 5. Now you know the average basal area per acre for the 20-acre harvest unit.

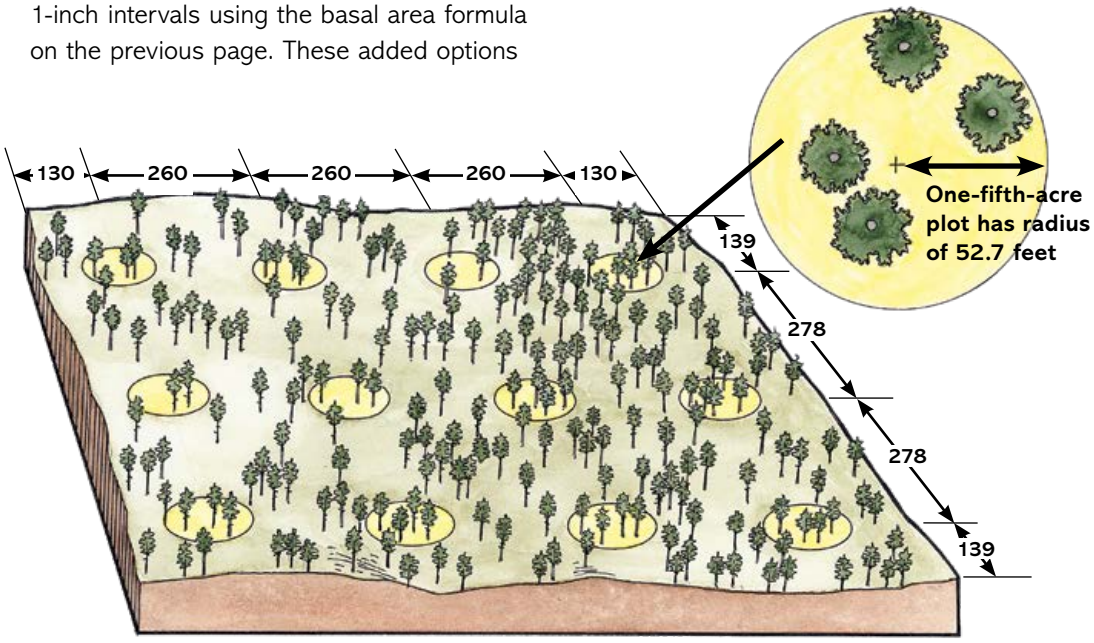
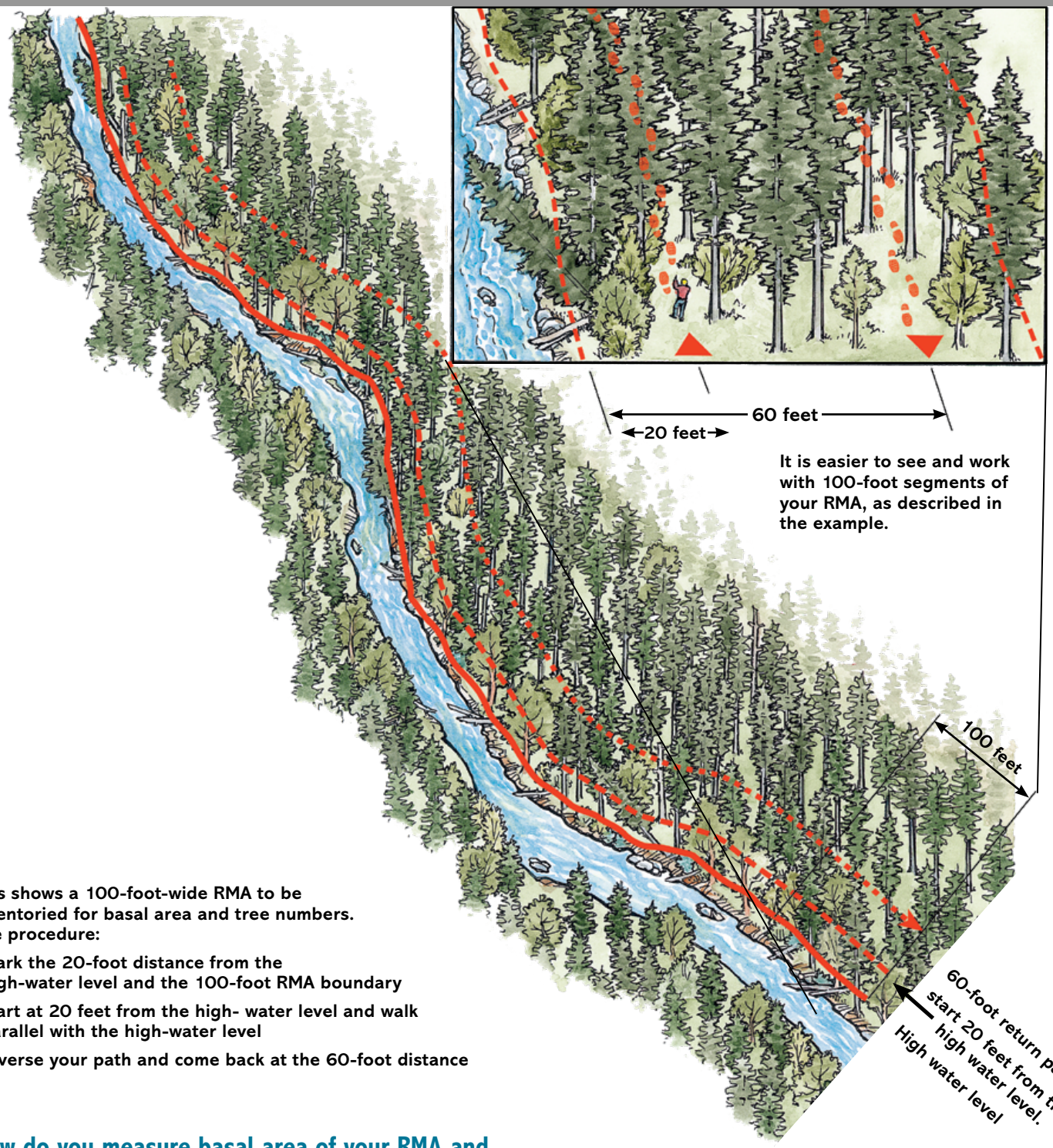


Table A-6	
DBH (inches)	Basal area (square feet)
6 to 10	0.3
11 to 15	0.9
16 to 20	1.8
21 to 25	2.9
26 to 30	4.3
31 to 35	5.9
36 to 40	7.9

Table A-7	
DBH (inches)	Basal area (square feet)
6	0.2
8	0.35
10	0.55
12	0.79
14	1.07
16	1.4
18	1.77
20	2.2
22	2.6
24	3.14
26	3.69
28	4.28
30	4.9
32	5.58
34	6.3
36	7.07



This shows a 100-foot-wide RMA to be inventoried for basal area and tree numbers. The procedure:

- **mark the 20-foot distance from the high-water level and the 100-foot RMA boundary**
- **start at 20 feet from the high- water level and walk parallel with the high-water level**
- **reverse your path and come back at the 60-foot distance**

How do you measure basal area of your RMA and identify which trees to leave?

1. Determine the necessary width of your RMA (Table 2-3). Then walk through a representative part of the RMA to see the size and density of conifers. Remember, conifers -- rather than hardwood trees -- are favored because, in general, they live longer, grow larger and last longer as snags and down logs.
2. Figure out how many trees must be left per 1,000 feet to meet the basal area target for the stream type (see, "You want to harvest along a stream – what do you need to know?" Page 19).
3. Use Table A-6, A-7 or the formula on page 156 to estimate average basal area per tree based on your estimate of the average diameter.

   For example, if the average diameter of conifers in the RMA is about 24 inches then the average basal area per tree is about 3 square feet. If the target for the stream is 170 square feet per 1,000 feet (17 per 100 feet) then you know that you will need to leave about five to six 24-inch conifers per 100 feet of RMA.

   17 ÷ 3 = 5.7

4. Determine the RMA length within the harvest unit by measuring in the field (pacing or using a tape) or scaling off an accurate aerial photo or map. Multiply the basal area target by this length.

   For example, if the RMA length is 1,500 feet and the basal area target is 170 square feet per 1,000 feet, the total for the 1,500 feet in the unit is 255 square feet.

   170 x 1,500 ÷ 1,000 = 255

5. Use a tally sheet like the example on page 160 (RMA tree tabulation form) to keep track of acceptable leave trees. Keep in mind you may be asked to submit copies of such field notes to ODF.

   Walk along the stream and select acceptable leave trees, starting with those that must be left: trees within 20 feet of the high-water level and trees that lean over the stream. Mark a number on each tree with tree-marking paint and record its diameter, whether conifer or hardwood, and its distance from the stream. Wait to fill in the basal area column until you've walked all of the 20-foot "no touch" portion of the RMA. Reverse direction and come back, marking and recording additional conifers in the outer RMA, as needed, to get close to the basal area target (recall your estimate of how many trees needed per 100 feet – 5.7, as calculated in the above example).

6. Calculate values for the basal area column (use Table A-6, A-7 or the basal area formula) and sum up the tree numbers and basal area values. Separate snags and large hardwoods from the live conifers.

   Compare the total conifer basal area with the standard target for the georegion and stream type and size (remember, there is usually both a basal area and tree count requirement). If you are above the standard target, you can go through the RMA again and consider harvesting some of the trees found beyond the 20-foot zone. If you are below the target, you'll need to measure and identify enough acceptable leave trees in the outer RMA to reach the target.

Table A-9 RMA Tree Tabulation Form (example)

Tree #	Conifer or hardwood	DBH	Basal area	Distance from stream
1	C	12	.9	<20
2	C	18	1.8	30
3	C	16	1.8	30
4	C	15	.9	40
5	C	14	.9	40
6	C	11	.9	40
7	C	11	.9	<20
8	C	11	.9	<20
9	C	19	1.8	<20
10	C	13	.9	30
11	H	28	4.3	30
12	C	12	.9	30
13	C	18	1.8	30
14	C	16	1.8	<20
15	C	35	5.9	<20
16	C	18	1.8	<20
17	C	21	2.9	30
18	C	14	.9	40
19	C	11	.9	40
20	C	36	7.9	30
Sum conifer	19 trees, 7 <20 ft.		36.5	14 sq. ft. <20 ft.
Sum hardwood	1 tree		4.3	

General prescription requirements for stream RMAs

This section includes the general prescription protection requirements for RMAs for various regions and stream and harvest types. Use these summaries when the live conifer basal area in the RMA is more than the standard target. For a detailed description of stream RMA protection see pages 19-33.

To use the summaries, you need to know the following:

1. the geographic region of your harvest (see page 10)
2. the type and size of the stream in the harvest unit (see page 8)
3. the type of harvest (1, 2, 3 or Unclassified) you will be doing (see page 17)

Check the list below for the page number of the summary that fits your situation. For example, if you are planning an operation in the Siskiyou geographic region, with a Type 3 harvest along a Large, Type F stream, use the summary on page 162.

Type F streams

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All geographic regions

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Use for

large Type F streams, Type 2 or 3 harvests and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-10 – Large Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	230	170
Interior & Western Cascades	270	200
Siskiyou	220	170

RMA width – 100 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 40 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows, and/or
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. All cottonwood and Oregon ash trees (at least 6 inches DBH) left in the RMA but growing more than 20 feet from the high-water level may count toward the basal area target.

A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are at least 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Can trees left in RMAs help meet other leave tree requirements?

Yes. Conifers left in the RMA in excess of the active management target and hardwoods left beyond 20 feet from the channel may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

medium Type F streams, Type 2 or 3 harvests and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-11 Medium Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	120	90
Interior & Western Cascades	140	110
Siskiyou	110	90

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are greater than 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Can trees left in RMAs help meet other leave tree requirements?

Yes. Conifers left in the RMA in excess of the active management target and hardwoods left beyond 20 feet of the channel may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

small Type F streams, Type 2 or 3 harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-12 Small Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	40	20
Interior & Western Cascades	40	20
Siskiyou	40	20

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are at least 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Can trees left in RMAs help meet other leave tree requirements?

Yes. All conifers and hardwoods left in the RMA may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

large Type F streams, Type 1 or unclassified harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-13 Large Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	300	270
Interior & Western Cascades	350	310
Siskiyou	290	260

RMA width – 100 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 40 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. All cottonwood and Oregon ash trees at least 6 inches DBH left in the RMA but growing more than 20 feet from the high water level may count toward the basal area target. This allowance applies only to large Type F streams.

A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are at least 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Use for

medium Type F streams, Type 1 or unclassified harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-14 Medium Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	160	140
Interior & Western Cascades	180	160
Siskiyou	140	120

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are at least 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Use for

small Type F streams, Type 1 or unclassified harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-15 Small Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Coast Range & South Coast	50	30
Interior & Western Cascades	50	30
Siskiyou	50	30

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are at least 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches or greater DBH and at least 30 feet high, that are anywhere within the RMA

Use for

large Type F streams, Type 2 or 3 harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

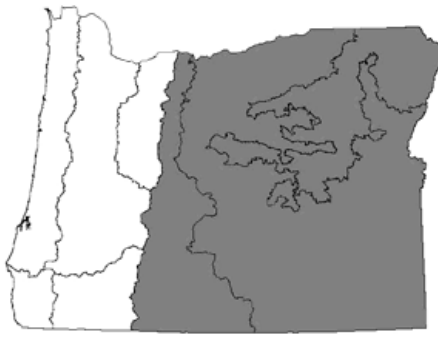


Table A-16 Large Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	170	130
Blue Mountains	170	130

RMA width – 100 feet

Leave the following on each side of stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 40 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. All hardwoods at least 6 inches DBH left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Can trees left in RMAs help meet other leave tree requirements?

Yes. Conifers left in the RMA in excess of the active management target and hardwoods left beyond 20 feet of the channel may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

medium Type F streams, Type 2 or 3 harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

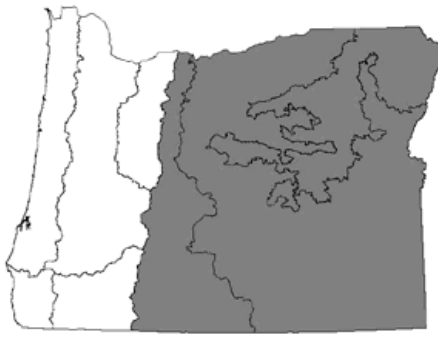


Table A-17 Medium Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	90	70
Blue Mountains	90	70

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work

Can some hardwoods and snags help meet the target?

Yes. All hardwoods (6 inches or greater DBH) left in the RMA may count toward the basal area target.

Sound conifer snags (6 inches or greater DBH and at least 30 feet high) left in the RMA may count toward as much as 10 percent of the basal area target.

Can trees left in RMAs help meet other leave tree requirements?

Yes. Conifers left in the RMA in excess of the active management target and hardwoods left beyond 20 feet of the channel may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

small Type F streams, Type 2 or 3 harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

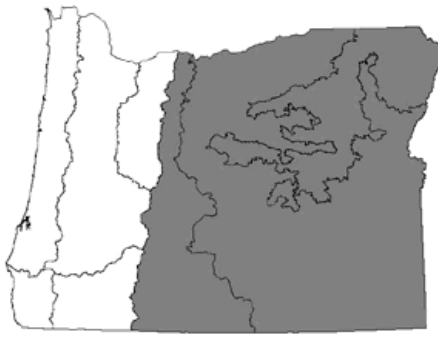


Table A-18 Small Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	50 (40 of live conifer)	50 (30 of live conifer)
Blue Mountains	50 (40 of live conifer)	50 (30 of live conifer)

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. No more than 40 square feet per 1,000 feet of the standard target or 30 square feet per 1,000 feet of active management target is required to be live conifer. The remainder of the target is to be met by the basal area of retained snags, dead or dying trees, or hardwoods if they are available.

All hardwoods at least 6 inches DBH left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Can trees left in RMAs help meet other leave tree requirements?

Yes. All conifers and hardwoods left in the RMA may be counted toward requirements for leave trees within Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

large Type F streams, Type 1 or unclassified harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

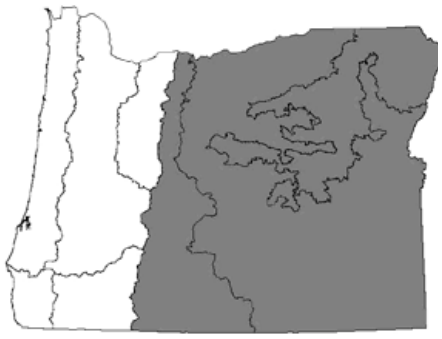


Table A-19 Large Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	220	200
Blue Mountains	220	200

RMA width – 100 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 40 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. All hardwoods at least 6 inches DBH left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Use for

medium Type F streams, Type 1 or unclassified harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

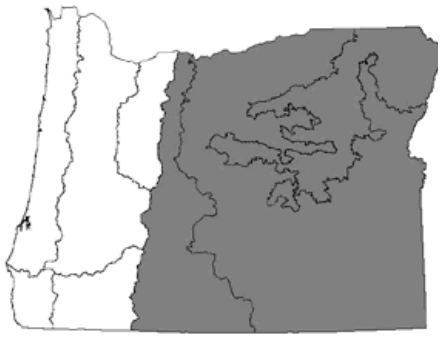


Table A-20 Medium Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	120	100
Blue Mountains	120	100

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. All hardwoods at least 6 inches DBH left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Use for

small Type F streams, Type 1 or unclassified harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

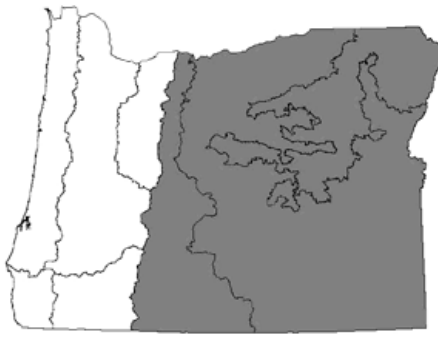


Table A-21 Small Type F Basal Area Targets		
Geographic region	Square feet of basal area per 1,000 feet of stream	
	Standard target	Active management target
Eastern Cascades	50 (40 of live conifer)	50 (30 of live conifer)
Blue Mountains	50 (40 of live conifer)	50 (30 of live conifer)

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- enough conifer basal area within the RMA to meet the standard target

[OR]

Leave less conifer basal area, but no less than the active management target, in exchange for stream improvement work. This includes:

- placing logs or trees in stream channels to create pools or hiding cover for fish
- installing fencing or off-channel watering sites to keep livestock away from streams
- constructing small side channels to provide refuge for fish during high flows
- other enhancement work

Check with ODF if you plan to exchange basal area for stream improvement work.

Can some hardwoods and snags help meet the target?

Yes. No more than 40 square feet per 1,000 feet of the standard target or 30 square feet per 1,000 feet of the active management target is required to be live conifer. The remainder of the target is to be met by the basal area of retained snags, dead or dying trees, or hardwoods if they are available.

All hardwoods at 6 inches DBH left in the RMA may count toward the basal area target.

Sound conifer snags at least 6 inches DBH left in the RMA may count toward as much as 10 percent of the basal area target.

Use for

Medium Type SSBT, Prescription 1 – No Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

no harvest will take place within the RMA of a Type SSBT stream.



Table A-22 Medium Type SSBT Prescription 1 – No Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)
Wildlife Leave Trees: Up to 50% of the trees retained to meet the total basal area target and any wildlife leave trees in excess of the total basal area target: Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)
RMA Total basal area (20 to 80 feet) = 69 sq. ft.
Notes for Table A-22 1. Distances are measured from the high water level of the Type SSBT stream. 2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.

RMA width – 80 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-22, and
- any trees in excess of the total basal area target in Table A-22

Use for

medium Type SSBT, Prescription 2 – Partial Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the live conifer basal area in the RMA located more than 20 feet from the high water level of the Type SSBT stream is more than the RMA total basal area in Table A-23.



Table A-23 Medium Type SSBT Prescription 2 - Partial Harvest RMA:
Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)

Basal area target: Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)	Live conifer trees (8 inches or greater DBH) per each 500-foot stream segment, each side of the stream
No Harvest Zone: 0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.	
Inner Zone: 20 to 50 feet, minimum 18 sq. ft.	Inner Zone: 20 to 50 feet, minimum 7 trees
Outer Zone: 50 to 80 feet, minimum 18 sq. ft.	Outer Zone: 50 to 80 feet, minimum 7 trees
RMA Total (20 to 80 feet) = 69 sq. ft.	RMA Total (20 to 80 feet) = 15 trees

Notes for Table A-23
1. Distances are measured from the high water level of the Type SSBT stream.
2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.
3. Must meet requirements of each zone and RMA total.

RMA width – 80 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA
- minimum live conifer trees, at least 8 inches DBH, per 500 feet within the RMA for the Inner Zone, Outer Zones and the RMA total in Table A-23
- minimum conifer and hardwood basal area targets within the RMA for the Inner Zone, Outer Zones and the RMA total in Table A-23

Can some hardwoods and snags help meet the basal area targets?

Yes. A combination of the following can be included in the basal area target:

- the basal area of hardwoods left in the RMA that are greater than 6 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are growing more than 20 feet from the high-water level can account for up to 10% of the basal area requirement

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-23, and
- any trees in excess of the total basal area target in Table A-23

Use for

medium Type SSBT, Prescription 3 – North-sided Buffer, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the north side of a Type SSBT stream has a stream segment at least 200 feet length and meets the standards in the Type SSBT Prescription 3.



Table A-24. Medium Type SSBT Prescription 3 – North-sided Buffer: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)
Geographic Region: Coast Range, South Coast, Interior, Western Cascades
Wildlife Leave Trees: All conifers and hardwoods trees that meet wildlife leave tree requirements within 40 feet of the stream high water level.
Notes for Table A-24. 1. Distances are measured from the high water level of the Type SSBT stream.

RMA width – 40 feet

Leave the following on the north side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Type SSBT Prescription 3 standards:

- north side of a Type SSBT stream has a stream segment at least 200 feet in length, and
- Type SSBT stream has a stream valley direction that runs in a general east to west direction, stream valley direction is between 60 and 120 degrees east and 240 and 300 degrees west on a compass bearing of 0 and 360 degrees as north

Operators shall:

- retain all trees within 40 feet of the high water level on the north side of a Type SSBT stream where the stream valley direction criteria are met
- apply either Type SSBT Prescription 1 – No Harvest RMA or Type SSBT Prescription 2 – Partial Harvest RMA, where the Type SSBT Prescription 3 – North-sided Buffer is not applied
- describe in a written plan and map where Prescription 3 is intended to be implemented

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements within 40 feet of the stream high water level.

Use for

medium Type SSBT, relief Prescription 1 – No Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

no harvest will take place within the Type SSBT RMA and the parcel meets the standards of relief Prescription 1 – No Harvest RMA



Table A-25 Medium Type SSBT Relief Prescription 1 – No Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0110)
Wildlife Leave Trees: Up to 50% of the trees retained to meet the total basal area target and any wildlife leave trees in excess of the total basal area target. Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)
RMA Total basal area (20 to 70 feet) = 58 sq. ft.
Notes for Table A-25 1. Distances are measured from the high water level of the Type SSBT stream. 2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- the basal area of hardwoods left in the RMA that are greater than 6 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are growing more than 20 feet from the high-water level can account for up to 10% of the basal area requirement

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-25, and
- any trees in excess of the total basal area target in Table A-25

Use for

medium Type SSBT, relief Prescription 2 - Partial Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the live conifer basal area in the RMA located more than 20 feet from the high-water level of the Type SSBT stream is more than the RMA total basal area in Table A-24 and the parcel meets the standards in relief Prescription 2 – Partial Harvest RMA.



Table A-26 Medium Type SSBT Relief Prescription 2 - Partial Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0110)

Basal area target: Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)	Live conifer trees (8 inches or greater DBH) per each 500-foot stream segment, each side of the stream
No Harvest Zone: 0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.	
Inner Zone: 20 to 45 feet, minimum 15 sq. ft.	Inner Zone: 20 to 45 feet, minimum 6 trees
Outer Zone: 45 to 70 feet, minimum 15 sq. ft.	Outer Zone: 45 to 70 feet, minimum 6 trees
RMA Total (20 to 70 feet) = 58 sq. ft.	RMA Total (20 to 70 feet) = 13 trees

Notes for Table A-26
1. Distances are measured from the high water level of the Type SSBT stream.
2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.
3. Must meet requirements of each zone and RMA total.

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA
- minimum live conifers, at least 8 inches DBH, per 500 feet within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-26
- minimum conifer and hardwood basal area targets within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-26

Can some hardwoods and snags help meet the basal area targets?

Yes. A combination of the following can be included in the basal area target:

- the basal area of hardwoods left in the RMA that are greater than 6 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are growing more than 20 feet from the high-water level can account for up to 10% of the basal area requirement

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained that meet the basal area target in Table A-26, and
- any trees in excess of the total basal area target in Table A-26

Use for

small Type SSBT, Prescription 1 – No Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

no harvest will take place within the RMA of a Type SSBT stream.



Table A-27 Small Type SSBT Prescription 1 – No Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)
Wildlife Leave Trees: Up to 50% of the trees retained to meet the total basal area target and any wildlife leave trees in excess of the total basal area target. Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)
RMA Total basal area (20 to 60 feet) = 37 sq. ft.
Notes for Table A-27 1. Distances are measured from the high water level of the Type SSBT stream. 2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall..

RMA width – 80 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-27, and
- any trees in excess of the total basal area target in Table A-27

Use for

small Type SSBT, Prescription 2 – Partial Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the live conifer basal area in the RMA located more than 20 feet from the high-water level of the Type SSBT stream is more than the RMA total Basal Area in Table A-28.



Table A-28 Small Type SSBT Prescription 2 - Partial Harvest RMA:
Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)

Basal area target: Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)	Live conifer trees (8 inches or greater DBH) per each 500-foot stream segment, each side of the stream
No Harvest Zone: 0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.	
Inner Zone: 20 to 40 feet, minimum 10 sq. ft.	Inner Zone: 20 to 40 feet, minimum 4 trees
Outer Zone: 40 to 60 feet, minimum 10 sq. ft.	Outer Zone: 40 to 60 feet, minimum 4 trees
RMA Total (20 to 60 feet) = 37 sq. ft.	RMA Total (20 to 60 feet) = 8 trees

Notes for Table A-28
1. Distances are measured from the high water level of the Type SSBT stream.
2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.
3. Must meet requirements of each zone and RMA total.

RMA width – 60 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA
- minimum live conifers, at least 8 inches DBH, per 500 feet within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-28
- minimum conifer and hardwood basal area targets within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-28

Can some hardwoods and snags help meet the basal area targets?

Yes. A combination of the following can be included in the basal area target:

- the basal area of hardwoods left in the RMA that are greater than 6 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are growing more than 20 feet from the high-water level can account for up to 10% of the basal area requirement

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-28, and
- any trees in excess of the total basal area target in Table A-28

Use for

small Type SSBT, Prescription 3 – North-sided Buffer, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the north side of a Type SSBT stream has a stream segment at least 200 feet length and meets the standards in the Type SSBT Prescription 3.



Table A-29. Small Type SSBT Prescription 3 – North-sided Buffer: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0105)
Geographic Region: Coast Range, South Coast, Interior, Western Cascades
Wildlife Leave Trees: All conifers and hardwoods trees that meet wildlife leave tree requirements within 40 feet of the stream high water level.
Notes for Table A-29 1. Distances are measured from the high water level of the Type SSBT stream.

RMA width – 40 feet

Leave the following on the north side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Type SSBT Prescription 3 – North-sided Buffer Standards:

- north side of a Type SSBT stream has a stream segment at least 200 feet in length
- Type SSBT stream has a stream valley direction that runs in a general east to west direction
- stream valley direction is between 60 and 120 degrees east and 240 and 300 degrees west on a compass bearing of 0 and 360 degrees as north

Operators shall:

- retain all trees within 40 feet of the high water level on the north side of a Type SSBT stream where the stream valley direction criteria are met
- apply either Type SSBT Prescription 1 – No Harvest RMA or Type SSBT Prescription 2 – Partial Harvest RMA, where the Type SSBT Prescription 3 – North-sided Buffer is not applied
- describe in a written plan and map where Prescription 3 is intended to be implemented.

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements within 40 feet of the stream high water level.

Use for

small Type SSBT, relief Prescription 1 – No Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

no harvest will take place within the RMA of a Type SSBT stream.



Table A-30 Small Type SSBT Relief Prescription 1 – No Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0110)
Wildlife Leave Trees: Up to 50% of the trees retained to meet the total basal area target and any wildlife leave trees in excess of the total basal area target. Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)
RMA Total basal area (20 to 50 feet) = 28 sq. ft.
Notes for Table A-30 1. Distances are measured from the high water level of the Type SSBT stream. 2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall.

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA

Can trees left in RMAs help meet the wildlife leave tree requirements?

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained to meet the total basal area target in Table A-30, and
- any trees in excess of the total basal area target in Table A-30

Use for

small Type SSBT, relief Prescription 2 – Partial Harvest RMA, Type 2 or 3 harvests and Coast Range, South Coast, Interior and Western Cascades geographic regions, including the "main stem" of any Type F stream upstream of the Type SSBT of a harvest Type 2 or Type 3 units.

Use when

the live conifer basal area in the RMA located more than 20 feet from the high-water level of the Type SSBT stream is more than the RMA total in Table A-31 and the parcel meets the standards of relief Prescription 2 – Partial Harvest RMA.



Table A-31 Small Type SSBT Relief Prescription 2 - Partial Harvest RMA: Streamside Tree Retention for Harvest Type 2 or Type 3 Units (OAR 629-642-0110)

Basal area target: Square feet of basal area per each 500-foot stream segment, each side of the stream (any combination of conifers and hardwoods 6 inches or greater DBH)	Live conifer trees (8 inches or greater DBH) per each 500-foot stream segment, each side of the stream
No Harvest Zone: 0 to 20 feet = Retain all trees. Trees in this area do not count toward meeting the basal area or live conifer tree requirements in this table.	
Inner Zone: 20 to 35 feet, minimum 7 sq. ft	Inner Zone: 20 to 35 feet, minimum 3 trees
Outer Zone: 35 to 50 feet, minimum 7 sq. ft.	Outer Zone: 35 to 50 feet, minimum 3 trees
RMA Total (20 to 50 feet) = 28 sq. ft.	RMA Total (20 to 50 feet) = 6 trees
Notes for Table A-31 1. Distances are measured from the high water level of the Type SSBT stream. 2. Up to 10% of the basal area requirement may be comprised of sound conifer snags 6 inches or greater DBH and at least 30 feet tall. 3. Must meet requirements of each zone and RMA total.	

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees within the RMA that lean over the stream channel
- all snags and downed wood in the stream channel and RMA
- minimum live conifers, at least 8 inches DBH, per 500 feet within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-31
- minimum conifer and hardwood basal area targets within the RMA for the Inner Zone, Outer Zone and the RMA total in Table A-31

Can some hardwoods and snags help meet the basal area targets?

Yes. A combination of the following can be included in the basal area target:

- the basal area of hardwoods left in the RMA that are greater than 6 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are growing more than 20 feet from the high-water level can account for up to 10% of the basal area requirement

Can trees left in RMAs help meet the wildlife leave tree requirements?

Yes. Operators may count as wildlife trees all conifers and hardwoods that meet wildlife leave tree requirements as follows:

- all trees within 20 feet of the high-water level channel
- in the remainder of the RMA, up to 50% of the trees retained that meet the basal area target in Table A-31, and
- any trees in excess of the total basal area target in Table A-31

Use for

large Type D or N streams, Type 2 or 3 harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-32 Large Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Coast Range & South Coast	90
Interior & Western Cascades	110
Siskiyou	90

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

Can some hardwoods and snags help meet the target?

Yes. All cottonwood and Oregon ash trees, at least 6 inches DBH, left in the RMA but growing more than 20 feet from the high-water level may count toward the basal area target.

A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are greater than 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Can trees left in RMAs help meet other leave tree requirements?

Yes. All conifers and hardwoods left in the RMA may be counted toward requirements for leave trees within Type 2 or Type 3 harvests, as long as they meet the other requirements for leave trees.

Use for

medium Type D or N streams, Type 2 or 3 harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-33 Medium Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Coast Range & South Coast	50 (30 may be from hardwoods)
Interior & Western Cascades	50 (30 may be from hardwoods)
Siskiyou	50 (30 may be from hardwoods)

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 10 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target.

Can some hardwoods and snags help meet the target?

Yes. Hardwood trees left in the RMA can contribute up to a maximum of 30 square feet of basal area per 1,000 feet toward meeting the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, can make up as much as 5 percent of the basal area target.

Use for

large Type D or N streams, Type 1 or unclassified harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-34 Large Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Coast Range & South Coast	140
Interior & Western Cascades	160
Siskiyou	120

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RM,
- no fewer than 30 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target.

Can some hardwoods and snags help meet the target?

Yes. All cottonwood and Oregon ash trees, at least 6 inches DBH, left in the RMA but growing more than 20 feet from the high-water level may count toward the basal area target.

A combination of the following can make up to 10 percent of the basal area target:

- the basal area of hardwoods (other than alder) left in the RMA that are greater than 24 inches DBH but growing more than 20 feet from the high-water level
- the basal area of sound snags, at least 6 inches DBH and at least 30 feet high, that are anywhere within the RMA

Use for

medium Type D or N streams, Type 1 or unclassified harvest and west-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.



Table A-35 Medium Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Coast Range & South Coast	60 (30 may be from hardwoods)
Interior & Western Cascades	60 (30 may be from Hardwoods)
Siskiyou	60 (30 may be from hardwoods)

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 10 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

Can some hardwoods and snags help meet the target?

Yes. Hardwood trees left in the RMA can contribute up to a maximum of 30 square feet of basal area per 1,000 feet toward meeting the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, can make up as much as 5 percent of the basal area target.

Use for

large Type D or N streams, Type 2 or 3 harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

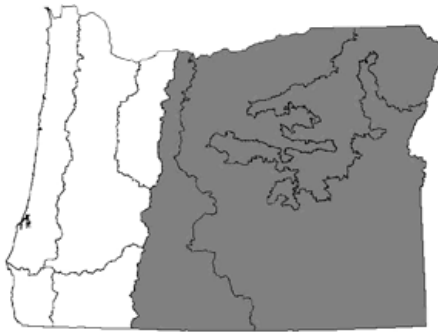


Table A-36 Large Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Eastern Cascades	70
Blue Mountains	70

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 30 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target.

Can some hardwoods and snags help meet the target?

Yes. All hardwoods left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Can trees left in RMAs help meet other leave tree requirements?

Yes. All conifers and hardwoods left in the RMA may be counted toward requirements for leave trees with Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

medium Type D or N streams, Type 2 or 3 harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

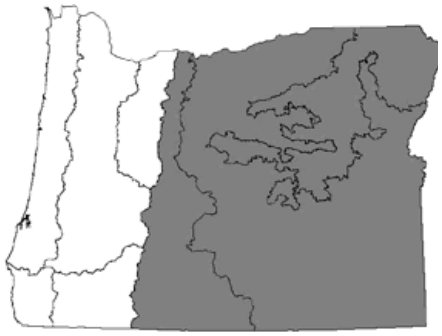


Table A-37 Medium Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Eastern Cascades	50
Blue Mountains	50

RMA width – 50 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 10 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

Can some hardwoods and snags help meet the target?

Yes. All hardwoods left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, can make up as much as 5 percent of the basal area target.

Can trees left in RMAs help meet other leave tree requirements?

Yes. All conifers and hardwoods left in the RMA may be counted toward requirements for leave trees with Type 2 or 3 harvests, as long as they meet the other requirements for leave trees.

Use for

large Type D or N streams, Type 1 or unclassified harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

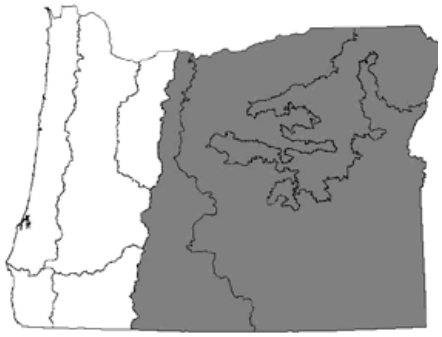


Table A-38 Large Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Eastern Cascades	100
Blue Mountains	100

RMA width – 70 feet

Leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and downed wood in the channel and RMA
- no fewer than 30 live conifers, at least 11 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

Can some hardwoods and snags help meet the target?

Yes. All hardwoods left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, left in the RMA may count toward as much as 10 percent of the basal area target.

Use for

medium Type D or N streams, Type 1 or unclassified harvest and east-side geographic regions.

Use when

the live conifer basal area in the RMA is more than the standard target.

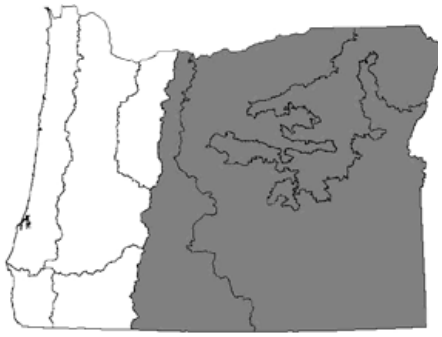


Table A-39 Medium Type D or N Basal Area Targets	
Geographic region	Standard target, square feet of basal area per 1,000 feet of stream
Eastern Cascades	60
Blue Mountains	60

RMA width – 50 feet

Leave the following on each side of the stream:

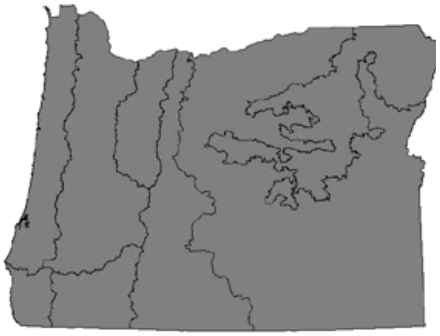
- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA
- no fewer than 10 live conifers, at least 8 inches DBH, per 1,000 feet within the RMA
- enough conifer basal area within the RMA to meet the standard target

Can some hardwoods and snags help meet the target?

Yes. All hardwoods left in the RMA may count toward the basal area target.

Sound conifer snags, at least 6 inches DBH and at least 30 feet high, can make up as much as 5 percent of the basal area target.

Use for
small Type D streams, all types of harvest and all geographic regions.



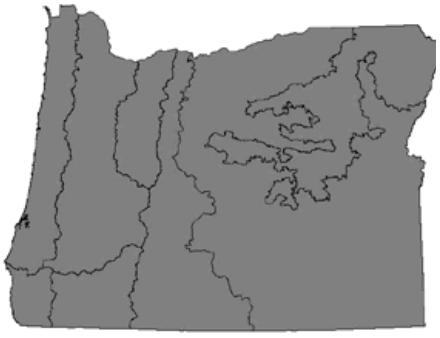
RMA width – 20 feet

There are no basal area targets for these streams.

However, leave the following on each side of the stream:

- all understory vegetation within 10 feet of the high-water level
- all trees within 20 feet of the high-water level
- all trees that lean over the channel and grow in the RMA
- all snags and down wood in the channel and RMA

Use for
small Type N streams, all types of harvest and all geographic regions.



No RMA width designated

There are no basal area targets for these streams.

However, leave the following on each side of the stream:

- understory vegetation and unmerchantable conifers (those less than 6 inches DBH) for 10 feet on each side of the high-water level for the perennial channels indicated below

Table A-40 Small Type N Vegetation Retention

Geographic region	Where required
Coast Range	None required
South Coast	Perennial channels where the upstream drainage area is greater than 160 acres
Interior	Perennial channels where the upstream drainage area is greater than 330 acres
Western Cascades	None required
Siskiyou	Perennial channels where the upstream drainage area is greater than 580 acres
Eastern Cascades	All perennial channels
Blue Mountains	All perennial channels

A stream is considered to be perennial if it usually has summer surface flow after July 15, as determined by ODF.

To minimize stream warming, operators are encouraged to leave understory vegetation and non-merchantable trees (those less than 6 inches DBH) along all perennial streams in operation areas.

How to plan for and calculate peak flows for stream crossings

If you're planning to install or replace a stream crossing, there's a key question to answer: Are there fish in the stream?

If yes, it's best to get help from a professional, because designing and installing the stream crossing can get complicated. Stream crossings must allow for fish passage, and this involves more things to consider. For example, the slope of the stream may require a different crossing design that makes the installation more costly. It's wise to check with experienced people.

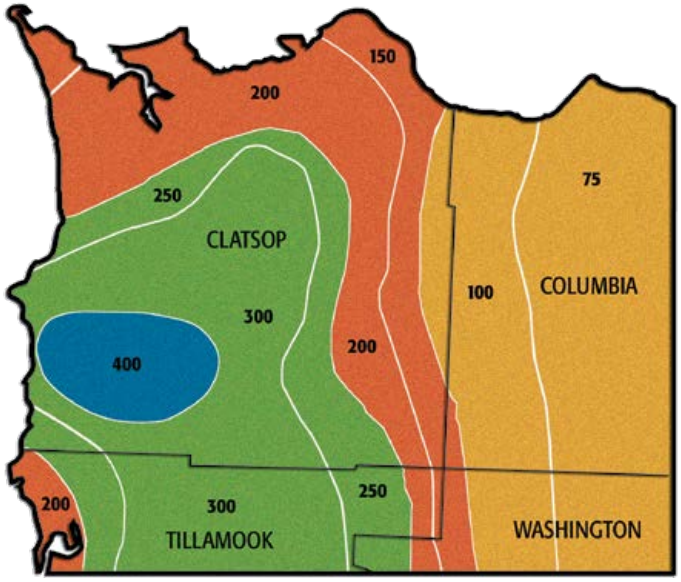
If no, your stream crossing is probably more straightforward.

Follow these steps to calculate the size of the culvert needed if the crossing is not on a fish-bearing stream. In some situations the same size culvert also may be adequate for a stream that has fish, but this should be verified before construction.

Remember that if the fill depth for your planned stream crossing is more than 15 feet (see page 129), it requires a written plan.

What flow level must the crossing be able to handle?

Forest practices rules require that a culvert or bridge crossing be sized to handle at least a 50-year peak flow (sometimes referred to as the 50-year storm).



This is the ODF's "Peak Flow for Forest Streams" map for the northwest corner of Oregon. Lines on the map indicate the 50-year peak flow in cubic feet per second per square mile of drainage area. For this area of Oregon, 50-year peak flows vary from 75 cfs per square mile on east side of the map to 400 cfs on the (wet) west side.

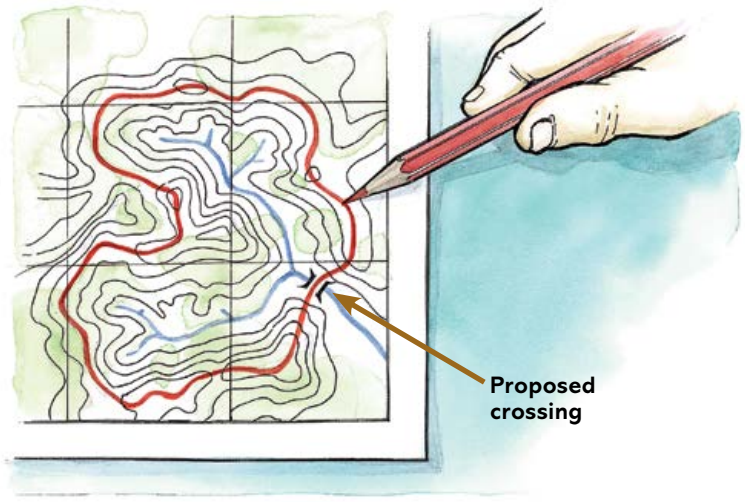
What this means

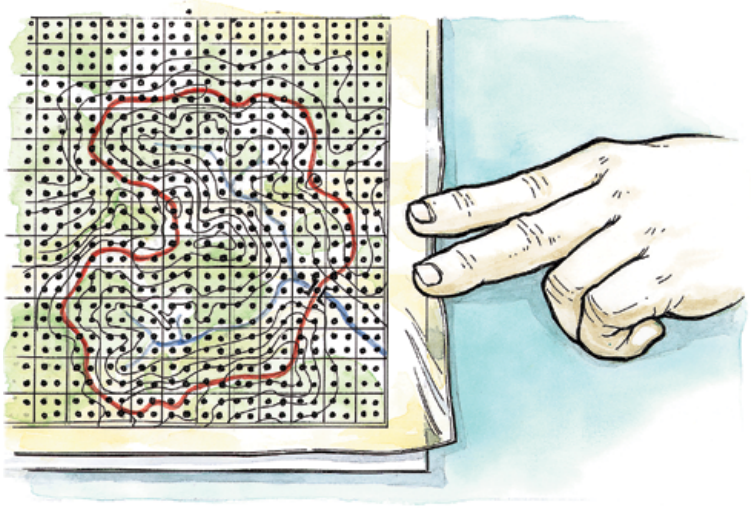
You need to be sure the structure you're installing can handle a very large storm and the runoff it produces. If not, the resulting damage or washout can require a costly replacement, along with stream and fish habitat damage below the failure and the inconvenience of a closed road.

The "50-year peak flow" actually refers to the local storm flow that has a 2 percent chance of occurring in any given year. When averaged across many years, a flow of this size occurs only about twice a century, but it's important to understand that the occurrence of such a storm flow does not affect the likelihood of the next big event – there's still a one in 50 chance (2 percent) a similar flow will occur in any following year.

How do you determine the peak flow?

Without a long-term gauging station on your stream, you can't know for sure what the 50-year peak flow is for a particular stream crossing location, but it can be estimated from an ODF map that's based on other local records and information. Here's how to do it.





STEP 1

Use a "Peak Flows for Forest Streams" map available at your local ODF office. The northwest corner of this map is illustrated on page 192.

Find the location of your planned stream crossing on the map. What is the value of the closest line? If your crossing is between two lines, figure out the average value of the two closest lines.

Example: Let's say you're planning to install a culvert in a location where the map indicates the 50-year peak flow to be 100 cfs per square mile of drainage. The next thing you have to figure out is the size of the drainage above your planned crossing.

STEP 2

Determine the size of the drainage upstream of your crossing.

- Use a 7.5-minute topographic map or software. Outline the drainage boundary (highest terrain above the stream crossing) with a pencil or electronic drawing tool (see illustration above).
- Use a 1:24000 dot grid to determine the size of the drainage. Dot grids are printed on clear plastic so you can lay them on top of topographic maps and see drainage boundaries (see illustration above). If you have map software, it may have a tool that can determine areas within such boundaries.
- Count the number of grid intersections that fall within the drainage boundary.
- Multiply the number of grid intersections by .036. This is the drainage area in square miles.

Example: If the number of squares counted within the drainage boundary is 23, the drainage is .83 square miles.

Here's the calculation: 23 x .036 = .83

STEP 3

Calculate peak flow for the size of your drainage.

From Step 1 we know the peak flow: 100 cfs.

From Step 2 we know the size of the drainage: .83 square miles.

How many cubic feet per second must the culvert handle?

The culvert must be sized to handle a flow of at least 83 cfs.

Here's the calculation: 100 x .83 = 83

STEP 4

Determine what size culvert is needed.

From Step 3 we know the peak flow in cfs.

Go to Table A-40. It lists the flow capacities for common sizes of round culverts.

The table shows that a 54-inch circular culvert has a capacity up to 87 cfs. With good conditions it would likely handle a flow of 83 cfs, but a larger pipe would provide an extra margin of safety.

Table A-40
Flow Capacity For Circular Culverts

Diameter (inches)	Capacity (cfs)
18	Less than 5
24	5-11
30	12-20
36	21-31
42	32-46
48	47-64
54	65-87
60	88-113
72	145-178

For other information sources, see pages 197-198.

Glossary

Although some important terms are included here, many are specifically defined in sections of the Oregon Forest Practices Act (ORS 527.620) and Rules (OAR 629-600-0100). Always verify these definitions to help ensure compliance with the act and rules.

Acre
a land area of 43,560 square feet, in any shape. If square, it would measure approximately 209 feet per side

Active management target
the minimum basal area required to protect the RMA when a landowner agrees to do stream improvement work on a Type F stream

Active Road
a road currently being used or maintained for removing commercial forest products.

Afforestation
planting a forest in an area where the previous vegetation or land use was not forest

Aggregate
mechanically crushed, angular rock used for forest road surfacing

Alternatives to burning
methods to reduce or avoid the need for slash burning (e.g., lop and scatter, chipping and biomass utilization)

Anadromous fish
fish that are born and reared in fresh water, move to the ocean to grow and mature, and return to fresh water to reproduce (e.g., salmon, steelhead, shad)

Aquatic life
organisms (e.g., plants, insects, animals) that spend all or a portion of their life in water

Aspect
the direction toward which a slope faces

Basal area
the cross-sectional area of the trunk of a tree, 4.5 feet above the ground, often calculated from the diameter at that height: basal area = tree diameter squared, times .005454

Biomass
the wood product obtained by chipping or grinding all or some portion of trees (e.g., tops, limbs, unmerchantable stems and other residues) usually for renewable energy production

Blowdown
trees felled by high winds

Bog
a hydrologically closed (no significant water flow) wetland, characterized by saturated peat soils and specialized plant communities

Bull trout
Fish species *Salvelinus confluentus*

Cable yarding
moving logs from the stump to the landing using an overhead system of winch-driven cables to which logs are attached with chokers

Clearcut
a logging and reforestation method for shade-intolerant tree species, in which the entire timber stand, except required leave trees, is harvested

Cobble
the name for a specific size class of rock: 3 to 12 inches in diameter

Conifer
a tree with cones, often called "evergreen" because it keeps its foliage year-round (e.g., pine, spruce, fir and larch trees) and also known as "softwood" from its wood characteristics

Culvert
pipe that channels water under a road

Cutslope
the slope above a road, created by a cut into the face of a hill slope during road construction

D stream – see "Type D stream"

DBH
(diameter at breast height) the diameter of a tree outside of the bark at breast height (i.e., 4.5 feet above the ground, measured on the uphill side of the tree)

Default standard
the minimum basal area required to protect the RMA when the existing basal area is less than half of the standard target and Alternative Prescriptions #1 and #2 are not applicable

Deforestation
clearing a forest and putting the land into a nonforest use

Domestic water use
the use of water for human consumption and other household human use

Down log
a green tree or an existing log intentionally left on the ground after a harvest for wildlife habitat and other benefits

Downspout
an attachment (e.g., a half-round culvert section) to a culvert outlet that carries water beyond the fill slope to control erosion

Drain dip
a shallow depression in the road surface to provide for surface drainage without interrupting vehicle traffic

End haul
moving excavated roadway material by dump truck to another location, in contrast to sidecasting the material next to the road

Estuary
a body of water semi-enclosed by land and connected with the open ocean where saltwater and freshwater mix (e.g., all estuary waters, tidelands, tidal marshes and submerged lands extending upstream to the head of tidewater)

Every reasonable effort
actions required by the landowner or operator if a fire starts in an active operation, which maintain limited liability exposure; can vary based on amount and type of available resources

F stream – see "Type F stream"

Fledgling
a young bird learning to fly

Flush
any activity that causes a sensitive wildlife species to leave its nest, roost or perching tree

Free-to-grow
the point when a tree or stand has a high probability of remaining or becoming dominant over competing vegetation; reforestation rules require this be achieved within six years

Geotextile
synthetic fibers formed into woven or non-woven fabric used to separate, filter or reinforce; used in road surfaces to reduce rutting, stabilize the ground and increase the load-carrying capacity

Gradient
the slope of a road surface in the direction of travel, usually expressed in percent; e.g., a 10 percent grade equals a change along the road of 10 feet vertical in 100 horizontal feet

Granite soils (decomposed granites; granitics)
light-colored soils with a coarse texture due to particle sizes ranging from sand to small gravel; loose and highly erodible due to low clay content that does not hold particles together

Ground-based yarding
moving logs from the stump to the landing using a dozer or rubber-tired skidder; attached logs are pulled behind the machine with chokers or one end of the logs lifted and dragged with a grapple

Hardwood
a broadleaf, usually deciduous, tree (e.g., oak, maple, cottonwood, ash, madrone)

Headwall
the steep, often bowl-shaped, upper reaches of a drainage

High-water level
the water level reached during the average annual high flow; often corresponds with the edge of streamside terraces, a change in vegetation or a change in soil or litter characteristics

Hog fuel
logging debris (e.g., defective logs, chunks, branches) that is ground up at a log landing and sold to and/or used by a mill to create electricity

Inactive Road
a road used for forest management exclusive of removing commercial forest products.

Juvenile fish
immature fish or fingerlings; stream crossings must not impede their movement up and downstream

Landowner
any individual, combination of individuals, partnership, corporation or association of whatever nature that holds an ownership interest in forestland, including the state and any political subdivision of the state

Limited liability (fire suppression)
a landowner or operator is responsible for fire suppression costs of no more than $300,000, given "every reasonable effort" and no willful, malicious or negligent actions found to cause the fire

Log landing
the area where logs may be collected, delimbed and loaded onto trucks.

Main stem
the portion of a Type F stream that is directly upstream of a Type SSBT stream

Marsh
a wetland formed in a shallow pond, depression, river margin or tidal area; characteristic plants include grasses, sedges, cattails and bulrushes

N stream – see "Type N stream"

Notification of Operation
a document required to be filed with the ODF 15 days prior to starting a forest operation

Operation
any commercial activity relating to the establishment, management or harvesting of forest tree species

Operator
any person, including a landowner or timber owner, who conducts an operation

Peak flow
the highest stream flow from a large storm or snowmelt event; a 50-year return interval flow for stream crossing design

Perennial stream
a stream that has running water after July 15 under normal climatic conditions

Plantation
a reforested area composed primarily of trees established by planting or seeding practices

Pole
a young tree between 1 and 10 inches DBH (see DBH)

Prescribed burn
the deliberate burning of wildland fuels for the purpose of fire hazard reduction, with consideration of local weather, soil moisture, populated areas and time of day

Prior approval
formal permission from ODF for certain forest practices before the activities begin

Ravel (dry ravel)
the particle-by-particle erosion of loose rock or dry soil fragments from steep slopes, driven by gravity and not water; common on road cutslopes and on steep slopes after wildfire

Reforestation
the re-establishment of forest cover either naturally or by planting or seeding

Resource site
unique area used by sensitive, threatened or endangered species where protection measures are required; includes nesting, roosting, watering and foraging locations

RMA (riparian management area)
an area along each side of specified waters of the state with special vegetation retention and management requirements for the protection of water quality, fish and wildlife habitat

Road prism
the cross-section of a road between the points of excavation and fill

Rule of thumb
a simple guideline or procedure based on general concepts or experience, which provides roughly correct but not strictly accurate or reliable results

Salmon
any of the five salmon species that exist in Oregon. These species are:

(a) Chinook salmon *(Oncorhynchus tshawwytscha)*;

(b) Coho salmon *(Oncorhynchus kisutch)*;

(c) Chum salmon (*Oncorhynchus keta)*;

(d) Sockeye salmon *(Oncorhynchus nerka)*; and

(e) Pink salmon *(Oncorhynchus gorbuscha)*

SSBT
a stream with salmon, steelhead or bull trout present or otherwise used by salmon, steelhead, or bull trout at any time of the year as determined by the State Forester

Scarify
mechanically remove competing vegetation or interfering debris, and/or disturbing the soil surface, to improve reforestation success

Scenic highway
designated highways with special requirements for forest operations within specified distances

Seedling
a young tree less than 1 inch DBH (see DBH)

Seep
water emerging from the ground along an extensive line or surface; in contrast to a spring where the water emerges from a localized spot

Shelterwood
A harvest and reforestation method in which most trees are removed but some are retained to shade seedlings that otherwise would be susceptible to heat and drought

Shovel
an excavator equipped with a grapple, used instead of a skidder or dozer to move logs

Side channel
a channel other than a main channel of a stream that only has flowing water when high-water levels occur

Significant wetland
those wetland types that require site-specific protection

Site class
a grouping of site indexes that indicates relative productivity

Site index
a measure of forest site quality based on the height of the dominant trees in a stand at a specified age, usually 50 or 100 years

Site preparation
any treatment that enhances site conditions for plantation establishment or natural regeneration

Skidding
in ground-based logging, the process of dragging logs from the woods to a landing; called "yarding" in cable or helicopter logging

Slash
tree tops, branches, bark and other natural debris, left after a forest operation

Slope (degrees or percent)
an incline measured as the change in surface level within a given horizontal distance, expressed in degrees or as a percentage (e.g., a rise of 2 feet that spans 100 feet is a 2 percent slope or an angle of 1.15 degrees)

Snag
a dead standing tree or section of the stem at least 30 feet tall and at least 11 inches DBH (see DBH)

Sound snag
a dead tree with some intact bark or limb stubs; conifers can have merchantable wood

Squash pipe
a type of culvert used to cross streams in areas with low road clearances or wide channels; also can provide better conditions for fish passage

Standard target
the minimum basal area of specified tree types and sizes that must be retained in the RMA when harvesting near a Type F or D stream

Steelhead
the anadromous life history variant of *Oncorhynchus mykiss*

Stocking
the number of trees on a given area, as in the case of trees per acre required to be planted after a harvest

Stream
a channel with a distinct bed or banks scoured by water which serves to confine water and that contains flowing surface water during some portion of the year.

Stream-associated wetland
a wetland that is not classified as significant and that is next to a stream

Stream improvement
actions to improve aquatic habitat, including placing logs, trees or boulders in streams, fencing out livestock, constructing side channels and afforestation

Subgrade
the layer of a roadbed on which the base or surface course is placed; on an unsurfaced road, this is the wearing surface (top layer upon which vehicles travel)

Talus
slope formed by an accumulation of rock debris, sometimes from a cliff or road cut above

Temporary crossing
a stream crossing installed and used during a harvest and promptly removed when the operation is completed or prior to seasonal runoff, whichever comes first

Temporary fill
material (e.g., soil and rock) used to construct a temporary crossing that must be removed from below the high water level of the stream at the completion of the operation

Threatened or endangered species
any species of plant or animal listed as in danger of becoming rare or extinct throughout all or a significant portion of its range, as defined by the Endangered Species Act of 1976

Topography
the surface forms, elevations and contours of an area of land

Turbidity
the cloudy appearance of a water body, caused by suspended or dissolved solids, algae, etc.; can indicate natural or accelerated erosion

Type 1 harvest
a harvest operation that requires reforestation because the number of seedlings, saplings or poles left does not meet the local stocking standards; however, wildlife leave trees are not required

Type 2 harvest
a harvest operation that requires wildlife leave trees but not reforestation because an adequate number of seedlings, saplings or poles are left; sometimes called a "green clearcut"

Type 3 harvest
a harvest operation that requires reforestation and, if larger than 25 acres, wildlife leave trees and down logs; limited to 120 acres and typically a clearcut

Type D stream
a stream that has domestic water use, but no fish use

Type F stream
a stream with fish use, or both fish use and domestic water use

Type N stream
a stream with neither fish nor domestic water use

Unclassified harvest
a harvest operation that meets the standards for both reforestation stocking and wildlife trees; typically a commercial thinning

Understory vegetation
those plants growing below the canopy formed by other, taller plants in a forest

Waste disposal area
a location for excess soil, rock and other debris from road construction that is stable and from where the material will not enter waters of the state

Water bar
a diversion ditch and/or hump constructed diagonally across a road or skid trail to control runoff and prevent erosion of road and trail surfaces

Waters of the State
include canals, creeks, estuaries, ponds, reservoirs, springs, streams, wells and wetlands

Wetland
an area sufficiently inundated or saturated by surface or ground water that local plants are typically those adapted to wet soil conditions; includes marshes, swamps, bogs and similar areas

Wildlife tree
a green tree at least 30 feet tall and at least 11 inches DBH (see DBH), planned for and left after a harvest to supply habitat for birds and other wildlife

Written plan
a document prepared by an operator or landowner that describes how an operation will be conducted and will protect resources; required by the ODF for several types of operations and/or activity locations

Other information sources

OAR = Oregon Administrative Rules

ORS = Oregon Revised Statutes

Copies of these and other publications and technical information available from ODF at www.oregon.gov/odf or from OFRI at KnowYourForest.org

FROM PAGE 6 – SECTION: HOW TO COMPLY WITH THE OREGON FOREST PRACTICES ACT

1. OAR Chapter 629-Division 605, Planning Forest Operations
2. A Guide to Legal Requirements for Preventing and Controlling Fires in Operations on and near Forestland in Oregon – ODF
3. OAR Chapter 629-Division 600, Definitions

FROM PAGE 12 – SECTION: HOW WATERS OF THE STATE ARE CLASSIFIED AND PROTECTED

1. OAR Chapter 629-Division 635, Water Protection Rules: Purpose, Goals, Classification and Riparian Management Areas
2. OAR Chapter 629-Division 642, Water Protection Rules: Vegetation Retention Along Streams
3. OAR Chapter 629-Division 645, Water Protection Rules: Riparian Management Areas and Protection Measures for Significant Wetlands
4. OAR Chapter 629-Division 650, Water Protection Rules: Riparian Management Areas and Protection Measures for Lakes
5. OAR Chapter 629-Division 655, Water Protection Rules: Riparian Management Areas and Protection Measures for "Other Wetlands," Seeps and Springs
6. Forest Practices Technical Note 1 Water Classification

FROM PAGE 18 – SECTION: YOU WANT TO HARVEST TIMBER ON YOUR PROPERTY. HOW DO YOU PLAN FOR IT?

1. OAR Chapter 629-Division 630, Harvesting Rules
2. ORS 527.620, Definitions
3. ORS 527.676, Leaving snags and downed logs in harvest type 2 or type 3 units; green trees to be left near certain streams

FROM PAGE 33 – SECTION: YOU WANT TO HARVEST TIMBER ALONG A STREAM. WHAT DO YOU NEED TO KNOW?

1. OAR Chapter 629-Division 635, Water Protection Rules: Purpose, Goals, Classification and Riparian Management Areas
2. OAR Chapter 629-Division 642, Water Protection Rules: Vegetation Retention Along Streams

FROM PAGE 35 – SECTION: YOU WANT TO HARVEST TIMBER AROUND A LAKE. HOW DO YOU MEET THE REQUIREMENTS?

OAR Chapter 629-Division 650, Water Protection Rules: Riparian Management Areas and Protection Measures for Lakes

FROM PAGE 37 – SECTION: YOU WANT TO HARVEST TIMBER IN OR NEAR A WETLAND. HOW DO YOU MEET THE REQUIREMENTS?

OAR Chapter 629-Division 645, Water Protection Rules: Riparian Management Areas and Protection Measures for Significant Wetlands

FROM PAGE 40 – SECTION: WHAT ARE THE REQUIREMENTS FOR LEAVING WILDLIFE TREES, SNAGS AND DOWN LOGS?

1. Oregon Guidelines for Selecting Reserve Trees, Associated Oregon Loggers
2. ORS 527.676-Leaving snags and downed logs in harvest type 2 or type 3 units; green trees to be left near certain streams

FROM PAGE 47 – SECTION: HOW DO YOU PROTECT SENSITIVE WILDLIFE SITES WHEN YOU HARVEST?

1. OAR Chapter 629-Division 665, Specified Resource Site Protection Rules
2. Forest Practices Note #8 (Revised), Spotted Owl, Dec. 1994
3. Forest Practices Note #10, Osprey, Sept. 1992
4. Forest Practices Program News Note, Summary of wildlife tree and down log retention requirements
5. Bald eagle management guidelines for Oregon and Washington. U.S. Fish and Wildlife Service, 1981. 10p.
6. Edge, W.D., Managing wildlife habitats in forested ecosystems. Oregon State University Extension Service, 12p.
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PRINTING:
Thanks to the Oregon Department of Forestry for financially supporting the printing of this guide.



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Second edition published in 2012
First edition published in 2002



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TARDAEWETHER Kellen * ODOE

From: TOKARCZYK John A * ODF
Sent: Thursday, November 15, 2018 11:48 AM
To: TARDAEWETHER Kellen * ODOE
Subject: RE: B2H Comments
Attachments: Boardman to Hemingway Transmission Additional Details 11152018.docx

Updated.

From: TOKARCZYK John A * ODF
Sent: Wednesday, November 14, 2018 2:01 PM
To: TARDAEWETHER Kellen * ODOE <Kellen.Tardaewether@oregon.gov>
Subject: B2H Comments

Kellen,

There is a small iteration to the comments I made earlier. There is no substantive change, just addition of websites where clarification may be needed.

John

Oregon

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State Forester's Office
2600 State Street
Salem, OR 97310-1336
503-945-7200
FAX 503-945-7212
http:/ /www.odf.state.or.us

November 15, 2018

"STEWARDSHIP IN FORESTRY"

RE: Boardman to Hemingway Transmission Line Project

Please accept the following response from the Oregon Department of Forestry (ODF) concerning the above. The ODF's comments are primarily related to the potential for construction, operation, and maintenance of project components that would be located across state and privately owned forest lands. In these instances project operators are responsible for review and compliance with applicable requirements found in statute and code. In addition, there is ongoing concern where proposed projects introduce the threat and or potential for creation of risk where wildfire is a concern.

With respect to wildfire risk, efforts should be sought to mitigate hazards through all phases of the proposed. Phases include planning, construction, maintenance, completion, and removal. Risk mitigation expectations and measures are unique to each project and can be further detailed in conjunction with the ODF.

Additionally, depending on the location of any proposed project activity, operator requirements and considerations may include but are not limited to the following conditions:

State and Private Forest Lands - Project activities involving commercial forest activity on state and private forest lands are governed by the Oregon Forest Practices Act, Oregon Revised Statute (ORS) 527, and Oregon Administrative Rules (OAR) chapter 629 divisions 605 through 665. These apply even though the forest activity is a peripheral component of the project(s). The forest practice rules are intended to provide resource protection and to set standards for planning forestry practices including harvesting, road construction and maintenance, protecting water quality in waters of the state, limiting effects on specified resource sites, providing for public safety down slope of high landslide hazards, and determining reforestation or land conversion requirements. Requirements include but are not limited to:

- **Operation Notification –** Notification to the State Forester is required for each operation on forestland under ORS 527.670. A separate notification should be filed for each county affected by the project. All notifications require a 15 day waiting period before activity may begin unless a waiver is requested. Notifications are shared with the Department of Revenue for tax filing purposes (ORS 321.550). A notification is required for each owner involved in the project.

- **Compliance with the Forest Practices Act** – The clearing or harvest of forests must comply with the Forest Practices Act. The project contractor(s) must plan for harvesting techniques that comply with the harvesting rules, particularly around streams, wetlands, and specified resource sites such as sensitive habitat. The presence of certain resources in or near an operation will trigger requirements to submit written plans in conjunction with notification. Activities necessitating statutory written plans are listed in OAR 629-605-0170. Additionally plans for alternate practices may be required for any activity which proposes modification of a rule requirement such as normally retained riparian management area trees, conversion to a land use incompatible with tree cover or other situations listed in OAR 629-605-0173. Where other agencies' regulations will be applicable, written approval from those agencies must be submitted as part of the plan for alternate practice. Additionally, non-statutory written plans may be required for any situation encountered that is listed in OAR 629-605-0170. These requirements may be waived if a request is submitted to the local ODF Stewardship Forester and said request is deemed reasonable.

- **Fire Protection** – The Oregon Department of Forestry is responsible for wildfire protection on private, state and some federal lands (BLM west of Cascades). Individuals and corporations conducting forest operations are subject to wildfire prevention and suppression requirements under Oregon Revised Statute chapter 477 and the associated administrative rules within chapter 629. Additional information regarding these requirements is available at the Department's website, http://www.oregon.gov/odf/Pages/fire/fire.aspx.

    - **Power Driven Machinery (PDM)** – Every person conducting an operation within a forest protection district that uses fire in any form or power driven machinery shall first obtain from the forester a written permit (ORS 477.625). By obtaining a PDM, which is included in the Notification of Operation, operators are required to follow certain fire prevention, readiness and suppression guidelines during fire season (https://www.oregon.gov/ODF/Fire/FirePreventionDocuments/2017%20Fire%20Season%20Requirements.pdf).
    - **Fire Season** – When fire season is declared those conducting an operation within a forest protection district must have fire tools and a water supply and also provide a Fire Watch service. As fire danger increases through the course of the season, time restrictions may be imposed in an effort to prevent fires from starting during the most critical times of the day (https://gisapps.odf.oregon.gov/firerestrictions/ifpl.html).
    - **Liability** – Under Oregon law, a landowner/operator must make every reasonable effort to suppress a wildfire resulting from an operation. Part of this requirement stems from meeting the above requirements and following fire prevention laws and rules. Rules violations may result in the billing of the landowner for the costs required to put the fire out by ODF. Limited liability, with a cap of $300,000 in fire suppression costs, still occurs if the operator follows all of the rules.

- **Road Construction and Reconstruction –** Project operators must ensure that road construction, reconstruction, and maintenance comply with the Forest Practices Act rules and associated best management practices (Rule Division 625).

- **Conversion of Forestlands** – While nothing in the Forest Practices Act shall prevent the conversion of forestland to any other use (ORS 527.730), many of the implementing administrative rules address the conversion to non-forest use to ensure the conversion process is coordinated with other relevant federal, state, and local agencies.

- **High Landslide Hazard Locations** – Operations that include areas classified as high landslide hazard locations require planning and geotechnical assessment to provide for public safety (Rule Division 623).

State Forest Lands – Additional considerations beyond those noted above include project activities which could or will affect portions of state forests. The Northwest Oregon Forest Management Plan (FMP) directs and guides management activities on State Forest lands. The ODF concerns with respect to the referenced project(s) lie with the potential for hindrance in strategies employed to achieve FMP goals and objectives. Specific concerns and considerations include but are not necessarily limited to:

- **Loss of Timber Production** – Oregon law requires that state forest lands generate revenue for trust-land counties via timber sales. Loss of forest productivity is a concern particularly where land is converted to a non forest status. To minimize the loss of productivity and conversion to a non-forest status, the ODF request that the operator(s) consider:
    - Keeping construction corridors to a minimum width and clear only what is necessary
    - Co-locate the pipeline in existing utility and road right-of-ways where possible
    - Provide for reforestation of the portion that will not be used as a permanent right of way
    - Consider alternative routes that avoid state forest land as much as possible

- **Conflicts with Planned Operations –** If and where appropriate, ODF requests that construction activity consider the timing of logging operations and mitigation that will minimize conflicts between road use, road construction, heavy equipment, log haul, and harvest activities. Additional activities such as tree planting, site preparation, and road maintenance should be considered as well.

- **Terrain and Operational Constraints –**Where planned project activity could or will challenge state forestland management interests such as general access, logging feasibility, timber sale design, slope stability, or resource inventory, coordination and consultation with ODF for project route selection are recommended and should be considered.

- **Other Considerations** – If and where appropriate considerations should be made where the proposed project(s) could or will affect FMP interests and or other applicable statute or rule as they relate to:
    - Protection of Forestland from wildfire
    - Aquatic and Riparian Resources
    - Threatened and Endangered Species
    - Land Management Classification System
    - Landscape Design
    - Recreation
    - Invasive Species
    - Cultural Resources

The aforementioned points of consideration serve to underline several elements of the Oregon Forest Practices Act as well as general issues of concern as they relate to the project under consideration, but do not represent the breadth of responsibility required of the proposer. There is an implicit expectation that the project proposer will be familiar with and fulfill all obligations entailed in the Oregon Forest Practices Act, as well as all relating statutes and rules (federal, state, and local) where the proposed project intersects with Oregon forest land and necessitates forest operations. Complete understanding and observance of these requirements as they relate to forest land in the course of the proposed is the responsibility of the proposer.

The Oregon Department of Forestry appreciates the opportunity to comment on the proposed. In the event that additional questions or concerns arise please contact me at 503-945-7414.

Sincerely,

John Tokarczyk
Oregon Department of Forestry

PRIVATE FOREST ACCORD



— 2022 —



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CHAPTER 1: INTRODUCTION

1.0 Introduction

This Private Forest Accord Report (the Report) is presented to the Oregon Legislature, Oregon Governor Kate Brown, and the Oregon Board of Forestry on February 2, 2022. It memorializes the agreements of the Authors (see below) to modify Oregon's forest practice laws and regulations to craft a Habitat Conservation Plan (HCP) that will achieve the issuance criteria of an Incidental Take Permit (ITP) under Section 10 of United States Endangered Species Act for the Covered Species (as defined in Section 1.4.1). These agreements are collectively known as the Private Forest Accord (PFA) and were the result of negotiations that concluded on October 30, 2021. The PFA negotiation process was established under the February 10, 2020 Memorandum of Understanding (the MOU), then formalized and funded through passage of SB 1602 (2020).

This Report is presented in conjunction with SB 1501, SB 1502, and HB 4055, and the agreements herein are to be implemented through the resulting statutory language of those bills and the administrative rules called for by the above bills and identified in this Report. It is the intention of the Authors that all rules promulgated to implement the Private Forest Accord will be consistent with the agreements contained in this Report.

1.1 Background

1.1.1 The Memorandum of Understanding

On February 10, 2020, 12 forest sector companies, Oregon's largest small woodlands owner organization, and 13 conservation and fishing organizations signed a Memorandum of Understanding (the MOU), which laid the foundation for the Private Forest Accord process. Prior to signing the MOU, the signatories were embroiled in a costly and unpredictable battle over competing initiative petitions that would appear on the November 2020 ballot. The 2020 voter initiatives followed on the heels of decades of fierce debate between the forest products sector and the conservation and fishing community about how to adequately manage privately owned forestlands to achieve a range of outcomes. These debates resulted in deeply entrenched political camps, which in turn often made achieving meaningful policy objectives difficult.

The MOU was a good-faith effort by both the forest products sector and the conservation and fishing community to find collaborative approaches to resolving the numerous conflicts that were embodied in the initiative petitions. A copy of the MOU is attached to this Report as Appendix A.

The MOU included three substantive agreements:

1. The signatories agreed to work collaboratively to pass aerial pesticide application legislation consistent with the term sheet attached to the MOU as Exhibit B. This legislation was included in SB 1602, which was passed by the Oregon House and Senate during the 2020 First Special Session and subsequently signed into law by Governor Brown. The legislation increased buffers around homes, schools, water intakes, and streams for helicopters applying pesticides. It also created a first-in-the-nation electronic notification system that allows neighbors to obtain notice prior to a planned aerial pesticide application, as well as notice of completion of activities.

2. The signatories agreed to support legislation instructing the Board of Forestry to extend the 2017 salmon, steelhead, and bull trout (SSBT) stream rules to the Siskiyou Georegion at the soonest possible date. This expansion was also passed into law through SB 1602.

3. The signatories agreed to participate in "a science-informed policy development process, rooted in compromise, to evaluate and jointly recommend substantive and procedural changes to Oregon forest practice laws and regulations" (p. 2). The goal of this process was to "finalize a plan to prepare an application to the federal services through changes to Oregon's Forest Practices Act and implementing regulations that will provide a rational basis for an approvable Habitat Conservation Plan, or other mechanism for federal regulatory assurances, covering listed salmonids and other aquatic and riparian-dependent species" (p. 2). The MOU limited the identified process to 18 months and required that any potential agreements would be reached before the 2022 legislative session. This process was formalized and funded through the passage of SB 1602, and would become the Private Forest Accord process.

In addition to supporting the above, the MOU signatories also agreed to abide by various ground rules during the Private Forest Accord process. MOU signatories were not required to support the final

outcome of the Private Forest Accord process, and failure of the process was always a strong possibility.

1.2 The Private Forest Accord

1.2.1 Authors of the PFA Report

The Authors of this Report are a subset of signatories to the February 10, 2020 Memorandum of Understanding (the MOU) that established the foundation for the PFA process. The Authors consist of 1) a coalition of prominent conservation and fishing groups (Conservation Coalition) and 2) a coalition of prominent Oregon forest sector companies and the Oregon Small Woodlands Association (Working Forest Coalition).

The Authors are listed in the table below:

Conservation Coalition Authors	**Working Forest Coalition Authors**
Audubon Society of Portland	Campbell Global
Beyond Toxics	Greenwood Resources
Cascadia Wildlands	Hampton Lumber
Klamath Siskiyou Wildlands Center	Lone Rock Resources
Northwest Guides and Anglers	Manulife Timberland and Agriculture (Hancock Natural Resource Group)
Oregon League of Conservation Voters	Oregon Small Woodlands Association
Oregon Stream Protection Coalition	Port Blakely
Oregon Wild	Rayonier
Pacific Coast Federation of Fishermen's Associations	Roseburg Forest Products
Rogue Riverkeeper	Seneca Sawmill/Sierra Pacific Industries
Trout Unlimited	Starker Forests
Umpqua Watersheds	Weyerhaeuser Company
Wild Salmon Center	

1.2.2 Sponsors of the PFA Process

The Private Forest Accord was facilitated by Governor Kate Brown, with the assistance of her staff and outside mediators, and with direction and support from the Oregon Legislature.

1.2.3 Participating Agencies

Throughout the Private Forest Accord process, the Authors interfaced with various federal and state agencies. The agencies that substantively participated and provided guidance during the process are identified in the following table:

Participating State Agencies	**Participating Federal Agencies**
Oregon Department of Environmental Quality (DEQ)	National Marine Fisheries Service (NMFS)
Oregon Department of Fish and Wildlife (ODFW)	United States Fish and Wildlife Service (USFWS)
Oregon Department of Forestry (ODF)	

1.3 Goals of the PFA

The Authors of this Report utilized a collaborative process balancing biological and economic goals to develop practical solutions to avoid, minimize, and mitigate the effects of timber harvest, stand management, road system management, and other activities regulated under the Oregon Forest Practices Act on Covered Species and aquatic habitats. These strategies were developed to improve and protect functions in riparian areas and on steep slopes, including the recruitment of large wood, removal of fish passage barriers, and protection from increased sediment delivery and temperature. These discussions have culminated in the agreements outlined in this Report.
The goals pursued during the Private Forest Accord process are as follows:

- **Provide greater business certainty:** Provide a greater level of certainty to forest landowners and industries that depend on Oregon's private working forests without compromising the viability of Oregon's manufacturing infrastructure.
- **Provide greater environmental certainty:** Provide a greater level of certainty for the survival and recovery of threatened and endangered species and for the protection of aquatic resources.
- **Provide greater regulatory certainty:** Submit a supportable application to National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (collectively the "Federal Services") to achieve a programmatic aquatics HCP, which in turn will yield the issuance of an Incidental Take Permit (ITP) and enhance habitat for covered species.
- **Provide science-driven adaptive management process:** Support the certainty and durability of Oregon's forest practices laws concerning private forestland and regulations

through the establishment of an Adaptive Management Program that involves a rigorous look at the efficacy of existing and future forest practice regulations, and a science-driven process for analyzing the need for any changes.

- **Provide alternatives for small forestland owners:** Address the potential disproportionate impacts that regulatory changes might have on small forestland owners and provide alternative compliance paths and/or financial impact mitigation for these potential disproportionate impacts.

1.4 The PFA Process



As established under the MOU, the signatories agreed to a series of mediated meetings over an 18-month period to develop a final plan that would result in legislation for the 2022 legislative session. The PFA process began in late 2020 when Peter Koehler was hired as a mediator, using funds made available by SB 1602. Soon thereafter, the Conservation and Working Forest Coalitions began meeting separately with Mr. Koehler. Each coalition appointed six representatives to directly participate in the mediations. Starting on January 12, 2021, and led by Governor Brown, representatives from the two coalitions began meeting together in sessions mediated by Mr. Koehler. As a result of the COVID-19 pandemic, meetings generally occurred virtually.

As the process developed, numerous subgroups were formed to address specific issues. These subgroups included the following: riparian areas, steep slopes, roads, mitigation, small forestland owners, funding, amphibians, east side issues, and adaptive management. Most subgroups met for two hours on a weekly or bi-weekly basis through much of 2021. Multiple other meetings were facilitated to address issues such as beaver management. In addition to the issue-focused subgroup meetings, coalition representatives engaged jointly in all-day meetings periodically throughout 2021. Many subgroup and joint meetings benefitted from attendance by staff from the National Marine Fisheries Service, United States Fish and Wildlife Service, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, as well as numerous contractors hired by both coalitions.

Over the 18-month period, the Authors and their representatives investigated the scientific needs of the species at issue, as well as the scientific rationales, operational implications, and economic feasibility of various prescriptions and approaches. The Authors also explored numerous other scientific and policy issues related to private forest management.

To meet deadlines for the required 2022 legislative session, coalition representatives met in Portland from October 25 to 29, 2021. Governor Brown and several members of her staff attended much of that negotiation. Early in the morning of October 30, 2021, agreement was reached on the Private

Forest Accord prescriptions. Those prescriptions were memorialized in a term sheet and a series of chapters that were released to the public shortly after their signature. The term sheet and chapters that were agreed to on October 30, 2021, are the basis of this Report.

1.4.1 Covered Species Agreement

The Authors will support a Habitat Conservation Plan and application for an Incidental Take Permit, consistent with this Report, for the Covered Species. The Authors further agree that the term of the HCP should be 50-years for fish species and 25- years for amphibian species. The Covered Species shall include the following:

- All native salmon and trout (*Oncorhynchus spp.*)
- Bull trout (*Salvelinus confluentus*)
- Mountain whitefish (*Prosopium williamsoni*)
- Pacific eulachon/smelt (*Thaleichthys pacificus*)
- Green sturgeon (*Acipenser medirostris*)
- Columbia torrent salamander (*Rhyacotriton kezeri*)
- Southern torrent salamander (*Rhyacotriton variegatus*)
- Coastal giant salamander (*Dicamptodon tenebrosus*)
- Cope's giant salamander (*Dicamptodon copei)*
- Coastal tailed frog (*Ascaphus truei*)

It is anticipated that the HCP application process will further develop the definition of Covered Species, consistent with the above intent.

1.4.2 Covered Activities Agreement

The Authors will support a Habitat Conservation Plan and application for an Incidental Take Permit, consistent with this Report, for the Covered Activities. Covered Activities shall include ongoing and planned forest management practices as defined within the Oregon Forest Practice Act statutes (Oregon Revised Statutes 527.610 – 527.770, 527.990, and 527.992) and rules (Oregon Administrative Rules Chapter 629). The intent of the Private Forest Accord is to provide coverage for forest practices excluding the application of pesticides or fertilizers. It is anticipated that the HCP application process will further develop the definition of Covered Activities, consistent with the above intent.

1.4.3 Covered Lands Agreement

The Authors will support a Habitat Conservation Plan and application for an Incidental Take Permit, consistent with this Report, for the Covered Lands. Covered Lands shall mean all privately owned forestlands, as defined at ORS 527.620(7), in the State of Oregon.

Nothing in this Report or the legislation implementing it affects:

(a) The treaty or other rights of an Indian Tribe;
(b) The beneficial ownership interest of:

(A) Land held in trust by the United States for an Indian Tribe; or
(B) Land held by an Indian Tribe.

The Board of Forestry shall develop a process for an Indian Tribe to elect to join as an applicant for the Habitat Conservation Plan consistent with the terms and requirements applicable to private forestlands under this Report.

1.4.4 Complete Agreement

This Report, SB 1501, SB 1502, and HB 4055 represent the complete Private Forest Accord agreement of the Authors. Other issues were discussed as part of the Private Forest Accord process for which no agreements were reached. When adopting, amending, or repealing rules as envisioned by this Report, the board shall resolve any gaps or ambiguities in the requirements of this Report -by: (a) referring to the -intent and structure of the rules implementing ORS 527.610 to 527.770 that are in effect on the effective date of SB 1501; and (b) achieving the outcomes described in this Report.

It is the intention of the Authors that any future interpretations of the Private Forest Accord process will look to this Report and the contemporaneous legislation as the complete agreement and will not look to extemporaneous sources.

1.4.5 Additional Issues Considered under the PFA Process

a. Tethered Logging Rulemaking

The Authors agree to initiate rulemaking on tethered logging within three years after the effective date of SB 1501, SB 1502, and HB 4055. This rulemaking may use, but does not need to use, the new adaptive management process described in this Report. The Authors anticipate that the Board of Forestry will evaluate the terms of plans for alternate practices (PFAP) approved for tethered logging practices, including the use of a template PFAP form, and relevant scientific literature to determine whether to promulgate a rule regarding tethered logging practices.

b. Post-Disturbance Rulemaking

The Authors agree that the Board of Forestry should complete a rulemaking under ORS 527.714 related to post-disturbance harvest of trees retained pursuant to the rules adopted pursuant to this Report by November 30, 2025. The new adaptive management process described in this Report will not apply to this rulemaking. Instead, the Authors anticipate that the Board of Forestry will first commission a review of literature and other evidence to consider whether the current rules and practices related to post-disturbance harvest are sufficient to meet the goals of the PFA, and will consider post-fire ecology, post-fire forest regeneration, and worker safety. This process will include stakeholder engagement and solicitation of information from the public and other agencies, through public hearings and/or written comments. ODF will prepare a report that (1) summarizes the literature, comments, and other materials received and (2) evaluates whether current rules need to be modified to align with the goals of the PFA. ODF may choose to include a recommended course of

action in its report. The Board will use the ODF report in proceeding under ORS 527.714, including making the findings required by ORS 527.714(5) necessary to adopt a new or revised rule.

1.4.6 Commitments of the Authors



The Authors agree to use all reasonable efforts to support the expeditious implementation of the recommendations contained in this Report. In so doing, the Authors commit to working together in good faith to create a positive, constructive process for achieving the goals of this Report.

The Authors' commitments are subject to (i) the Legislature's adoption of SB 1501, SB 1502, and HB 4055 prior to April 1, 2022; (ii) the Board of Forestry's adoption of permanent rules implementing the recommendations of this Report by November 30, 2022; (iii) the provision of adequate funding for the implementation of the recommendations contained in this Report; and (iv) the receipt of federal assurances relating to the Endangered Species Act by December 31, 2027, for the Covered Species.

1.5 Appendices

The following appendices are attached and incorporated into this Report:

Appendix A – February 2020 Memorandum of Understanding

Appendix B – Delineating Landslide and Debris Flow Susceptibility in Western Oregon in Support of the Private Forest Accord

Appendix C – Guidance for Identification of Slope Retention Areas from Designated Sediment Source Areas

Appendix D – Forest Conservation Credit



CHAPTER 2: RIPARIAN AREAS

2.1 Introduction

Riparian areas provide numerous functions necessary to create and maintain habitat for freshwater species. Thus, prescriptions governing riparian area management are essential to maintain and enhance freshwater habitats in forested landscapes. Strategies that limit human disturbance in riparian areas and provide habitat functions for salmonids and the other covered species are a critical component of this agreement.

In an effort to balance ecological and economic needs, the proposed revised forest practice rules and prescriptions in this chapter differ based on the type of streams associated with unit-level timber harvest. As examples, fish-bearing streams (Type F) and streams inhabited by salmon, steelhead, or bull trout (Type SSBT) receive greater riparian protection than non-fish-bearing (Type N) streams, and many non-fish perennial streams (Type Np) receive greater protections than non-fish seasonal streams (Type Ns). Because of these differences, accurately and fully mapping the hydrography within Oregon's forested watersheds, and correctly identifying the extent and type of streams on the landscape are critical for implementing the revised rules and prescriptions, and to support the

application for an HCP. This information will also aid landowners in applying these prescriptions accurately in the field.

2.1.2 Definitions

The Authors intend that definitions under the Oregon Forest Practices Act (ORS 527.610 –527.992) will remain in place consistent with the most current Forest Practice Rules (OAR chapter 629, divisions 600 through 680), except for the following revised or new definitions established in this Chapter:

> **"Channel migration zone"** (CMZ) means the area where the active channel of a stream is prone to move and this results in a potential near-term loss of riparian function and associated habitat adjacent to the stream, except as modified by a permanent levee, dike, railroad lines, or any public transportation infrastructure. For this purpose, near term means the time scale required to grow a mature forest. ODF shall develop a Tech Note to assist in identifying a CMZ consistent with Washington DNR Board Manual 2.
>
> **"Type Np stream"** means all perennial streams that are not Type SSBT, Type F, or Type D streams.
>
> **"Lateral Type Np stream"** means any Type Np stream that is not a Terminal Type Np stream, for the purposes of RMA prescriptions as established in this Chapter in Table 2.
>
> **"Terminal Type Np stream"** means the largest Type Np stream by basin size that is immediately upstream of the end of a Type F or Type SSBT stream, for the purposes of RMA prescriptions as established in this Chapter in Table 2.
>
> **"Type Ns stream"** means all seasonal stream reaches that are not Type SSBT, Type F, Type D, or Type Np streams.
>
> **"Seeps"** means features similar to springs, except without a well-defined point or points of groundwater surface discharge and usually very low flow.
>
> **"Springs"** means features where groundwater discharges to land surface or a surface water body at a well-defined point or points. Spring volumes range from small, intermittent trickles to millions of gallons per day, depending on the groundwater source and hydraulic head.

2.2 Goals

The overarching goal of the riparian management system proposed in this Chapter is to maintain and enhance riparian functions, related specifically to large wood, shade, and sediment, that support fish and amphibians.

2.2.1 Goals Specific to the Proposed Stream Classification System

To aid in implementation and enforcement of the proposed riparian management system, the Authors established the following goals specific to the proposed stream classification system:

a. Develop and maintain statewide hydrography on private forest lands based on the highest-resolution digital elevation models (DEMs) appropriate for such use. Hydrography for stream classification will rely on the synthetic stream layers developed by TerrainWorks derived from high-resolution DEMs in support of the steep-slope management provisions of the Private Forest Accord.

b. Attribute the hydrography with sufficient information to accurately classify streams with respect to fish distribution and habitat and the likelihood of perennial flow.

c. Establish the authority and responsibility for the Oregon Department of Fish and Wildlife (ODFW) to develop and maintain stream layers describing fish use and perenniality.

d. Incorporate the synthetic stream layers, fish habitat and use information, and perenniality classifications into the ODF FERNS system for purposes of implementing the forest practice rules.

e. Ensure that the models, processes, and data used to classify streams with respect to fish use and the likelihood of perennial flow are transparent and accessible to the regulated community and the public.

f. Ensure that the riparian management system is implemented equitably and consistently across the state.

2.3 Private Forest Accord Commitments

2.3.1 Stream Classification

Hydrography for stream classification will rely on the synthetic stream layers developed by TerrainWorks derived from high-resolution DEMs in support of the steep-slope management provisions of the Private Forest Accord. This synthetic stream layer should be updated as new technology or data become available to improve the resolution of the stream network. The Authors agree that the newly- developed layers should be incorporated into the National Hydrography Dataset (NHD).



The following beneficial stream classes are currently identified under OAR 629-635-0200: Type F, Type SSBT, Type D, and Type N. These stream classes are also differentiated by stream size (i.e., small, medium, and large). Under the PFA, the Authors intend that these definitions will persist except for the revised or new definitions established in this Chapter.

2.3.1.1 Determining Distribution of Fish and Fish Habitat

ODFW will maintain a database of data layers mapping fish use utilizing modeling, physical habitat surveys, and fish presence. ODFW will work with ODF to incorporate ODFW's findings into a fish distribution layer for incorporation into ODF FERNS to delineate the Type F stream network.

a. Model and Map

A map will be developed by TerrainWorks to identify Type F streams based on the "Optimal" version of the fish distribution model developed by Fransen et al. 2006[1] by May 1, 2023. As discussed below, end of fish locations identified through valid field surveys will override modeled limits of fish distribution, subject to the review and standards described in subsection (b) below. This map will be incorporated into FERNS no later than July 1, 2023, for purposes of regulating Type- F and Type- SSBT RMAs. After peer review (analogous to that requisite for publication), a fish distribution model being developed by the Pacific Northwest (PNW) Research Station (Penaluna et al., in preparation) will be used to map Type F streams. This will replace the Fransen et al. 2006-derived map in FERNS, provided: 1) the accuracy of the PNW model is deemed by ODFW to be equal to or better than the Fransen (2006) Optimal model, and 2) valid historical field surveys are incorporated as described in 3.3.1.1.b. Other modeled approaches developed in the adaptive management program may be used as well, pursuant to that process.

b. Historical Fish Distribution Field Surveys

The modeled map of Type F streams developed by TerrainWorks will be modified to incorporate historical "ODF End of Fish" information obtained from physical habitat surveys or direct sampling of fish presence, subject to a quality assurance and quality control review where data are available. This review will consider: 1) if surveys were conducted in the seasonal window appropriate for the technique used, and 2) if the survey adequately considered the presence of artificial obstructions.

Data derived from the direct sampling of fish presence will be incorporated into the map of Type F streams unless a review by ODFW concludes that the survey fails to satisfy the following criteria:

1) **Surveys conducted outside of recommended survey season that found an absence of fish based on e-fishing:** Surveys that found an absence of fish based on e-fishing but were conducted outside of the recommended survey season (Table 1 in ODF and ODFW's joint publication, Surveying Forest Streams for Fish Use, 2004) will be

[1] Brian R. Fransen, Steven D. Duke, L. Guy McWethy, Jason K. Walter & Robert E. Bilby. 2006. A Logistic Regression Model for Predicting the Upstream Extent of Fish Occurrence Based on Geographical Information Systems Data, North American Journal of Fisheries Management, 26:4, 960-975, DOI: 10.1577/M04-187.1

disregarded, unless there was a valid scientific reason to use an out-of-season survey (e.g., a waterfall, pH, etc.) approved by ODFW.

2) **Surveys above artificial obstructions conducted prior to implementation of 2007 artificial obstruction rules:** Surveys above artificial obstructions conducted prior to the implementation of the 2007 artificial obstruction rules will not be relied on to determine the end of fish use unless the operator can meet the post-2007 required showing (obstruction will persist until key piece size realized), per OAR 629-635-0200(11)(f). Otherwise, for purposes of layer to be incorporated into ODF FERNS, fish use will be extended above an artificial obstruction to the end of modeled fish use, per OAR 629-635-0200(11)(b).

ODFW must disqualify historic field surveys pursuant to the above no later than May 1, 2023 for purposes of incorporation into the TerrainWorks stream layer and ODF FERNS; provided that should ODFW disqualify a historic field survey after May 1, 2023, the ODF FERNS layer will be updated but units laid out pursuant to the map prior to the update will be considered in compliance.

ODFW will undertake a process of assessing the modeled layer with current ODF end of fish use, prioritizing the streams with the largest deviations between ODF and the model for initial analysis. Where there are large deviations, ODFW will first determine whether it is a product of a pre-2007 artificial obstruction (in which case the model will prevail absent the requisite showing), or due to an otherwise valid survey (in which case the survey would prevail). This process will follow the methodology described in OAR 629-635-0200 (11). If completed in time, ODFW's findings will be folded into the TerrainWorks stream layer that is incorporated into ODF FERNS. Otherwise, ODFW's findings will be incorporated into ODF FERNS as completed.

c. Use of Electro-Fishing (E-Fishing)

Electro-fishing (e-fishing) will remain a valid method of establishing fish absence for FPA regulatory purposes, provided that the protocol will be revised to require surveying 1,320 feet upstream of the last fish located, not the current 150 feet, unless the surveyor first reaches the physical habitat criteria stopping rules described below. All e-fishing surveys are and will be conducted in accordance with NOAA Fisheries electrofishing guidelines and any updates to those guidelines (NOAA 2000). If ODFW convenes a multi-stakeholder process to review efficacy of sampling methods that includes at a minimum equal representation by conservation interests and the timber industry, and following that process adopts a rule that requires the use of methods other than e-fishing to determine fish presence or absence for delineating fish distribution for FPA, then ODF and ODFW will require the use of suitable alternatives. All federally recognized Tribes will be notified by ODFW about this process, including all meetings.

d. Update of Physical Habitat Criteria

e. Table 2, "Physical Habitat Survey to Determine Natural Barriers to Fish Use,"[2] will be updated and elevated into rule by January 1, 2025. The updated physical habitat criteria will rely on peer-reviewed data, and incorporate an external peer review process with scientists who have expertise in stream fish habitat, fluvial processes, and geomorphology; and foresters with field experience surveying for fish presence, with opportunity for public comment. The physical habitat criteria will align with the stopping rules developed through model development and validation in the field in consultation with ODFW.

f. Environmental DNA (eDNA) Surveys

The Authors agree to collaborate and facilitate studies that inform and improve or validate the reliability and efficacy of eDNA on private, state, and federal forestlands, and incorporate those findings into the relevant modeled layers as appropriate.

g. Maintenance of the Fish Use Layer

ODFW-approved survey work will be regularly incorporated into ODF FERNS on a timely basis. ODFW and ODF will create and maintain a clear process for landowner certification of survey work. ODF or ODFW may object to the survey, but absent objection the landowner certification will be accepted and considered final and will be incorporated into the relevant layers. ODFW will also establish requirements for the training and certification of field surveyors.



2.3.1.2 Determining SSBT Habitat Distribution

Changes to the SSBT habitat distribution layer maintained by ODFW were not discussed during the PFA negotiations but are assumed to occur at least every 4 years consistent with OAR 629-635-0200(13)(b).

2.3.1.3 Mapping and Identifying Perennial Streams

a. Identifying Perennial Streams

[2] Oregon Department of Forestry, Forest Practice Rule Guidance: Division 653 Water Protection Rules: Purpose, Goals, Classification, and Riparian Management Areas. 17 December 2021. Available online < https://www.oregon.gov/odf/Documents/workingforests/fpa-guidance-division-635-water-classification.pdf >.

Perennial streams shall be identified based on modeled outputs or field surveys, through a phased approach that is intended to increase mapping resolution as quickly as possible with available information. During the initial phase, existing maps will be used with additional field verification requirements. In the second phase, the perennial stream network will be modeled based on high-resolution LiDAR-derived DEMs, and field verification by the landowner will no longer be required, but will be permitted as described below. The three phases to identify perennial streams are established below:

1) **Phase One: Field identification during harvest unit planning**
   To guide field identification of perenniality, TerrainWorks will incorporate the NHD High Resolution perennial stream classifications in its initial mapped layer. However, landowners will be obligated to apply RMA prescriptions established in this Chapter to perennial streams, whether or not mapped as perennial in ODF FERNS. This phase ends once Phase Two approaches are implemented. Phase One applies statewide.

2) **Phase Two: Comprehensive regulatory layer with potential for field verification**

   a. **West of the Cascade Crest:**

   The USGS in coordination with the PNW Research Station is developing the Western Oregon Flow Permanence Model (Burnett et al., in prep), following an established modeling approach (e.g., Jaeger et al. 2019). The newly developed model relies on high-resolution LiDAR-derived DEMs, various other physical and biological covariates, and field observations on flow permanence collected by a standard method and archived (i.e., FLOwPER; Jaeger et al. 2020). The model returns probabilistic estimates describing flow permanence for the region west of the Cascade Crest. Within three months after the model is available, ODFW in consultation with ODF and the Authors will assess whether or not the model outputs are sufficiently accurate to comprise a regulatory layer, or whether an alternative approach would be better. If sufficiently accurate, then the necessary covariates will be derived and the model will be run for basins in Western Oregon that were not used in model development.

   If ODFW in consultation with ODF and the Authors determines that the model outputs are insufficiently accurate to comprise a regulatory layer, then ODFW in collaboration with the Authors and other stakeholders and state and federal agencies will develop another method to map the extent of the perennial stream network for all private forest lands in Western Oregon. One approach is to develop an index of perenniality. Personnel at the USGS (Roy Sando and Kristin Jaeger) have proposed and can lead development of such an index, which would take advantage of the multiple streamflow permanence datasets that are available for Western Oregon. These include the National Hydrography Dataset streamflow classifications (perennial, intermittent, ephemeral), the USGS PRObability of Streamflow PERmanence Pacific Northwest ($PROSPER_{PNW}$) model outputs, the Western Oregon Streamflow Permanence Model outputs, streamflow permanence field observations used in the calibration of $PROSPER_{PNW}$ (McShane et al. 2017), and recent data collected using the FLOwPER Application (FLOwPER; Jaeger et al. 2020). The datasets differ in spatial resolution (NHD flowlines [with varying spatial resolutions], 30m, 10m, and point), temporal

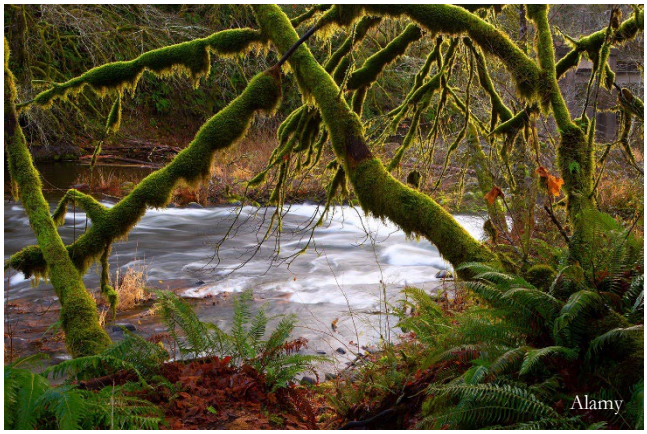
resolution (annual, one-time observations, repeat observations), periods of record (historical and contemporary), degrees of modeling and observational uncertainty, and data formats (i.e., raster, vector). Despite these differences, valuable information can be obtained from each product in determining stream perenniality.

Regardless of the modeled or indexed method chosen, the threshold for flow permanence will be established by ODFW through a joint agency/stakeholder process involving the Authors and the relevant state and federal agencies. The full extent of the perennial stream network for Western Oregon will be reflected in the TerrainWorks synthetic hydrography and become the regulatory layer that is incorporated into ODF FERNS as soon as possible but no later than July 1, 2025. At that time, landowners will be regulated to the new layer. Landowners may request validation by ODFW of fieldwork after presenting evidence that suggests the model outputs are inaccurate for a particular location. ODFW will develop criteria for the submission of evidence such as time-stamped and georeferenced photos. Should a landowner choose to conduct physical surveys, the resulting data conforming with ODFW survey protocols will be used to update the modeled perenniality layer in ODF FERNS.

b. East of the Cascade Crest

Outputs from the USGS PROSPER Pacific Northwest model are currently available for Eastern Oregon. As soon as possible, but no later than July 1, 2024, ODFW will in consultation with the Authors and ODF assess whether or not outputs of the PROSPER model are sufficiently accurate to comprise a regulatory layer. If not, then ODFW in collaboration with the Authors and other stakeholders and state and federal agencies, will develop another method to map the extent of the perennial stream network for all private forest lands in Eastern Oregon. As previously described, an alternative approach could be developing an index of perenniality by combining available data and modeled outputs. Regardless of the modeled or indexed method chosen, the threshold for flow permanence will be established by ODFW through a joint agency/stakeholder process involving the Authors and the relevant state and federal agencies. The full extent of the perennial stream network for Eastern Oregon will be reflected in the TerrainWorks synthetic hydrography and become the regulatory layer that is incorporated into ODF FERNS as soon as possible but no later than July 1, 2025. At that time, landowners will be regulated to the new layer. Landowners may request validation by ODFW of fieldwork after presenting evidence that suggests the model outputs are inaccurate for a particular location. ODFW will develop criteria for the submission of evidence such as time-stamped and georeferenced photos. Should a landowner choose to conduct physical surveys, the resulting data conforming with ODFW survey protocols will be used to update the modeled perenniality layer in ODF FERNS.

3) Phase Three: Adaptive management



The regulatory layers developed in Phase Two will undoubtedly be updated during the 50-year term of the HCP. Updates will be needed to respond to a changing climate as well as advances in understanding and technology. The models and indices described in Phase Two are static and not easily updated as new field observations and other data become available. These problems can be proactively addressed through development of a dynamic operational streamflow permanence model that can provide updated model predictions based on existing and new calibration data and high-resolution stream hydrography. Personnel at the USGS (Roy Sando and Kristin Jaeger) have proposed and could lead a collaborative project to develop a dynamic operational streamflow permanence model. Collaborators would include the Authors, other stakeholders, ODFW, and other relevant state and federal agencies. The modeling structure and statistical methods would likely build on approaches described in Jaeger et al. (2019) and Sando et al. (in prep). Key differences will include: 1) developing the model in a Cloud environment to facilitate recalibrating and re-running the model for specific scales, locations, and time periods; 2) incorporating the ability to preprocess and ingest newly collected (e.g., via FLOwPER) or newly "found" streamflow permanence data; and 3) serving final products through an easy-to-use and customizable interface that allows for visualization of that data (e.g., a dynamic threshold adjustment slider to view how stream perenniality predictions might change given different probabilistic thresholds). Potential timeline for model development and evaluation would be at least 4 years.

If a dynamic, operational model is developed, then the threshold for flow permanence will be established by ODFW through a joint agency/stakeholder process involving the Authors and the relevant state and federal agencies. The full extent of the perennial stream network for the entire state of Oregon will be reflected in the TerrainWorks synthetic hydrography and become the regulatory layer that is incorporated into ODF FERNS. At such time, landowners will be regulated to the new layer. Landowners may request validation by ODFW of fieldwork after presenting evidence that suggests the model outputs are inaccurate for a particular location. ODFW will develop criteria for the submission of evidence such as time-stamped and georeferenced photos. Should a landowner choose to conduct physical surveys, the resulting data conforming with ODFW survey protocols will be used to update the modeled perenniality layer in ODF FERNS.

b. Field Survey and Landowner Information Reporting

All perenniality field surveys will be reported through FLOwPER for incorporation into the Phase Two Modeling as appropriate within 2 months of observation.

2.3.2 Riparian Prescriptions

This section establishes the "**Standard Practice**" for Riparian Management Areas (RMAs) that the Authors have agreed will apply when timber is harvested near streams. Riparian Management Area retains the existing definition under OAR 629-600-0100(63) as "an area along each side of specified waters of the state within which vegetation retention and special management practices are required for the protection of water quality, hydrologic functions, and fish and wildlife habitat." Additional options available to Small Forestland Owners (SFOs) are defined in Chapter 5.



a. Riparian Management Area (RMA) Widths for all Stream Types

All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel, or channel migration zone (CMZ) if present. The definition of CMZ is established in Section 2.1.2 of this Chapter. The RMA width shall be measured separately on each side of the stream. The RMA width prescriptions established in Table 1 for Western Oregon and Table 2 for Eastern Oregon refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone (CMZ), if present, upslope).

b. Riparian Management Area (RMA) Lengths for all Stream Types

The measurements of RMA lengths are made from the confluence with the Type F or Type SSBT junction to which they are tributary.

2.3.2.2 Western Oregon Riparian Prescriptions

The table below establishes the RMA widths and prescriptions for Western Oregon under the Standard Practice. The RMA widths in Table 1 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone (CMZ), if present, upslope). The RMAs will be laid out as described in Section 2.3.2.4 below.

Table 1. Western Oregon RMAs

Stream Type	RMA Width and Prescription[1]
Large Type F and SSBT	110 feet no harvest
Medium Type F and SSBT	110 feet no harvest
Small Type F and SSBT	100 feet no harvest
Large Type N	75 feet no harvest
Medium Type N	75 feet no harvest
Small Type Np, tributary to SSBT	A 75-foot-wide no-harvest RMA from the confluence with the SSBT stream for the first 500 feet, then a 50-foot-wide no harvest RMA on the next 650 feet, for a total of up to 1,150' (the restricted harvest maximum "**RH Max**" applicable to a Western Oregon Small Type Np, tributary to SSBT), with an R-ELZ and ELZ as defined and further described below
Small Type Np, tributary to Type F	A 75-foot-wide no-harvest RMA from the confluence with the Type F stream for up to the first 600 feet (the "**RH Max**" applicable to a Western Oregon Small Type Np, tributary to a Type F), with an R-ELZ and ELZ as defined and further described below
Type Ns	35 feet equipment limitation zone

[1] All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel or channel migration zone (CMZ), if present. The RMA width prescriptions established in Table 1 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone [CMZ], if present, upslope). Measurements of length are made from the confluence with the Type F or Type SSBT junction they are tributary to.

a. Seeps and Springs in Western Oregon

Seeps and springs within the no-harvest portion of the RMA shall have a no-harvest RMA width of at least 35 feet and the length (parallel to the stream) shall be limited to the length of the feature.

2.3.2.3 Eastern Oregon Riparian Prescriptions

The table below establishes the RMA widths and prescriptions for Eastern Oregon under the Standard Practice. The Eastern Oregon RMA prescriptions establish an inner no-harvest zone and an outer managed-harvest zone. The RMA widths in Table 2 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone [CMZ], if present, upslope).

Table 2. Eastern Oregon RMAs

Stream Type	RMA Width and Prescription[1]
Large Type F and SSBT	30 feet inner no-harvest zone and 70 feet outer managed-harvest zone (100 feet total)
Medium Type F and SSBT	30 feet inner no-harvest zone and 70 feet outer managed-harvest zone (100 feet total)
Small Type F and SSBT	30 feet inner no-harvest zone and 45 feet outer managed-harvest zone (75 feet total)
Large Type N	30 feet inner no-harvest zone and 45 feet outer managed-harvest zone (75 feet total)
Medium Type N	30 feet inner no-harvest zone and 45 feet outer managed-harvest zone (75 feet total)
Small Type Np, Terminal	A 30-foot inner no-harvest zone and 30-foot outer managed-harvest zone, for up to the first 500 feet length above junction with Type F or SSBT (the "**RH Max**" applicable to an Eastern Oregon Small Type Np Terminal), with an R-ELZ and ELZ as defined and further described below
Small Type Np, Lateral	A 30-foot inner no-harvest zone for up to the first 250 feet length above junction with Type F or SSBT (the "**RH Max**" applicable to an Eastern Oregon Small Type Np Lateral), with an R-ELZ and ELZ as defined and further described below
Small Type Ns	30 feet equipment limitation zone (ELZ). Within 30-foot ELZ, retain shrubs and trees under 6 inches DBH, where possible, for up to the first 750 feet length from the confluence with Type F or SSBT streams

[1] All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel or channel migration zone [CMZ], if present. The RMA width prescriptions established in Table 1 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone (CMZ), if present, upslope). Measurements

of length are made from the confluence with the Type F or Type SSBT junction they are tributary to.

a. Outer Managed-Harvest Zone Equipment Limitations

All outer managed-harvest zones have an equipment limitation zone of 30 feet from the outer edge of the no-harvest zone.

b. Outer Managed-Harvest Zone Basal Area Retention

All managed-harvest zones will retain at least 60 square feet of basal area per acre. The basal area shall be made up of twenty-seven trees from the largest diameter class per acre with the balance made up of trees greater than 8 inches DBH. Within these retention requirements, species retained will be selected from fire-resilient species such as ponderosa pine, Douglas-fir, Western larch, and available hardwoods where they are present. Retained trees should be evenly distributed where possible based on site conditions.

c. Seeps and Springs in Eastern Oregon

Seeps and springs within the no-harvest portion of the RMA shall have a no-harvest RMA width of at least 35 feet and the length (parallel to the stream) shall be limited to the length of the feature.

2.3.2.4 Small Type Np Layout Methodology

For purposes of this section:

"**Flowing Water**" means continuous visibly flowing surface water within a channel.

A "**Flow Feature**" means Flowing Water for 25' or more.

The "**Modeled End**" means the upper-most point of perenniality on a perennial stream shown in ODF FERNS derived from the ODFW modeling described above, as it may change over time in different phases or as updated by ODFW pursuant to valid field surveys.

The "**Area of Inquiry**" means from the confluence with a Type F or Type SSBT stream to the longer of (a) the Modeled End plus 250', or (b) beyond the Modeled End to the end of the first 250' encountered without a Flow Feature.

The "**RH Max**" means the maximum distance described for any particular Np Stream as defined above.

An "**R-ELZ**" means an equipment limitation zone of 35' in Western Oregon and 30' in Eastern Oregon where all trees less than 6" DBH and shrubs are retained where possible

An "**ELZ**" means an equipment limitation zone of 35' in Western Oregon, and 30' in Eastern Oregon.

For purposes of laying out buffers on Type Np streams, a landowner (or operator) may elect to either lay out the unit relative to the Modeled End or pursuant to a field survey for perennial flow.

If the landowner elects to use the Modeled End without a field survey for perennial flow, then the restricted harvest zone described above will apply from the confluence to the shorter of the RH Max or the Modeled End, an R-ELZ will apply to the distance between the RH Max and the Modeled End, if any, and an ELZ will apply to the remainder of the stream channel.

Alternatively, landowners may elect to lay out Np stream buffers pursuant to a field survey for perennial flow within the Area of Inquiry, and layout must conform with the following rules:

1. If the upper-most Flow Feature within the Area of Inquiry is upstream of the RH Max, then the restricted harvest zone will extend from the confluence to the RH Max and an R-ELZ will extend from that point to that upper-most Flow Feature.
2. If the upper-most Flow Feature within the Area of Inquiry is upstream of the Modeled End but downstream of the RH Max, then the restricted harvest zone will extend from the confluence to that upper-most Flow Feature.
3. If there is no Flow Feature upstream of the Modeled End within the Area of Inquiry, then the restricted harvest zone will extend from the confluence to the shorter of the RH Max or the upper-most Flow Feature within the Area of Inquiry.
4. An R-ELZ will extend from the end of the restricted harvest zone to the last Flow Feature above it within the Area of Inquiry, if any.
5. An ELZ will extend beyond the restricted harvest zone, or R-ELZ if any, to the top of the channel.
6. If the upper-most Flow Feature within the Area of Inquiry is downstream of the RH Max, and Flowing Water that is not a Flow Feature is encountered between the Flow Feature and the RH Max, a 50' restricted harvest zone will be left on the Flowing Water, and the R-ELZ will extend from the upper-most Flow Feature within the Area of Inquiry to the buffered Flowing Water.
7. Where the upper-most Flow Feature is downstream of the RH Max, a no-harvest buffer will extend around the end of the Flow Feature with a radius equal to the no-harvest buffer width at that point.
8. If an Area of Inquiry extends beyond the ownership boundary, and the last 250' before reaching the ownership boundary does not have a Flow Feature, then the restricted harvest zone will extend to the upper-most Flow Feature within the ownership boundary, or the RH Max, whichever is shorter, and an R-ELZ will extend beyond that to the ownership boundary; *provided that* prior surveys documented in ODF FERNS that evidence a Flow Feature upstream of the ownership boundary will alter the layout per the rules above (e.g, if a Flow Feature within the Area of Inquiry but below the RH Max is evidenced in ODF FERNS beyond the ownership boundary, then the restricted harvest zone will extend to the ownership boundary).

In Eastern Oregon, the no-harvest lengths described above would include the inner no-harvest zone and the outer managed-harvest zone consistent with Table 2 of this Chapter.

Prior to Phase 2 modeling described above, during the period that landowners are obligated to buffer perennial streams that are not mapped as perennial, such streams shall have an Area of Inquiry that ends at the RH Max.

The Authors anticipate that the layout methodology will be modified in drought years and abnormally wet years, both of which will be defined by ODFW in a manner that is temporally discrete and relatively exceptional, and confined to the relevant geography. During a drought year, as defined by ODFW, the last Flow Feature within the Area of Inquiry will be deemed the longer of (a) the Modeled End, or (b) the last Flow Feature within the Area of Inquiry (i.e., in a drought year, the buffers can be lengthened but not shortened). During an abnormally wet year, as defined by ODFW, the Area of Inquiry will stop at the Modeled End (i.e., in an abnormally wet year, the buffers can be shortened, but not lengthened).

ODFW will develop a protocol for field surveys of perennial flow for making the determinations above, including for instance, the determination that water is flowing. ODFW will review all field surveys for perennial flow, provided that if ODFW does not object within 21 days, the field survey will control for purposes of unit layout. If ODFW disapproves a survey after the waiting period, the survey will not be incorporated into ODF FERNS, but the landowner may complete the layout and operate pursuant to the survey. If ODFW disapproves a survey during the waiting period, ODFW shall offer an expeditious process for resolving any disagreement with the landowner in conformance with ODFW's protocol for field surveys of perennial flow.

To the degree a landowner intends to conduct a field survey for perennial flow, the landowner must notify ODFW in advance. Such notice may be submitted immediately prior to conducting the survey, but no more than two years in advance. If a landowner provides such notice, then the notification of operation must include either (a) the completed survey, or (b) a certification that the landowner did not initiate the survey.

ODFW will incorporate landowner surveys into its perennial modeling, with weighting for any sample bias, land access limitations, or other problems in data collection, as appropriate. Further, unless disapproved by ODFW, ODF will maintain a record of field survey findings in ODF FERNS, and in completing unit layout landowners may rely on, and must observe, such findings appearing in ODF FERNS.

2.3.3 Slivers of Standing Trees Created by Existing Roads Within the RMA

Where a no-harvest RMA spans an existing road and a stewardship forester determines that the trees on the upstream edge would present a risk of windthrow and a safety hazard to users of the road, the stewardship forester may authorize removal of the trees, provided that an equivalent basal area is retained elsewhere in the harvest unit adjacent to an RMA or Designated Debris Flow Traversal Areas. No slivers greater than 15 feet in width shall be removed.

Miscellaneous

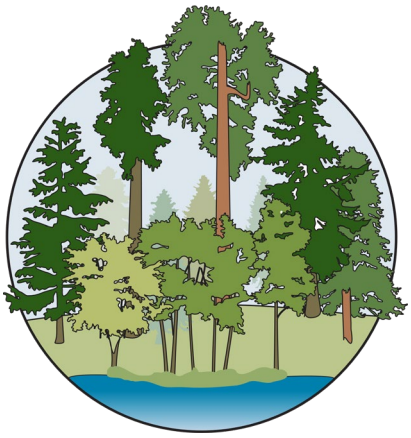
a. Current Rules

The Authors do not anticipate any material changes to the current rules or guidance applicable to management of no-harvest portions of RMAs including the following:

- Roads crossing streams, riparian areas, and equipment limitation zones (to the degree not addressed separately in the roads chapter)
- Cutting yarding corridors through riparian areas, and placement of guy-lines, tail-holds, and other necessary rigging.
- Averaging buffer widths over distances.

b. Wildlife Leave Trees

The Authors expect that, as under current rules, at least some of the trees left in riparian management areas will count toward the wildlife leave tree requirement.



Elizabeth Morales

c. Hardwood Conversion

The Authors expect that the current hardwood conversion option would not be used unless ODF makes a determination that the conversion would substantially improve the likelihood and timeline for reaching "desired future condition," as it may hereafter be defined by the Board.

d. Restoration Treatments

This Report acknowledges the rich and diverse habitat types found on the forests of Oregon, as well as the changes to the character, location, abundance, and ecological function of those habitats due to management over the past century plus. This Report acknowledges that restoration activities that address ecological changes in riparian areas due to alterations in forest disturbance and/or hydrologic regimes, such as removing conifers to ensure diverse hardwood habitats, removing stems in dense riparian areas, reforesting degraded riparian areas, adding large wood to stream channels, reintroducing fire through controlled burning, or high-disturbance treatments that remove invasive species or anthropogenic structures, may be appropriate treatments in some cases. Nothing in this Report is meant to prohibit such activities when genuinely undertaken for ecologically restorative purposes, and the Report Authors recognize that Plans for Alternate Practices are available as a mechanism to advance such projects. To the extent PFAP options and guidelines need expansion and/or revision to clearly accommodate ecological restoration projects, those changes should be made by the department.

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CHAPTER 3: TIMBER HARVEST ON STEEP SLOPES

3.1 Introduction

Pacific salmon, bull trout, and amphibians have evolved adaptations to the natural disturbance processes characteristic of watersheds comprising what are now private forest lands in Oregon. Many of these lands are steep and are naturally prone to initiating landslides and debris flows that contribute wood and sediment to drainage networks downslope (Burns et al. 2016; May and Gresswell 2003).

Forest management activities, principally road construction, road maintenance, and timber harvest on steep slopes, can affect the frequency and magnitude of slope failures (Sidle et al., 1985; Swanson and Dyrness, 1975). Roads typically are associated with a large fraction of management-related landslides (Montgomery et al., 1998), and can generate larger landslides than harvest-related failures (Robison et al., 1999). Road-related impacts to aquatic systems are addressed in Chapter 4. This Chapter addresses timber harvest effects on shallow, rapid hillslope failures.

Shallow, rapidly moving hillslope failures, which include undifferentiated colluvial landslides and channelized debris flows, are common in headwater systems (Benda et al., 2005; Hungr, 2014). Such failures initiate from bedrock hollows, convergent headwalls, and other steep slopes, including channel-adjacent features (Highland and Bobrowsky, 2008). Initiation occurs typically within the rooting zone of vegetation (Schmidt et al., 2001) and is associated with high precipitation events over days or weeks (Baum et al., 2011; Smith et al., 2014).



Landslides and debris flows can deliver large volumes of sediment and wood to streams. Landslides most frequently deliver to zero (0) order, 1st order, and 2nd order streams, with 0 order referring to hollows, swales, and headwalls that may not have a defined channel (May and Gresswell, 2004). Most debris flows initiate in headwater channels, rather than in habitat occupied by fish (Benda et al., 2005). However, debris flows can travel long distances, increasing in size as materials scoured along the way are incorporated, before depositing downstream, often in fish-bearing channels. Like many other natural disturbances, landslides and debris flows can adversely impact habitat and kill organisms along their travel paths (Bigelow et al., 2007; Everest and Meehan, 1981; Reeves et al., 1995). However, long term they are important natural processes that are necessary to create and maintain productive habitat for salmonids and other aquatic organisms (e.g., Reeves et al., 1995; Bisson et al., 1997; Gomi et al., 2002; Montgomery et al., 2003; Bisson et al., 2009; Foster et al., 2020).

The sediment and boulders, as well as large wood when available, that are delivered by landslides and debris flows can affect the quality of stream habitats in mountainous areas over time (Bisson et al., 2009). Large wood and boulders help increase physical habitat complexity, store spawning gravels, and regulate transport of fine sediments downstream (Bilby and Bisson 1998; Naiman et al., 2002). Sediment delivered by landslides and associated debris flows can create pools and provide gravel usable for spawning, but such sediment can also adversely impact fish habitat and macroinvertebrates if the frequency and magnitude of inputs are too high or lack large wood (Hartman et al., 1996; Jensen et al., 2009; Kobayashi et al., 2010).

Processes, including timber harvest and fire, can increase the frequency of landslides as well as alter the amount and characteristics of the material delivered to aquatic habitats (Benda et al., 2005; Korte and Shakoor, 2020). Removing trees from shallow-rapid landside source areas and debris flow runout paths via timber harvest decreases the amount of large wood that is available for future transport to fish-bearing streams. Debris flows can carry large wood that is sourced from the initiation site, stored along their length, and standing within their path. Removal of trees can decrease the cohesion of roots available to hold soil on hillslopes with the lowest values of root cohesion in the Oregon Coast Range observed in about the first 5-15 years while understory vegetation and trees re-establish (Schmidt et al., 2001; Jackson and Roering, 2009). The amount of wood and roughness (boulders) in and along a channel influences the distance a debris flow may travel. Lack of larger trees along a debris flow path can increase the debris flow travel distance and the ratio of deposited sediment to wood volumes, which can increase the potential for negative

effects and decrease the potential for beneficial impacts in creating and maintaining high-quality aquatic habitat (May 2002; Lancaster et al., 2003; Reid et al., 2016).



Numerous field studies have identified terrain features that foster landslide initiation and determine how far debris flows travel (Benda et al., 2005; Korte and Shakoor, 2020; Robison et al., 1999). Landslides that are most likely to initiate debris flows issue from steep areas of topographic convergence, often called headwalls in Oregon geologic nomenclature (Dietrich and Dunne, 1978). Once a landslide enters a stream channel, a subsequent debris flow will proceed downstream until eventually depositing where the channel gradient becomes too gentle or where a junction angle with a higher-order receiving channel is too large for it to continue (Benda and Cundy, 1990; May and Gresswell, 2004). Models based on this body of field-derived knowledge can predict likely landslide and debris flow behaviors from digital elevation data (Miller and Burnett, 2007; Miller and Burnett, 2008). These models can identify hillslopes most susceptible to timber harvest-associated increases in the frequency of landslides, as well as small, non-fish-bearing stream channels along which leaving large trees is most likely to benefit aquatic habitats (Burnett and Miller, 2007).

Several strategies have been applied in mountainous terrain to reduce and mitigate the effects of forest management on steep slopes and to encourage beneficial outcomes. These include leaving standing and downed trees and other vegetation in areas likely to initiate a landslide or transport a debris flow as a source of large wood for fish-bearing streams; adding wood to debris-flow-prone non-fish-bearing streams; and decreasing the frequency and magnitude of occurrence of human-caused landslides by reducing timber harvest volumes, avoiding potentially unstable slopes, and modifying logging systems to reduce compaction.

The Private Forest Accord seeks to provide the beneficial elements of landslides while mitigating the potential negative effects of forest management activities on shallow, rapid hillslope failures.

3.1.1 Definitions

"Debris Flow" is defined as a rapidly moving slurry of rock, soil, wood, and water, which is most often initiated by a landslide that delivers to and travels through steep, confined stream channels.

"**Debris Flow Traversal Area"** is defined as a non-fish-bearing (Type N) stream that has a non-zero probability of being traversed by a debris flow that delivers to a fish-bearing (Type F or Type SSBT) stream. The probability of traversal is calculated consistent with methods described in "Delineating Landslide and Debris Flow Susceptibility in Western Oregon in Support of the Private Forest Accord" (TerrainWorks 2022), which is attached in Appendix B.

"Designated Debris Flow Traversal Areas" are defined as any Debris Flow Traversal Area that has a probability of traversal in the upper 50%, calculated consistent with the methods described in

TerrainWorks, (2022). The width of the Designated Debris Flow Traversal Area is 25 feet on either side of the Type N stream and the length of the Designated Debris Flow Traversal Area is either:

a. The entire length of the Designated Debris Flow Traversal Area that has a probability of traversal in the upper 20%; or

b. A maximum of 1,000 feet upstream of a Type F or Type SSBT stream confluence for a Designated Debris Flow Traversal Area that has a probability of traversal between 20% and 50% alone or in combination with a Designated Debris Flow Traversal Area that has a probability of traversal in the upper 20%.

"Debris Flow Traversal Area Sub-basins" are defined as catchments within USGS HUC 4th field (8-digit) basins that contain Debris Flow Traversal Areas that have a probability of traversal in the upper 20%.

"Designated Sediment Source Areas" are defined as hillslope areas greater than ¼ acre in size within Debris Flow Traversal Area Sub-basins that provide the top 33% of the landslide-derived sediment to Type F or Type SSBT streams. Designated Sediment Source Areas are identified using methods described in TerrainWorks (2022).

"**Slope Retention Areas**" are defined as the 50%, at a minimum, of Designated Sediment Source Areas in each harvest unit that will be left unharvested.

"**Trigger Sources**" are defined as areas within Designated Sediment Source Areas that have the greatest (top 20%) probability of triggering a high-volume (top 33%) debris flow. Trigger sources are identified using methods described in TerrainWorks (2022).

3.2 Goals


Jim Yuscavitch

The goals of the PFA commitments regarding timber harvest on steep slopes is to provide large wood and sediment consistent with maintaining or improving aquatic habitat within large basins over long timeframes. (For the purposes of this Chapter, large basins are those of a size equivalent to those supporting independent populations of Oregon coastal coho salmon. In modeling to support the PFA, these are USGS HUC 4th Field [8-digit] basins). To accomplish this, sediment sources and debris flow runout paths will be identified and a subset of these will be managed during timber harvest activities to retain trees and other vegetation. These actions, together with other HCP commitments, are intended to provide high-quality habitat to support recovery and long-term conservation of the species covered by this HCP on private forestlands.

3.2.1 Objectives

Aligned with the overall goals for timber harvest on steep slopes to provide high-quality habitat that supports the recovery, protection, and long-term conservation of covered species on private forestlands, the Authors establish the following objectives under the PFA:

a. Leave trees in Designated Debris Flow Traversal Areas to help create and maintain high-quality habitat in:

    1) Type F or Type SSBT streams by delivering large wood and regulating sediment storage and transport.

    2) Type N streams by creating shade and cover for amphibians covered under the HCP.

b. Leave trees in Slope Retention Areas to:

    1) Reduce timber-harvest-related increases in the frequency and volume of sediment delivered to Type F or Type SSBT streams from mass wasting events.

    2) Contribute large wood to Type F or Type SSBT streams.

c. Leave trees on a subset of steep (>70%) slopes immediately adjacent to Type F or Type SSBT streams to:

    1) Stabilize these areas.

    2) Contribute large wood to Type F or Type SSBT streams.

3.3 Private Forest Accord Commitments

3.3.1 Public Safety

No changes are recommended to the existing high landslide hazard location rules for public safety related to timber harvest as these are beyond the scope of the HCP.

3.3.2 FERNS

The locations of Designated Sediment Source Areas and of Designated Debris Flow Traversal Areas will be added to FERNS. Landowners will use FERNS map tools to develop written plans. Notifications will be evaluated by ODF.

3.3.3 Designated Debris Flow Traversal Areas

As defined under Section 3.1.1 of this Chapter, Designated Debris Flow Traversal Areas are a subset of Debris Flow Traversal Areas that have a probability of traversal in the upper 50%, calculated consistent with the methods described in TerrainWorks (2022).

a. Written Plans

Written plans are required for harvest units containing Designated Debris Flow Traversal Areas.

b. Timber Harvest Prescriptions

Timber harvest is prohibited in Designated Debris Flow Traversal Areas. As defined under Section 3.1.1 of this Chapter, the width of the Designated Debris Flow Traversal Area is 25 feet on either side of the Type N stream and the length of the Designated Debris Flow Traversal Area is either:

a. The entire length of the Designated Debris Flow Traversal Area that has a probability of traversal in the upper 20%; or

b. A maximum of 1,000 feet upstream of a Type F or Type SSBT stream confluence for a Designated Debris Flow Traversal Area that has a probability of traversal between 20% and 50% alone or in combination with a Designated Debris Flow Traversal Area that has a probability of traversal in the upper 20%.

Yarding is allowed through Designated Debris Flow Traversal Areas, but the number, size, and location of yarding corridors shall be designed to minimize impacts.

c. Application

The timber harvest prescriptions for steep slopes established under Section 3.3.3 of this Chapter for Designated Debris Flow Traversal Areas apply to any private forest ownership class west of the summit of the Cascade Mountains.

3.3.4 Designated Sediment Source Areas and Slope Retention Areas

As defined under Section 3.1.1 of this Chapter, Debris Flow Traversal Area Sub-basins are catchments that contain Debris Flow Traversal Areas that have a probability of traversal in the upper 20% calculated consistent with the methods described in Benda and Miller (2022). Within the Debris Flow Traversal Area Sub-basins, Designated Sediment Source Areas are hillslope areas greater than ¼ acre in size that provide the top 33% of the landslide-derived sediment to Type F and Type SSBT streams.

a. Written Plans

A written plan is required for any harvest unit containing a Designated Sediment Source Area.

b. Timber Harvest Prescriptions

Timber harvest is prohibited in the Slope Retention Areas. Slope Retention Areas are defined as the 50%, at a minimum, of Designated Sediment Source Areas in each harvest unit that, after office and field review, will be left unharvested.

When choosing Slope Retention Areas, priority shall be given to those that:

1. Contain Trigger Sources; and

2. Are larger.

Adjustments to the distribution and location of Slope Retention Areas are allowed in certain cases. Where safety or increased risks to Type F or Type SSBT streams warrant, landowner representatives may select smaller Designated Sediment Source Areas or those Designated Sediment Source Areas without Trigger Sources instead of the standard priorities. Eligible concerns that may warrant selection of non-priority areas to satisfy the minimum 50% Designated Sediment Source Area requirement are that priority areas would 1) clearly reduce worker safety; or 2) cause more resource impact, such as additional road or landing construction, excessive sidehill yarding, or other yarding practices that clearly increase ecological impacts. Written plans must justify the rationale for choosing non-priority areas to satisfy the minimum 50% Designated Sediment Source Area requirement. Yarding, which may require cutting, but not removal, of trees, is permitted only through Slope Retention Areas that do not contain Trigger Sources, but the number, size, and location of yarding corridors shall be designed to minimize impacts.

c. Application

The timber harvest prescriptions for steep slopes established under Section 3.3.4 of this Chapter for Designated Sediment Source Areas and Slope Retention Areas apply to any private forest ownership class west of the summit of the Cascade Mountains, except for qualifying small forestland owners as identified by Chapter 5 of this Report.

3.3.5 Field Protocols

Field delineation of boundaries for Slope Retention Areas shall be accomplished by landowner representatives who are trained and certified by ODF. Delineation criteria are described in Appendix C. ODF in consultation with the Authors will formalize into a Technical Note the guidance in Appendix C.

3.3.6 Slopes Modeling

The State shall contract to have Designated Debris Flow Traversal Areas, Designated Sediment Source Areas, and Trigger Sources modeled west of the summit of the Cascade Mountains consistent with TerrainWorks (2022). Most of the models described in TerrainWorks (2022) that are used to identify these landscape features have been published in peer-reviewed scientific journals (Miller and Burnett, 2007; Miller and Burnett, 2008; Burnett and Miller, 2007). However, some

components of the model to identify Designated Sediment Source Areas based on the probability of sediment delivery to Type F or Type SSBT channels as negotiated are new and have not been peer reviewed. Consequently, the Authors agree that the approach to identify Designated Sediment Source Areas should undergo a scientific review before application. Scientific review will target the scientific merits of the modeling and not the PFA commitments based on the model results. The review will be directed by specific questions posed by the Authors that focus on the modeling methods and underlying assumptions. A key question is the scientific support for using the time-averaged approach in identifying Designated Sediment Source Areas. Unless the review identifies a significant scientific reason to deviate from the time-averaged approach, this will be the basis for modeled outputs to identify Designated Sediment Source Areas. If the review finds significant flaws in the approach or assumptions, then the model will be adjusted, if possible, to address these flaws. If a reconfigured model yields Designated Sediment Source Areas that fail to maintain reasonable consistency with the PFA commitments in balancing the overall number, size, and distribution of Designated Sediment Source Areas with the ecological benefits that the strategy provides, or the model cannot be reconfigured, then the identification of Designated Sediment Source Areas and screening criteria will be adjusted. For clarity, the negotiated terms were based on the mapped outcome of the time-averaged sediment delivery method, not solely the method itself, so maintaining a substantially similar mapped outcome is necessary to meet the PFA commitments. Adjustments to maintain reasonable consistency could include, for instance, a change to the 33% threshold for landslide-derived sediment.

3.3.7 Stream Adjacent Failures

a. Riparian Management Area (RMA) Prescriptions

Riparian Management Area (RMA) prescriptions are established in Chapter 2 of this Report. All measurements of RMA widths shall be made using the slope distance and shall be measured from the edge of the active channel or channel migration zone (CMZ), if present, as defined in Chapter 2 of this Report.

Landowners will extend the Riparian Management Areas (RMAs) established in Chapter 2 of this Report to 170 feet from the edge of a Type F or Type SSBT channel, or to the slope break, defined as at least a 20% difference in slope gradient, whichever is less (Figure 1), for all steep (>70%) slopes immediately adjacent to Type F or Type SSBT streams that are either:

(1) Actively failing and delivering sediment; or

(2) Unstable due to the toe interacting directly with erosive forces of a stream creating slope instability such that a slope failure extending beyond the standard width of the Riparian Management Area, as established in Chapter 2 of this Report, is likely (See Figure 2).

"Actively failing" indicates that erodible material and exposed soils are present and prone to continued shallow-rapid slope instability, with active features such as tension cracks, scarps, ground surface shearing, and oversteepened toes.

The lateral extent (i.e., the width) of the actively failing slope identified under (1) is defined by the edge of the scarp indicating slope movement.

The lateral extent (i.e., the width) of steep slopes identified under (2) should approximate the length (parallel to the stream) of slope instability, which is indicated by stream bank sloughing extending into and beyond the floodplain and into the steep slope.

b. Application

The timber harvest prescriptions for steep slopes established under Section 3.3.7 of this Chapter for Stream Adjacent Failures apply statewide.

3.3.8 Timber Harvest on Steep Slopes in Eastern Oregon

The Private Forest Accord does not prescribe new management measures for landslide initiation zones or debris flow traversal channels in Eastern Oregon. The Authors agree that Eastern Oregon's unique geologies and climates likely mean that these processes are different in magnitude, frequency, and impact on the covered species, when compared to Western Oregon. Similarly, the impact of timber harvesting on these processes is potentially different in Eastern Oregon. In light of this uncertainty, the Authors agree that the Adaptive Management Program shall, beginning no later than January 1, 2024, examine the scientific literature on the impacts that hillslope processes have on the covered species in Eastern Oregon. The primary focus will be on upslope initiated shallow rapid slides and how timber harvesting may impact these in Eastern Oregon environments. A secondary and more limited focus is whether other hillslope processes that likely affect covered species are changed by forest practices. Findings of the Adaptive Management Program on these topics will be presented to the Board of Forestry. These findings should focus primarily on the importance of shallow rapid landslides in Eastern Oregon to habitat for the covered species and the potential modification of these processes by forest practices or lack thereof. The report on this primary topic may or may not include recommendations as to desirability and relative importance of potential management measures. In addition, the report should convey whether the secondary review of literature on the effect of forest practices on other hillslope processes merits more thorough consideration by the Adaptive Management Program in light of scientific literature on the connection of these processes to covered species. Nothing in this Report should be read to suggest that any additional Eastern Oregon steep slope or other hillslope prescriptions are, or are not, necessary. The timber harvest prescriptions for steep slopes established under Section 3.3.3 of this Chapter for Designated Debris Flow Traversal Areas and under Section 3.3.4 of this Chapter for Designated Sediment Source Areas and Slope Retention Areas do not apply to any private forest ownership class east of the summit of the Cascade Mountains. The timber harvest prescriptions for steep slopes established under Section 3.3.7 Stream Adjacent Failures apply to all private forest ownership classes both west and east of the summit of the Cascade Mountains.

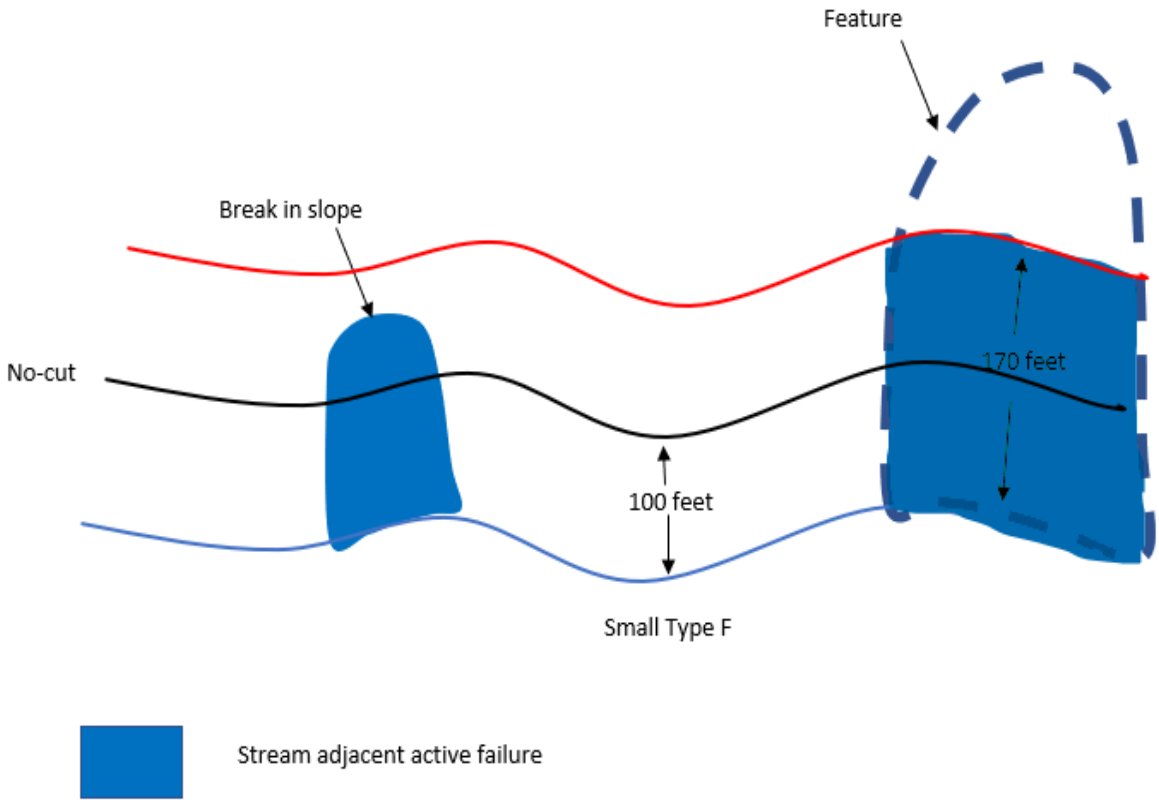
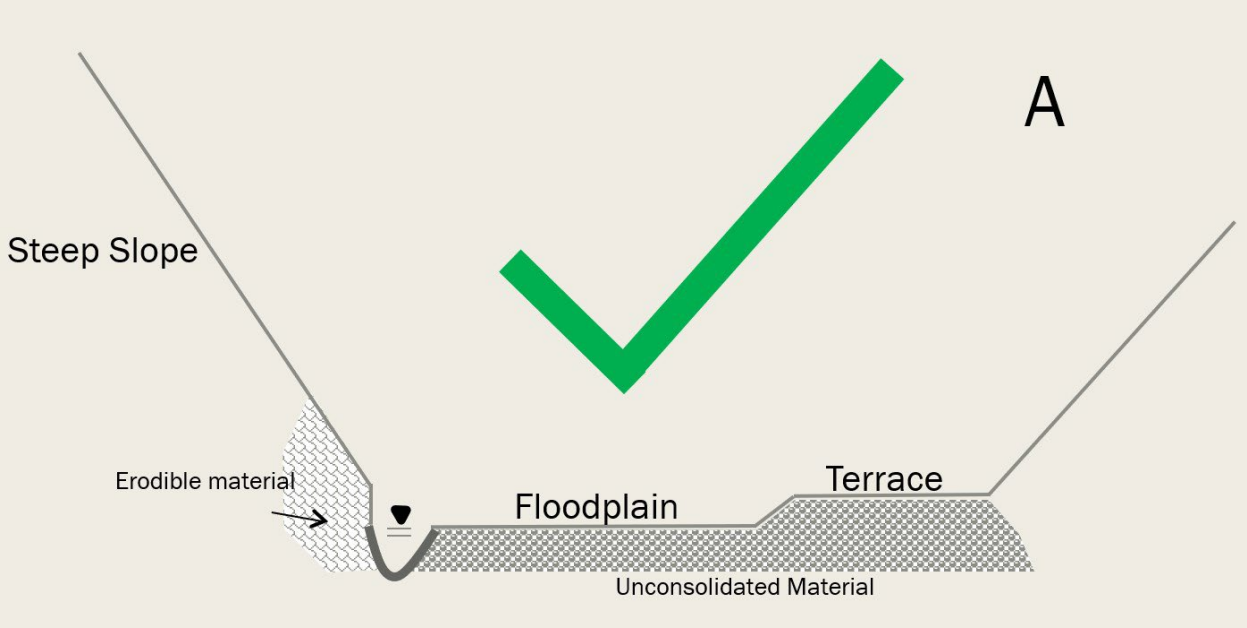


Figure 1. Example drawing of Stream Adjacent Failures relative to limitations imposed on extending the width of Riparian Management Areas on Type F and Type SSBT streams.

Figure 2. Example situations where widening of standard Riparian Management Areas on Type F or Type SSBT streams due to the toe of the slope interacting directly with erosive forces of a stream is or is not warranted (Stream Adjacent Failures). Stream adjacent failure prescriptions apply in C, but they do not apply in A or B.







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CHAPTER 4: ROADS

4.1 Introduction

Forest roads have the potential to impact the covered species by blocking access to habitat and by allowing sediment delivery to watercourses. Networks of forest roads can affect forest hydrology by increasing overland flow, increasing drainage density, and intercepting sub-surface flow (Wemple et al., 2001; Trombulak and Frissell, 2000; Gucinski, 2001; Van Meerveld et al., 2014). Forest roads can increase surface runoff and alter stream flow, although these effects vary in time and space depending on how recently the road has been constructed, where the road is located on the hillslope, and the scale of analysis (Wemple et al., 2001). Networks of forest roads can also act as a source of fine sediment to streams (NCASI, 2001; Reid and Dunne, 1984).

Forest roads can also be an area of potentially high hydrologic connectivity between the road surface and streams (La Marche and Lettenmaier, 2001). Hydrologically connected roads can deliver increased runoff, sediment, and chemicals associated with roads, including spills, tire debris, or oils generated on the road surface or cutslope. At the watershed scale, connections between roads and

streams can also alter the drainage density of the watershed and change runoff frequency and magnitude (Furniss et al., 2000; Weaver et al., 2015;Wemple et al., 2001).

The impacts of forest roads on erosional processes are not limited to chronic sources of sediment. Forest roads can lead to accelerated rates of landslides compared to unmanaged forested areas (Ice, 1985; Montgomery, 1994; Swanson and Dyrness, 1975). Roads built on steep slopes, especially using sidecast construction methods, can generate shallow-rapid landslides that often translate into debris flows. Roads can increase stormwater runoff to destabilize downslope hill sides and fill slopes and trigger large sediment pulses, especially when roads are constructed on steep, unstable slopes (Wemple and Jones, 2003). Road-related sediment can fill pools, cover spawning gravel, and aggrade stream channels (Furniss et al., 1991). Collectively, proper placement, construction, and maintenance of forest roads may minimize the frequency and magnitude of mass wasting events, and their associated delivery of sediment to streams.

The changes to Oregon's Forest Practice rules outlined in this chapter provide specific practices to avoid or minimize these impacts as well as systemic changes to the regulatory structure to ensure the practices are applied. It is well established through research that application of the existing and revised rules for forest roads will avoid or minimize the delivery of sediment to waters of the state (Luce and Black, 1999).

4.1.1 Road Location, Design, and Standards

Road location is one of the most important factors that can reduce water quality impacts from roads. Therefore, state recommendations for locating roads include: (1) use existing roads whenever possible; (2) locate roads as far from streams as possible; (3) locate roads to follow the existing slope contours; (4) locate roads on well-drained soils and avoid wetlands, seeps, and other wet areas; (5) avoid steep, unstable slopes to minimize potential for landsliding; (6) minimize excavation; and (7) minimize the number of stream crossings (ODF 2003a, NCASI 2009, NCASI 2012).

4.1.2 Timing of Road Construction and Restricting Use

Road construction can be scheduled to avoid disturbance during wet seasons when increased sediment and delivery are most likely to occur. Controlling the timing of road use can also be used to avoid severe disturbance of forest roads. For example, in the Mediterranean climate of the West Coast, native-surface roads typically are used only in the dry summer period to avoid the types of erosion and sediment loss that would occur with winter use. Furthermore, regulations governing use of roads during wet weather in the western US have become increasingly restrictive to protect water quality (ODF 2003b, Toman and Skaugset, 2011).

4.1.3 Road Surfacing

BMPs for forest roads in erosion-prone areas typically include surfacing with gravel, rock, asphalt, or other suitable materials to provide bearing strength and reduce deterioration and erosion from the road surface, and to achieve durable road drainage configurations. Appropriate surfacing can be combined with compaction to further increase bearing strength and resistance to erosion. For example, Swift (1984) found that 15 cm of crushed rock reduced sediment by 78% compared to a

bare road surface. Kochenderfer and Helvey (1987) found an 87% reduction in sediment yield from roads with 15 cm of rock compared to bare soil roads. More recently, Coe (2006) found 16-fold greater median sediment production from unrocked forest roads than from rocked roads in the Sierra Mountains. Unfortunately, even rocked roads can produce sediment during wet weather hauling. In order to reduce sediment production, managers should design road surfaces that resist rut formation and consider the aggregate level of fine sediment (Toman and Skaugset, 2011).

4.1.4 Mulching, Seeding, and Other Road and Stabilizing Techniques

Treatment of bare cut and fill slopes with mulch and seeding are effective BMPs to reduce erosion rates (Bethlahmy and Kidd, 1965; Megahan and Kidd, 1972). Burroughs and King (1989) reviewed studies from around the US where dense grass was used for erosion control of bare soils and found an 86% to 100% reduction in sediment with establishment of dense grass. On native soil roads with light traffic, Swift (1984) found 45% lower sediment yields with grass cover. Furthermore, combinations of seeding, mulching, slash application and water diversion BMPs (i.e., waterbars) provide redundancy and increase the effectiveness of erosion prevention and road stabilization practices (Wear et al., 2013; Wade et al., 2012; Sawyers et al., 2012).

4.1.5 Road Drainage Structures

The spacing of cross drains has been positively correlated with the length of sediment travel along and below roads (Packer, 1967). Therefore, effective spacing of drainage structures is critical, particularly for steeper road gradients with lower topographic position. The closer cross drains are spaced, the lower rill erosion (50% to 97% control reported by Packer) will be for the road surface.

4.1.6 Road Maintenance

Road maintenance is a balancing act between using sufficient treatment to keep the road safe and minimizing berms, rutting, and too much disturbance. As noted by Sugden and Woods (2007) in western Montana, reducing the frequency of grading can significantly reduce sediment yields from roads. Road slope, time since last road grading, roadbed gravel content, and precipitation explained 68% of variability in sediment yields from native surface forest roads.

4.1.7 Disconnecting Roads from Streams

Road drainage structures that deliver runoff directly to streams can affect sediment loads, peak flows, and transport of pollutants to streams. Furniss et al. (2000) showed that hydrologically connected roads can deliver increased runoff, sediment, and chemicals associated with roads, such as spills or oils generated on the road surface or cutslope. Connections between roads and streams can also alter the drainage density of watersheds and change runoff frequency and magnitude (Furniss et al., 2000; Wemple et al., 1996).

Several older surveys documented high rates of road-stream connectivity. For example, in western Washington, Bilby et al. (1989) found that 34% of road drainage structures discharged directly to

streams. In the Washington Cascades, Bowling and Lettenmaier (1997) found that 45% of culverts were connected to streams directly and 57% were connected either directly or through a gully.

Application of regulations similar to what is proposed as part of the PFA has demonstrated that these practices are effective in disconnecting roads from streams. For example, Dubé et al. (2010) found just 11% of the road network in Washington state to be hydrologically connected. Martin (2009) reported on a survey of private forest roads covering 1,047 miles of roads in eastern and western Washington. He found that 73% of the road network had low delivery potential (roads located on ridgelines, in shallow terrain, or without crossing defined channels). About half of the road system with high delivery potential was disconnected. Based on that survey, about 12% of the road network was hydrologically connected. Both of these studies were conducted prior to all of the road network being upgraded to the standards required under the Washington Forest Practice Rules.

4.1.8 Limiting Road Use during Wet Periods

Mills et al. (2003) examined turbidity response to wet season road use by monitoring turbidities above and below road crossings. Of sites monitored, 30% showed reductions or no changes to background levels of turbidity, and 90% showed turbidity increases of less than 20 nephlometric turbidity units (NTU). The remaining 10% ranged from 20 to 520 NTU. Total precipitation greater than 1.5–3.0 inches over three days, the fraction of surfacing material that was silt sized or smaller, and more than 250 feet of road ditch flowing directly to the stream were factors that resulted in statistically significant increases in turbidity below road crossings. Findings from this study influenced a subsequent revision to Oregon's Forest Practice Rules.

4.1.9 Fish Passage and Barrier Removal



The movement of aquatic organisms is an essential component of their distribution across the landscape and the persistence of populations and species. As life history needs shift, different movements for foraging, reproduction, growth, and refuge are required (Hoffman and Dunham, 2007). Biological corridors and habitat connectivity are critical to the survival and reproduction of covered species (Oregon Dept. of Fish and Wildlife, 2019). Naturally occurring barriers may limit movement of aquatic organisms due to physical constraints, such as channel slope or stream size, limits on food resources, or environmental disturbances (Hoffman and Dunham, 2007). However, barriers placed by humans that restrict or eliminate the movement of aquatic organisms can have multiple impacts, including fragmenting and isolating populations, increasing vulnerability to disturbances, reducing habitat connectivity, and lowering genetic diversity (Hoffman and Dunham, 2007; Hotchkiss and Frei, 2007; Rolls, 2011).

Road crossings in particular can create barriers to fish passage that may result in the loss of habitat for spawning or rearing, isolated genetic populations, inability to access refuge habitats during

environmental disturbances, or extirpation (Price et al., 2005; Bates et al.,2003; Beechie et al., 2006; Reiman and Dunham, 2000; Wofford et al., 2005; Neville et al., 2009; Reeves et al., 1995). Barriers to aquatic organism passage related to culverts can include outlet or inlet drops, clogged or collapsed culverts, excessive water velocities and turbulence, loss of bank-edge area, and lack of natural substrate (U.S. Forest Service, 2008). Reducing the impacts of human-placed barriers, such as culverts, requires mitigation of the effects on ecological processes. An ecosystems-based approach to road-stream crossings, such as stream simulation, prioritizes maintaining habitat diversity and quality, the connectivity of watersheds, and key ecological processes (U.S. Forest Service, 2008). Kemp and O'Hanley (2010) state that "evaluation of habitat restoration techniques have shown that the removal or mitigation of barriers that block fish dispersal lead to some of the largest increases in fish production (Roni et al., 2002)." Most recently, fish passage restoration at the watershed-scale has been utilized to increase habitat gain (Oregon Dept. of Fish and Wildlife, 2019).

4.1.10 Steep and Unstable Slopes

Roads in Oregon have been shown to alter landslide and debris flow characteristics, including increasing the likelihood of occurrence, sediment volumes, and runout lengths above those for intact forests or harvested areas (Amaranthus et al., 1985; May, 2002; Miller and Burnett, 2007). A study by Swanson et al. (1977) found that these factors led to sediment production from roads that was 49 times greater than from forested areas in the Oregon Coast Range. In the Oregon Coast Range, Sessions et al. (1987) found landslides associated with both mid-slope and ridge-top roads, but observed fewer landslides with smaller volumes where road layout attempted to minimize mid-slope positions. They noted that the majority of their inventoried landslides were initiated by storms with a return interval of 3 to 5 years and thus by relatively low rainfall amounts typical of such storms.

4.1.11 Definitions

As used in this Chapter:

"Abandoned roads" are defined as roads that were constructed prior to 1972 and do not meet the criteria of active, inactive, or vacated roads. This does not include skid trails.

"Active roads" are defined under OAR 629-600-0100(3) as "roads currently being used or maintained for the purpose of removing commercial forest products."

"Culvert with imminent risk of failure" is defined as a culvert in all waters of the state that:

1) Is actively diverting streams or ditchline runoff;

2) Is actively eroding the road prism or stream channel in a manner that has the potential to undermine the integrity of the culvert;

3) Is completely blocked, plugged, crushed, or buried;

4) Has partially or completely failed fill; or

5) Has high plugging potential as determined by the Stream Blocking Index (SBI)[3] or other comparable methodology, high magnitude of fill at risk, and high diversion potential in one or both directions.

"Culvert with minimal risks to public resources" is defined as a culvert in all waters of the state that:

1) Minimizes delivery of sediment to waters of the state;
2) Has not diverted streams or ditchline runoff and does not have the potential to divert streams or ditchline runoff; and
3) For Type F and Type SSBT streams:
    a. Provides passage for all species of adult and juvenile fish; and
    b. Provides passage of expected bed load and associated large woody material likely to be transported during flood events.

"Hydrologic disconnection" means the removal of direct routes of drainage or overland flow of road runoff to waters of the state.

"Inactive roads" are defined under OAR 629-600-0100(39) as "roads used for forest management purposes exclusive of removing commercial forest products."

"Fully functioning culvert in Type F or Type SSBT streams" is defined as a culvert that is located in a Type F or Type SSBT stream, at the time of Forest Road Inventory and Assessment (FRIA) inspection, meets the requirements of the Forest Practice Rules as of January 1, 2022, and ODF Tech Note 4, Version 1 (effective May 10, 2002).

"Fully functioning culvert in Type N or D streams" is defined as a culvert that is located in a Type N or Type D stream, and that, at the time of FRIA inspection, meets all requirements of the Forest Practice Rules as of January 1, 2022.

"Pre-existing culvert" is defined as a culvert with minimal risks to public resources that is also:

a. A fully functioning culvert in a Type F or Type SSBT stream; or

b. A fully functioning culvert in a Type N or Type D stream.

"Vacated roads" are defined under OAR 629-600-0100(91) as "roads that have been made impassable and are no longer to be used for forest management purposes or commercial forest harvesting activities."

"Waters of the state" has the meaning given in OAR 629-600-0100 (94), *i.e.* "'Waters of the state' include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries,

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[3] Flanagan, S. A., Furniss, M. J., Theisen, S., Love, M., Moore, K., and Ory, J. 1998. Methods for Inventory and Environmental Risk Assessment of Road Drainage Crossings. USDA Forest Service Technology and Development Program 9877-1809-SDTDC. p. 45.

marshes, wetlands, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction."

4.2 Goals

The overarching goal of the Private Forest Accord road management package is a balanced regulatory approach in which landowners continue to operate all roads as necessary, minimize new road construction, and build and maintain roads to achieve habitat and water quality requirements that ensure the viability of covered species.
To achieve this overarching goal, all roads will be designed, constructed, improved, maintained, or vacated to:

a. Prevent or minimize sediment delivery to waters of the state;
b. Ensure passage for covered aquatic organisms during all mobile life-history stages;
c. Prevent or minimize drainage or unstable sidecast in areas where mass wasting could deliver to public resources or threaten public safety;
d. Prevent or minimize hydrologic alterations of the channel;
e. Prevent or minimize impacts to stream bank stability, existing stream channel, and riparian vegetation;
f. To the maximum extent practicable, hydrologically disconnect forest roads and landings from waters of the state; and
g. Avoid, minimize, and mitigate loss of wetland function.

4.2.1 HCP Goals

The Authors established the following goals for road management under the HCP:

a. Increase distribution of fish on covered lands; and

b. Prevent or minimize delivery of sediment from forest roads to waters of the state.

4.2.2 Objectives of the HCP

In addition to the overarching goal identified for forest roads under the Private Forest Accord process, specific objectives for forest roads as part of the HCP include:

- Removal of anthropogenic barriers to fish passage on active and inactive forest roads;
- Removal or stabilization of unstable road fills on active and inactive forest roads;
- Application of revised rules designed to avoid or minimize delivery of sediment on forest roads and, to the maximum extent practicable, achieve hydrologic disconnection of forest roads and landings from waters of the state; and

- Assessment of and select treatment of abandoned roads.

4.3 Private Forest Accord Commitments

4.3.1 Summary of Inventory Processes for Forest Roads

The Authors established several inventory processes to meet the overarching goal of the Private Forest Accord road management package to develop a balanced regulatory approach in which landowners continue to operate all roads as necessary, minimize new road construction, and build and maintain roads to achieve habitat and water quality requirements that ensure the viability of covered species.

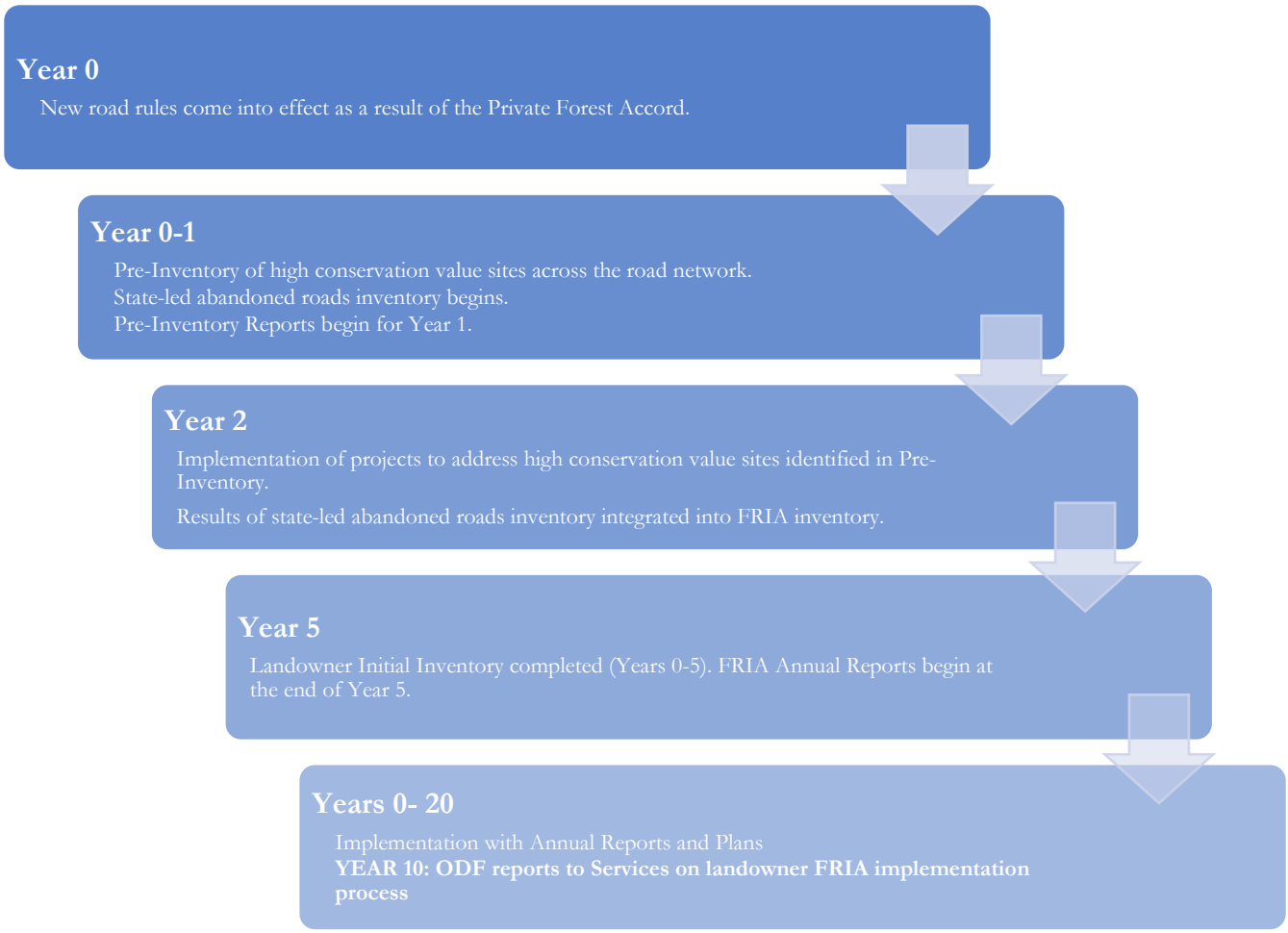


In summary, these additions include:

a. Forest Road Inventory and Assessment (FRIA) Process: This establishes an inventory process for landowners to assess the complete road network within their ownership. The goal is to identify whether roads are meeting the Forest Practice Rules (FPRs) that are required to be established under this Chapter and in this Report and bring roads into compliance with the FPRs. It requires identification and implementation of high conservation value projects in the first 1-5 years. By Year 5, landowners must submit an Initial Inventory to Oregon Department of Forestry (ODF) that describes the current status of the road network and a plan to bring roads into compliance with the Forest Practice Rules that are required to be established under this Chapter. The three core documents for the Initial Inventory due by Year 5 are 1) maps, 2) a work matrix, and 3) a written plan. By Year 5 through the culmination of the FRIA process (Years 0-20), landowners must bring roads into compliance with the FPRs that are required to be established under this Chapter and submit Annual Reports and Plans to ODF. ODF will be responsible for managing the data submitted by landowners.

b. State-Led Abandoned Roads Inventory: Under this process, the State of Oregon will take the lead in identifying abandoned roads that are not proactively identified or disclosed by landowners in the FRIA process. First, the State will lead a cooperative effort to identify abandoned roads and assess risk. Then, the State will prioritize abandoned roads for potential remediation. Landowners will then add identified high-priority abandoned road locations into the FRIA process. Landowners will conduct field verification to determine net benefits and practicability of remediation. Finally, if conditions are met, the abandoned road will be remediated as part of the FRIA process.

Figure 1. Timeline of Inventory Processes



4.3.2 The Forest Road Inventory and Assessment (FRIA)

The primary goals of the FRIA process are to determine whether forest roads meet Oregon's Forest Practice Rules that are required to be established under this Chapter, the technical guidance as updated in this Private Forest Accord process and this Chapter, and to bring the forest roads into compliance with the FPRs to the extent necessary.

4.3.2.1 Forest Roads Inventoried under FRIA Process

Roads to be inventoried include Active and Inactive Forest Roads (as defined). Landowners do not need to affirmatively seek out Abandoned Roads, but shall disclose any Abandoned Roads within their ownership of which they are aware. To the extent known, Abandoned Roads and roads vacated pursuant to OAR 629-625-0650 should be included in a FRIA inventory.

There will be four basic road categories tracked within a FRIA:

- Meets FPR standards;
- Does not meet FPR standards;
- Vacated (per OAR 629-625-0650); and
- Abandoned.

Landowners are encouraged to conduct distinct FRIAs for geographically distinct ownership blocks. These blocks shall be called "Road Management Blocks" (RMBs). Separate inventories will be done for distinct RMBs.

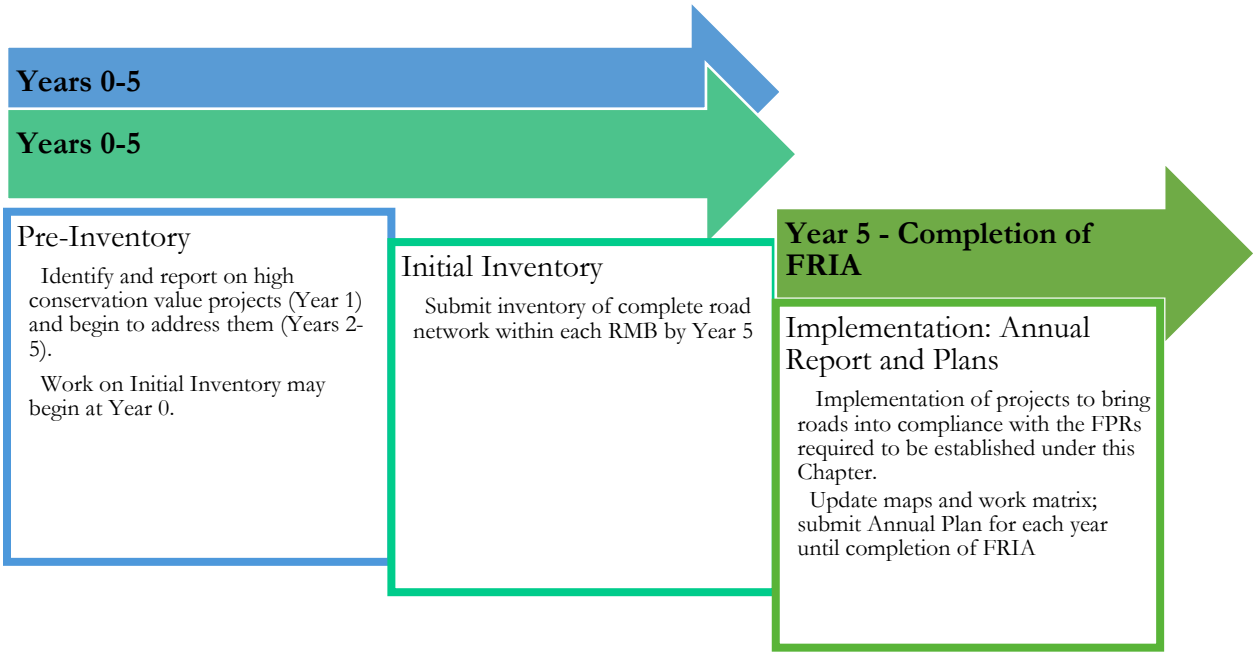
4.3.2.2 The FRIA Process for Each Road Management Block (RMB)

For each RMB, the FRIA process will involve three components:

(1) **A "Pre-Inventory" process** to identify and conduct high conservation value projects from the outset of the FRIA;

(2) **An "Initial Inventory"** where the complete road network inventory must be submitted to ODF within the initial 5-year period; and

(3) **Implementation and "Annual Report and Plan"** that must be submitted to ODF each year starting at the end of Year 5 until the culmination of the FRIA process (Year 20). The Annual Report and Plan tracks the work done and demonstrates progress toward the goal.



a. The Pre-Inventory (Years 0-5)

The purpose of the Pre-Inventory is for landowners to identify, prioritize, and address high conservation value sites within the first five years of the FRIA. In general, high conservation value sites are those sites that currently contribute significant risk to aquatic resources at a scale beyond the site itself and, if resolved, would result in both ameliorating that risk and providing significant ecological benefit at a scale beyond the site itself.

High conservation value sites are defined for the purposes of the Pre-Inventory process as established in this Chapter as sites with:

1) Areas of known chronic sedimentation. Consideration will be given to areas where log hauling will occur during the 5-year inventory phase.
2) Fish passage barriers known to be of significant concern. Priorities will be based on locations where fish passage would provide the greatest benefit to native migratory fish consistent with OAR 635-412-0015(2) and other criteria as determined by the Oregon Department of Fish and Wildlife (ODFW) in consultation with ODF and consistent with the Oregon Fish Passage Barrier Data Standard developed by the ODFW Fish Screening and Passage Program.
3) Ongoing stream diversions at stream crossings and areas with stream diversion potential;
4) Areas of known hydrologic connectivity.

In the Pre-Inventory process, landowners will prioritize high conservation value site projects to ensure compliance with the Forest Practice Rules that are required to be established under this Chapter that:

1) Remove fish passage barriers consistent with ODFW requirements;
2) Minimize the potential for sediment delivery to waters of the state;
3) Minimize stream diversions at water crossings;
4) Minimize hydrologic connectivity between roads and waters of the state; and that
5) Meet other relevant criteria as determined by ODF in consultation with other state and federal agencies.


Brian Kelley

After landowners submit their Pre-Inventory list of sites in Year 1, ODF and ODFW will meet with each landowner in Year 2 to review the list. ODF and ODFW will coordinate to ensure that high conservation value site projects are prioritized based on habitat values, road conditions, sediment delivery to waters of the state, hydrologic connectivity, and fish passage in alignment with the barrier assessment and inventory prioritization under the ODFW Fish Passage Program (FPP). Additionally, ODF and ODFW will coordinate to ensure that information collected in the Pre-Inventory process is standardized and is in a format consistent with the Oregon Fish Passage Barrier Data Standard (OFPBDS) and this Chapter.

Year 0-1: Within the first year of the Pre-Inventory, landowners prepare a list of high conservation value sites as defined above. This list is based on the landowner's evaluation of 1) areas of known chronic sedimentation; 2) fish passage barriers known to be of significant concern; 3) ongoing stream diversions at stream crossings and areas with stream diversion potential; and 4) areas of known hydrologic connectivity. The landowner submits a report at end of Year 1.

Year 2: Landowner meets with ODF and ODFW to discuss the Year 1 list and to solicit feedback on the prioritization of the Pre-Inventory. ODF and ODFW can propose additional projects to a landowner's Pre-Inventory list if they believe that a high conservation value site has not been addressed.

Landowners that do not identify any high conservation value sites in the Pre-Inventory are still required to meet with ODF and ODFW to solicit feedback on the process.

Years 2-5: Landowners will begin to address projects following Year 2 meeting with ODF and ODFW. Landowners will submit annual reports to ODF for Years 2-5 to confirm that Pre-Inventory projects are being addressed and to provide status updates.

b. The Initial Inventory (Years 0-5)

The Initial Inventory occurs concurrently with the Pre-Inventory during the first five years of the FRIA process. As part of the Initial Inventory, an assessment of the complete road network for each RMB must be submitted to ODF within the initial 5-year period of the FRIA.

In the Initial Inventory, landowners will identify and prioritize sites consistent with the following priorities for work over the FRIA period. Priorities for work will be projects that will provide the greatest environmental benefit (greatest good first), consistent with potential risk of negative impacts to resources protected under the FPA. Generally, projects will be prioritized in the following order, while also taking into consideration operational constraints:

1) Fish passage barriers, consistent with ODFW requirements.
2) Erosion and sediment within the road prism (cutslope, ditch, road surface, fill slope), stream diversion potential, and hydrologic connectivity such that delivery to waters of the state is minimized.
3) Potential slope failures which could deliver to waters of the state.
4) Basins containing, or road systems potentially affecting, waters which either contain a listed threatened or endangered aquatic species under the federal or state law or a water body listed on the current 303(d) water quality impaired list for road-related issues.

ODF and ODFW will coordinate to ensure that information collected in the Initial Inventory is standardized and is in a format consistent with the Oregon Fish Passage Barrier Data Standard (OFPBDS) and this chapter. Landowners will prioritize addressing the high conservation value site projects identified in the Pre-Inventory in consultation with ODF and ODFW.

Years 0-5: Landowners will assess the complete road network within each RMB to develop the core documents required for the Initial Inventory submission (maps, work matrix, and written plan).

Year 5: Before the close of Year 5, landowners will submit the Initial Inventory to ODF. ODF will coordinate with ODFW to ensure that data submitted through the Initial Inventory is consistent with ODFW data standards, specifically for the Oregon Fish Passage Barrier Data Standard (OFPBDS) and this Chapter.

The Initial Inventory Submission will include three core documents:

(1) **Maps:** Paper or electronic maps showing an RMB's road network. ODF will provide guidance on how to best share data.

(2) **Work Matrix:** A document or table showing actions necessary to ensure that all roads are brought into compliance with the FPRs that are required to be established under this Chapter. This document will also show prioritization of work.

(3) **Plan:** A written plan describing how the landowner intends to bring its road network into compliance by the close of the FRIA period (Years 0-20). Shall include specific actions likely to be addressed in upcoming calendar year, and also a general description of how all work will occur during the FRIA period. The plan shall include a description of how the

landowner is prioritizing the work, with the goal of optimizing the environmental benefits of projects and ongoing operations.

The specific information included in the Initial Inventory Submission shall include:

- **Location and Length of Forest Roads:** Inventories will show the location and estimated length of Active roads, Inactive roads, and Vacated roads in an RMB.

- **Locations of Streams:** To the extent known, an inventory will show the location of streams in an RMB. Streams shall be coded as Fish, Non-fish, SSBT, fish presence unknown, and/or 303(d) listed due to sedimentation, turbidity, or temperature to assist in the prioritization of work.

- **Status of Road:** Each road segment in an inventory shall be identified as meeting FPR standards, not meeting FPR standards, Vacated, or Abandoned. This will include a determination of whether a road segment is complying with FPRs that are designed to hydrologically disconnect roads. Where a road is determined to not comply with FPRs, the landowner will identify the work necessary to achieve standards and prioritize the work accordingly (e.g., replace a culvert, disconnect a crossing, etc.). Detailed design plans will be submitted in the Annual Report and Plans.

- **Abandoned Roads:** Abandoned roads known by the landowner should be disclosed in the FRIA. Unknown abandoned roads will be addressed through the State's inventory process and integrated into the FRIA as described in that process.

- **Road-Related Fish Passage Barriers:** Each known or potential road-related fish passage barrier should be identified and prioritized. The prioritization of road-related fish passage barriers shall be described in the Initial Inventory with the goal of optimizing environmental benefits of projects and ongoing operations. ODF will coordinate with ODFW to ensure that assessment and prioritization of fish passage barriers is consistent with the ODFW Fish Passage Program and that any data collected is consistent with the Oregon Fish Passage Barrier Data Standard (OFPBDS) and this Chapter.

- **Locations of Stream Crossing Culverts:** The inventory shall show the location of stream crossing culverts in an RMB.

- **Status of Stream Crossing Culverts:** The inventory shall show the status of stream crossing culverts in an RMB. An assessment of the status of a stream crossing culvert shall include:

    - Date of installation, if known;

    - Assessment of the culvert material used;

    - Assessment of whether the culvert is:

        - A fully functioning culvert in a Type F or Type SSBT stream;

- A fully functioning culvert in a Type N or Type D stream;
- A culvert with imminent risk of failure;
- A culvert with minimum risks to public resources; or
- Of a status that cannot be determined. If the status of the culvert cannot be determined, it must be included and prioritized for improvement during the course of the FRIA. The status may be changed as more detailed information is gathered as part of the annual work plan and inventory update process.

c. Annual Inventory Reports and Plans (Years 5–20)

After the Initial Inventory is submitted to ODF, landowners shall submit an Annual Inventory Report each year until the completion of the FRIA process (Years 0-20).

The Annual Inventory Reports and Plans will include three core documents:

- **Updated Maps:** Mapping similar to Initial Inventory submission but updated to reflect work done over course of the prior year, additional information discovered, and potential changes in prioritization.
- **Updated Work Matrix:** Updated table or document corresponding to inventory submission showing work completed and work to be completed. This may show changes in prioritization and discovery of new issues.
- **Annual Plan:** Updated plan discussing 1) work conducted in prior year, 2) work likely to be completed in upcoming calendar year, and 3) general plan to complete all necessary work by the end of the FRIA period.

Collectively, the Annual Plans, Updated Work Matrixes, and Updated Maps for each RMB must show and contain:

- **Total Length of Forest Roads Improved:** Both in annual period, and over course of FRIA process.
- **Total Length of Forest Roads Still Requiring Improvement:** Remaining miles of road requiring improvement.
- **Total Length of Forest Roads Planned for Improvement in Upcoming Year:** Plan to detail location and nature of the work.
- **Total Length of Forest Roads Vacated:** Both in annual period, and over course of FRIA process.
- **Total Length of Forest Roads Planned to be Vacated in the Upcoming Year:** Plan to detail location and nature of work.

- **Number of Fish Barriers Brought into Compliance with the FPRs that are Required to be Established under this Chapter:** Both in annual period, and over course of FRIA process.

- **Number of Fish Barriers Still Needing Improvement:** Both in annual period, and over course of FRIA process.

- **Number of Fish Barriers to be Improved in the Upcoming Year:** Plan to detail location and nature of work.

- **Certification that Landowner Remains on Track to Complete FRIA Process:** Landowner to certify, after review of inventory, work history, and plans that they believe they will meet FRIA completion deadline. Failure to certify requires landowner to seek immediate extension from ODF.

4.3.2.3 Pre-Existing Culverts Identified in FRIA Process

Pre-existing culverts require a separate category and treatment under FRIA if these culverts are fully functioning with minimal risks to public resources and therefore are a lower priority to bring into full compliance with the FPRs that are required to be established under this Chapter. Culverts that are not fully functioning may be impassable to fish, restrict fish movement, result in loss or degradation of habitat, have diversion potential or high hydrologic connectivity, or otherwise represent a risk to public resources. See definitions under Section 5.1.10.

a. Pre-Existing Culvert Determination under FRIA:

Once a landowner has inventoried and assessed the status of a stream crossing culvert as part of the Initial Inventory, the landowner shall address each pre-existing culvert and each culvert that does not meet the definition of a pre-existing culvert pursuant to the following requirements:

i. If the structure is fully functioning with minimal risk to public resources and the date of installation is known, it shall be maintained until the end of its service life. In any case where a culvert has been reused and the first installation date is known, it shall be maintained until the end of its service life from the original date of installation.

ii. If the structure is fully functioning with minimal risk to public resources and the date of installation is NOT known, the culvert must be inspected at least every five years as part of the Annual Inventory Report and Plans process under the FRIA.

iii. If the structure is NOT fully functioning, or there is more than a minimal risk to public resources (e.g., fish passage barrier or high diversion potential), it needs to be prioritized to be repaired or replaced as part of the FRIA process. These culverts will not be considered "pre-existing culverts."

iv. If the structure has an imminent risk of failure, it needs to be repaired or replaced as soon as practicable, but no later than two years after the structure is identified.

Repair or upgrades can include, but shall not be limited to, measures such as adding a Metal End Section (MES) at the inlet to increase capacity and debris-passing performance. If structural failure occurs, the landowner or manager must, within 90 days, submit to ODF for review and approval a plan or plans for that culvert to be repaired or replaced as soon as practicable. These culverts will not be considered "pre-existing culverts."

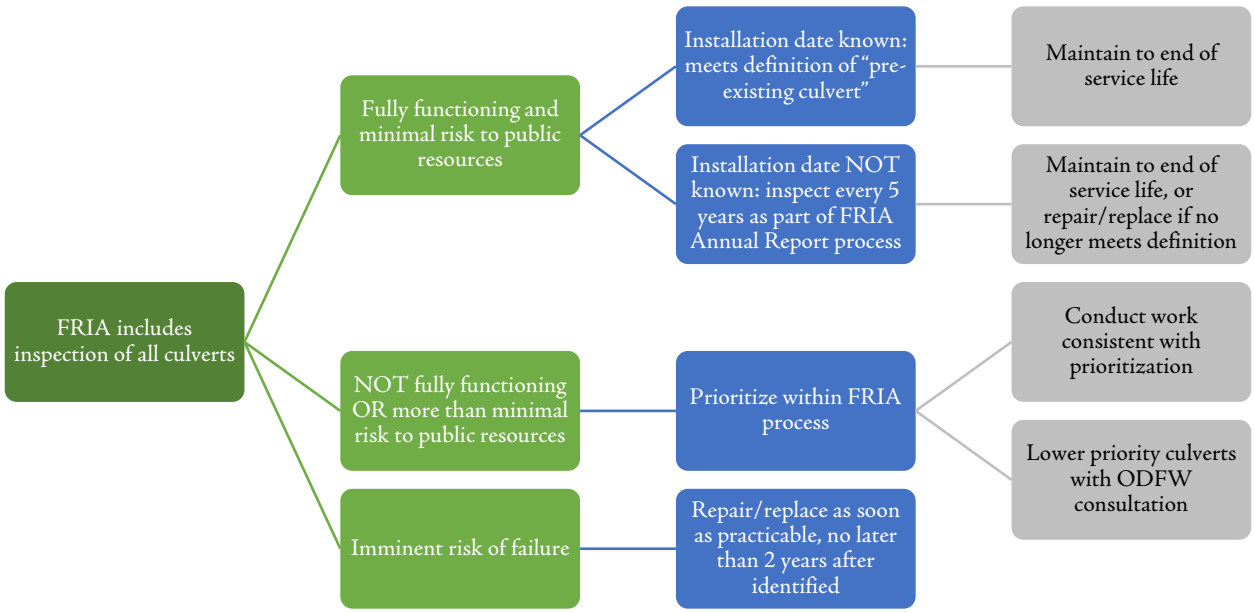
b. Lower Priority Culverts that Do Not Meet the Pre-Existing Culvert Definition

Lower priority culverts, in consultation with ODFW, may be maintained until the end of their service life, or a maximum of 30 years:

(i) If, in consultation with ODFW, the culvert is partially functioning to provide fish passage and the cost of repair/replacement is disproportionate to the benefits of repair/replacement; or

(ii) If, in consultation with ODFW, the culvert is providing valuable wetland or pond habitat.

Figure 2. Framework to Address Pre-Existing Culverts in the FRIA Process



4.3.3 Small Forestland Owners (SFOs) and Road Management

The Authors do not intend for the FRIA process to apply to small forestland owners (SFOs), but small forestland owners (SFOs) will be required to submit Road Condition Assessments (RCAs) under various circumstances, as established under Chapter 5. All new construction related to roads on forestland owned by SFOs must satisfy the same standards of the Forest Practice Rules that apply to all landowners that are required to be established under Chapter 5.

4.3.4 State-Led Abandoned Roads Inventory

Abandoned roads are defined as roads that were constructed prior to 1972 and do not meet the criteria of active, inactive, or vacated roads. This does not include skid trails. Many abandoned roads are unmapped and may be difficult to inventory. Abandoned roads present special risks to aquatic systems, as lack of regular access can result in ongoing and potential problems going unnoticed. Some of these abandoned roads have the potential to produce chronic sediment and increase risks of mass wasting and stream diversions. Gucinski et al. state that "Plugged culverts and fill-slope failures are frequent and often lead to catastrophic increases in stream channel sediment, especially on abandoned or unmaintained roads (Weaver and others, 1995)" (Gucinski et al., 2001, p. 28).

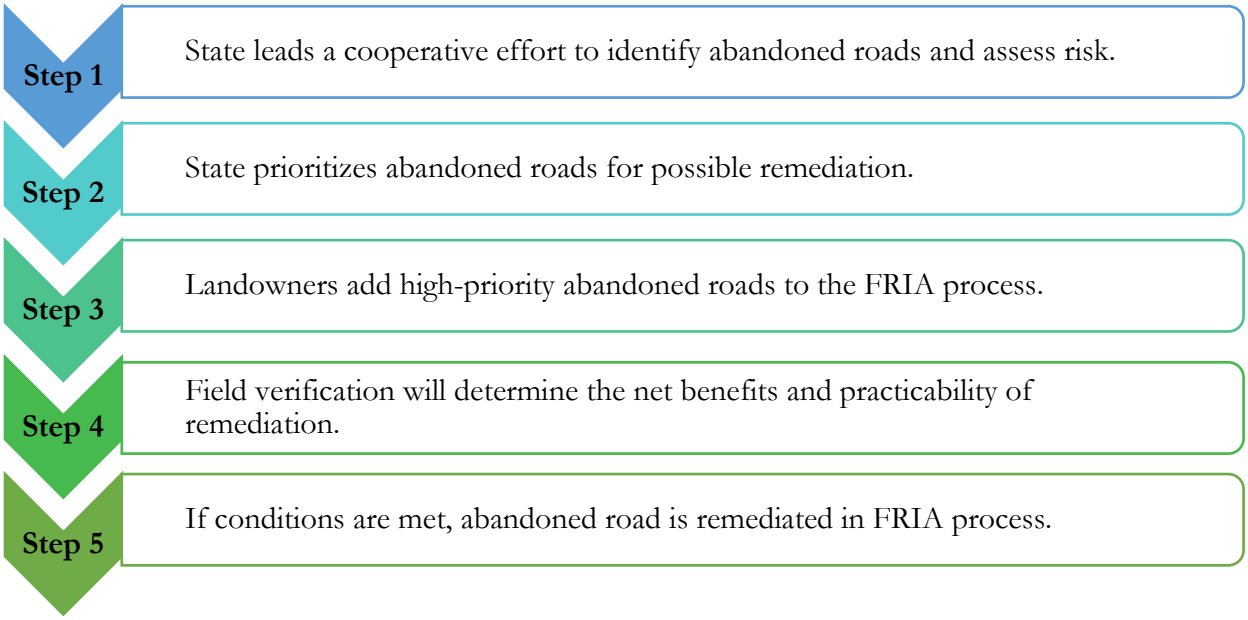
Stream diversion and diversion potential at stream crossings are critical concerns for abandoned roads. Diversion potential for a stream exists when crossing capacity may not accommodate high flows, causing the stream to back up behind the fill and flow down the road. If the stream crossing capacity is exceeded and the stream simply flows over the road fill and back into the natural channel, the stream crossing does not have diversion potential. Stream diversion may also occur due to ice and snow accumulations on the road or if debris flows deposit material across the roadway (Furniss et al., 1997, p. 1). Furniss et al. (1997) note that "In almost all cases, diversion will create a greater erosional consequence of capacity exceedance than streamflows that breach the fill but remain in the channel" (p. 1).

The number and condition of abandoned roads on private timberlands in Oregon is uncertain, but abandoned or "legacy" roads have been cited by the Environmental Protection Agency and NOAA Fisheries as an area of concern and a reason for the agencies' disapproval of Oregon's coastal nonpoint pollution control program.

4.3.4.1 Process to Address Abandoned Roads through State-Led Inventory

To address the risks that abandoned roads may pose to waters of the state, the following process will be implemented. This process would prioritize assessments of abandoned roads and require remediation if needed based on risk to aquatic systems and cost to remedy.

Figure 3. Summary of State-Led Abandoned Roads Inventory Process



Step 1) The State, in coordination with EPA, leads a cooperative effort to identify abandoned roads and assess risks.

ODF will identify abandoned roads through the use of LiDAR object-based classification (e.g., the methods described in Sherba et al., 2014), supplemented by existing GIS data, aerial images, landowner disclosure of known abandoned roads, inventory data, and some site visits for calibration. DEQ and U.S. EPA will provide consulting and technical support for ODF implementation.

After identifying abandoned roads, the state and cooperators would then identify locations associated with abandoned roads with a high level of risk to waters of the state or infrastructure.

Criteria to determine high-risk locations, in order of preference, should include:

1. Ongoing stream diversions at stream crossings;
2. Diversion potential at stream crossings;
3. Likelihood of hydrologic connectivity;
4. Comparative risk of chronic sediment produced; and
5. Risk of contribution to mass wasting.
6. Other relevant criteria as determined by ODF in consultation with other state and federal agencies.

Additional criteria to determine high-risk locations should consider abandoned roads located in the critical locations under the FPRs that are required to be established under this Chapter.

The result of this process will yield a set of potential high-risk locations for further consideration for remediation.

Step 2) State prioritizes abandoned roads for possible remediation.

Following the identification of abandoned roads and ranking of risk, the State will work with landowners to develop priorities for potential remediation in a stakeholder process to determine high priorities.

Considerations should include:

1. Importance of the watershed (HUC-6) to recovering salmonids;
2. Number of stream crossings based on full-densified stream network in GIS or LiDAR;
3. Cost and benefit of work to remediate problems and risks; and
4. Other relevant criteria as determined by ODF in consultation with other state and federal agencies developed in the stakeholder process.

The result of this process will yield a set of high-priority abandoned road locations from the identified high-risk locations in Step 1.

Step 3) Landowners add high-priority locations to the Forest Roads Inventory and Assessment (FRIA).

Where high priority abandoned road locations are identified under Step 2, landowners shall add them to the Initial Inventory (Years 0-5) of the FRIA process.

Step 4) Field verification will determine the net benefits and practicability of remediation.

Field verification of all high-priority sites will be documented through the FRIA annual implementation reporting process. ODF, in consultation with the Oregon Department of Environmental Quality and Oregon Department of Fish and Wildlife when necessary, will review landowner verifications of high priority sites and remediation plans as part of the annual work plan process.

Field verification shall include:

1. **Confirmation that the high-priority location is on an abandoned road.**

2. **Determination regarding whether the high-priority location is diverting the stream or has diversion potential.**

    a. The State and cooperators will develop indicators to determine whether the location is actively diverting the stream or has diversion potential (*See* Furniss et al., 1997).

    b. Landowners should consider potential erosional consequences, the value of downstream resources, the sensitivity of downstream resources to erosion and sedimentation, and costs to repair the road if a stream diversion occurs.

3. **Determination regarding whether the high-priority location is actively contributing sediment or has a high risk of contributing significant quantities of sediment to waters of the state.**

    a. The state and cooperators will develop indicators to determine whether the location is actively contributing or has the potential to contribute sediment to waters of the state. These indicators could include:

        - A sediment deposit that reaches the high water line of a defined channel of flood-prone area.
        - A channel that extends from a road drainage structure outlet to the high water line of a defined channel or a flood-prone area.
        - Evidence of surface flow between the drainage structure outlet and a defined channel or a flood-prone area.
        - Observation of turbid water reaching all typed waters, lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals during runoff events.
        - Evidence of direct sediment entry into a watercourse or a flood-prone area from road surfaces or drainage structures and facilities (e.g., ponded sediment, sediment deposits, delivery of turbid runoff from drainage structures during rainfall events);
        - Gullies or other evidence of erosion on road surfaces or below the outlets of road drainage facilities or structures, including ditch drain (relief) culverts, with transport or a high likelihood of transport to a watercourse.
        - Native-surfaced road exhibiting erosion.
        - Native-surfaced road composed of erodible soil types (e.g., granitic soils).
        - Rilled, gullied, or rutted road approaches to crossings.
        - Existing ditch drain (relief) culverts or other road drainage structures with decreased capacity due to damage or impairment (e.g., crushed or bent inlets, flattened dips due to road grading).
        - Decreased structural integrity of ditch drain (relief) culverts, waterbreaks, or other road drainage structures (e.g., excessive pipe corrosion, breached water-breaks, or rutted road segments).

- Ditch scour or downcutting resulting from excessively long undrained ditches with infrequent ditch drain (relief) culverts or other outlet structures or facilities. This condition can also result from design inadequacies (e.g., spacing not altered for steep ditch gradient), inadequate erosion prevention practices (e.g., lack of armoring), or ditches located in areas of erodible soils.

4. Determination regarding whether the restoration would be a net benefit to waters of the state.

a. To determine whether restoration would be a net benefit to waters of the state, landowners must weigh the ecological impacts of accessing and addressing the high-priority location against the value of vacating the high-priority locations.

b. This analysis will be presented as part of the annual reporting process.

5. Determination regarding the practicability of restoration/remediation.

a. To determine practicability, landowners must evaluate the financial expense and environmental benefit for a range of alternatives. These alternatives could include no action, vacating the high-priority location, and any other reasonable mitigation alternatives to address identified risks, including but not limited to:

1) Ongoing stream diversions at stream crossings;

2) Diversion potential at stream crossings;

3) Likelihood of hydrologic connectivity;

4) Comparative risk of chronic sediment produced; and

5) Risk of contribution to mass wasting.

b. Landowners must then propose the most practicable alternative from this analysis as part of the annual reporting process.

Step 5) If conditions are met, identified problems shall be remediated in the FRIA process (Years 0-20).

In consultation with ODF, if the landowner determines that all four of the following conditions are met, then the project will be scheduled for remediation in the FRIA process through the Annual Reports and Plans (Year 1–20):

1. The high-priority location is an abandoned road;

2. The high-priority location is actively contributing or has a high risk of contributing significant quantities of sediment to waters of the state;

3. The restoration would be a net benefit to waters of the state; and

4. Restoration is practicable.

4.3.5 Hydrologic Connectivity in Forest Practice Rules (FPR) Revisions and Proposed Inventory Processes

Hydrologic connectivity occurs where road and ditch runoff is delivered to the natural stream channel system. Roads can generate overland flow due to the relatively impermeable surface of the road prism and can also intercept interflow at cutslopes, effectively converting subsurface flows to surface flows. When these surface flows have a continuous flow path between the road prism and a natural stream channel, hydrologic connectivity occurs (Furniss et al., 2000, pp. 5-6). As Furniss et al. describe, "a hydrologically connected road becomes part of the stream network" (pp. 5-6).

Hydrologically connected roads can deliver increased runoff, sediment, and chemicals associated with roads, such as spills or oils generated on the road surface or cutslope. At the watershed scale, connections between roads and streams can also alter the drainage density of the watershed and change runoff frequency and magnitude (See Furniss et al., 2000; Weaver et al., 2015).

The Authors agree that the goal of disconnecting roads and streams is to minimize sediment delivery, hydrologic change, and risk of road pollutants entering waters of the state.

4.3.5.1 Summary of Rule Revisions and Process Changes to Address Hydrologic Connectivity

See Section 4.4 for complete text of proposed rule revisions. The requirement to hydrologically disconnect all forest roads and landings from waters of the state to the maximum extent practicable was added in several sections of the FPRs as established consistent with this Chapter including the goals, defining the term in rule, and as well as new rules pertaining to crossings. The Authors also added requirements to develop specific technical guidance, training, and monitoring protocols for hydrologic connectivity.

4.3.6 Updates Due to Natural Disasters

If a landowner experiences a natural disaster, they shall evaluate the area impacted and adjust their prioritization and schedule based on the changed circumstances as part of the annual reporting and planning process. If the scale of the disaster is significant enough where that timeframe is not feasible, the landowner may propose a different timeline with concurrence from ODF.

4.3.7 Stakeholder Processes

4.3.7.1 High-Priority and High-Risk Abandoned Roads Stakeholder Process

In Step 1 of the proposed Abandoned Roads process, the State in coordination with EPA and landowners will identify locations associated with abandoned roads that have a high level of risk to waters of the state or to infrastructure (See Section 4.3.4).

Concurrently, the state will convene a stakeholder process and invite landowners, state agencies, Tribes, conservation groups, and other interested stakeholders to determine the criteria to prioritize those identified high-risk abandoned roads (Step 2).

Considerations should include:

1. Importance of the watershed (HUC-6) to recovering salmonids;

2. Number of stream crossings based on full-densified stream network in GIS or LiDAR;

3. Cost and benefit of work to remediate problems and risks; and

4. Other relevant criteria as determined by ODF in consultation with other state and federal agencies [developed in a stakeholder process].

The result of this process will yield a set of high-priority abandoned road locations from the identified high-risk locations in Step 1.

4.3.7.2 Development of Rule Implementation Guidance

The Oregon Department of Forestry shall convene a stakeholder process to inform the development of implementation guidance for the following topics. Operations consistent with final technical guidance from ODF are determined to be consistent with the relevant rule. As allowed by rule, operators may diverge from technical guidance where alternative approaches are applied due to site specific conditions. The stakeholder process shall invite Representatives from conservation, fishing, Tribes, landowners, operators, and regulatory agencies with expertise in implementation of best management practices on forest roads.

1. Hydrologic Disconnection: Following revisions to the FPRs, ODF shall create new technical guidance or revise existing guidance (e.g., ODF Tech Note 8) to provide more technical information about implementation of hydrologic disconnection standards that are referred to/incorporated by rule.

2. Abandoned Roads: Following revisions to the FPRs, ODF in consultation with other state agencies including but not limited to Oregon Department of Environmental Quality

(DEQ), shall create new technical guidance or revise existing guidance regarding the proposed Abandoned Roads process (See Section 5.3.4).

3. Construction in Wetlands: Following revisions to the FPRs, ODF in consultation with other state agencies shall create new technical guidance or revise existing guidance regarding construction in wetlands.

4. Review of Existing ODF Tech Notes: Following revisions to the FPRs, ODF shall review and update existing technical guidance for compliance with new rules:

- ODF Tech Note 3 (2001): Replacing Stream Crossing Structures Outside Normal In-Water Working Periods
- ODF Tech Note 4 (in process): Fish Passage Guidelines for New and Replacement Stream Crossing Structures
- ODF Tech Note 5 (2002): Determining the 50-Year Peak Flow and Stream Crossing Structure Size for New and Replacement Crossings
- ODF Tech Note 7 (2003, edited 2019): Avoiding Roads in Critical Locations
- ODF Tech Note 8 (2003): Installation and Maintenance of Cross Drainage Systems on Forest Roads
- ODF Tech Note 9 (2003): Wet Weather Road Use

5. Adaptive Management: Additional items as identified under the adaptive management framework established under Chapter 10 of this Report.

4.3.9 Development of Training Requirements

ODF shall provide training opportunities for forest landowners and operators on the revised rules including but not limited to:

- Hydrological disconnection; and

FRIA methods and protocols.

4.3.10 Development of Monitoring Requirements

The Independent Research Science Team (IRST) created under the PFA shall design and oversee baseline and trend monitoring for hydrologic disconnection. Compliance monitoring will be conducted through the Department's process.

1. Baseline and Trend Monitoring for Hydrologic Disconnection: The methodology for the monitoring shall be based off of Dube et al. (2010) and Martin (2009). The purpose of the monitoring for hydrologic disconnection is to establish a baseline and to monitor and report the change in hydrologic connectivity over time as the FRIA is implemented. The overarching goal is to ensure that all forest roads and landings shall be hydrologically disconnected to the maximum extent feasible from waters of the state. The Adaptive Management Program Committee shall use the results of the baseline and trend monitoring

to develop regional goals consistent with that monitoring. All hydrologic connectivity data should be public and shared as it becomes available to help focus goals, identify accomplishments, and inform statewide learning.

2. **Compliance Monitoring:** Site-specific and watershed assessments of implementation of FPRs and BMPs shall be conducted in accordance with FPR requirements and the processes outlined in Chapter 8.

4.4 Revised Rules in Conformance with Private Forest Accord Commitments

Oregon's regulations for forest roads offer a comprehensive suite of best management practices to ensure the protection of public resources. Clear, specific, measurable, objective, and enforceable rules are critical for proper application by practitioners and for transparency to the public. The proposed changes to Oregon's forest road rules that reflect this intent are included below. The Authors recognize that ODF may make minor modifications in rule writing that adhere to the intentions established in this Chapter by the Authors.

OAR 629-600-0100
Definitions

Hydrologic disconnection means the removal of direct routes of drainage or overland flow of road runoff to waters of the state.

OAR 629-625-0100
Written Plans for Road Construction

(1) A properly located, designed, and constructed road greatly reduces potential impacts to water quality, forest productivity, fish, and wildlife habitat. To prevent improperly located, designed, or constructed roads, a written plan is required in the sections listed below.

(2) In addition to the requirements of the water protection rules, operators must submit a written plan to the State Forester before:

(a) Constructing a road where there is an apparent risk of road-generated materials entering waters of the state from direct placement, rolling, falling, blasting, landslide or debris flow;

(b) Conducting machine activity in Type F, Type SSBT, or Type D streams, Type N streams, lakes, or significant wetlands; or

(c) Constructing roads in riparian management areas.

(d) Operators shall consult Tech Note 4 for required information to be included in written plans for water crossings.

(e) Constructing any water crossing in all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals.

(f) Constructing roads in critical locations.

(3) Operators shall submit a written plan to the State Forester before constructing roads on high landslide hazard locations. Operators and the State Forester shall share responsibility to identify high landslide hazard locations and to determine if there is public safety exposure from shallow, rapidly moving landslides using methods described in OAR 629-623-0000 through 0300. If there is public safety exposure, then the practices described in 629-623-0400 through 0800 shall also apply.

(4) In addition to the requirements of the water protection rules, operators shall submit a written plan to the State Forester before placing woody debris or boulders in stream channels for stream enhancement.

OAR 629-625-0200
Road Location

(1) The purpose of this rule is to ensure roads are located where potential impacts to waters of the state are minimized and hydrologic connectivity between roads and waters of the state is reduced to the maximum extent practicable.

(2) When locating roads, operators shall designate road locations which minimize the risk of materials entering waters of the state and minimize disturbance to channels, lakes, wetlands and floodplains.

(3) **Critical Locations**. Operators shall avoid locating roads in critical locations. When alternate routes that avoid critical locations are not legally feasible due to ownership boundaries or other legal impediments, physically feasible due to safety considerations, or would have a greater environmental risk, operators may locate roads in critical locations. Critical locations include:

(i) High landslide hazard locations

(ii) Slopes over 60% with decomposed granite-type soils

(iii) Locations parallel to, and within an RMA or within 50 feet of stream channels or lakes, excluding crossings and approaches to crossings

(iv) Within Significant wetlands,[4] stream-associated wetlands,[5] or wetlands[6] greater than 0.25 acres in size

[4] OAR 629-600-0100 (70) "Significant wetlands" means those wetland types listed in OAR 629-680-0310, that require site specific protection, as follows: (a) Wetlands that are larger than eight acres; (b) Estuaries; (c) Bogs; and (d) Important springs in eastern Oregon.
[5] OAR 629-600-0100 (77) "Stream-associated wetland" means a wetland that is not classified as significant and that is next to a stream.
[6] OAR 629-600-0100 (95) "Wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation

(v) Any active stream channel, exclusive of stream crossings in compliance with OAR 629-625-320

(vi) Locations parallel to, and within 50 feet of, a stream channel or within an RMA for a distance exceeding 500 feet per mile of road length, exclusive of stream crossings in compliance with OAR 629-625-320. However, the distance of 500 feet per mile can be exceeded where there are no other nearby alternatives and the road can be located far enough from the stream to not affect the minimum RMA leave tree requirements, and also to allow effective sediment filtering.

(vii) High landslide hazard locations where rock is likely to be highly sheared or otherwise unstable so that it is not possible to excavate a stable cutslope. If such a cutslope failure may divert road surface drainage to a high landslide hazard location and could trigger a debris flow below the road with potential for delivery to a stream, that road should not be constructed unless the operator demonstrates that the cutslope can be stabilized by buttressing or other means

(viii) Locations cutting through the toe of active or recently active deep-seated landslide deposits and where a reactivated landslide would likely enter waters of the state

(ix) Highly dissected, steep slopes where it is not possible to fit the road to the topography with full bench end haul construction

(4) All road construction in critical locations shall be reviewed on site and reviewed by the Department with consultation from a qualified professional as appropriate for the site, including but not limited to ODF, DEQ, and ODFW. Onsite review must occur within 14 days, otherwise the operator may continue with operations consistent with written plan.

(5) All road construction in critical locations must be outlined in a written plan. The written plan shall include a narrative describing why alternative routes are not feasible or would have greater environmental risk.

(6) Operators shall minimize the number of stream crossings.

(7) To reduce the duplication of road systems and associated ground disturbance, operators shall make use of existing roads where practical. Where roads traverse land in another ownership and will adequately serve the operation, investigate options for using those roads before constructing new roads. Notifications that include new road construction shall affirm that options, if they exist, were investigated.

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typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, bogs, and similar areas. Wetlands do not include water developments as defined in section (93) of this rule.

OAR 629-625-0310
Road Prism

(1) Operators shall use variable grades and alignments to avoid less suitable terrain so that the road prism is the least disturbing to protected resources, avoids steep sidehill areas, wet areas, and potentially unstable areas as safe, effective vehicle use requirements allow.

(2) Operators shall end-haul excess material from steep slopes or high landslide hazard locations where needed to prevent landslides.

(3) Operators shall design roads no wider than necessary to accommodate the anticipated use and minimize impacts to covered species from new road construction. The running surface width should average not more than thirty-two feet for double lane roads and twenty feet for single lane roads, exclusive of ditches plus any additional width necessary for safe operations on curves, turnouts, and landings.

(4) Operators shall design cut and fill slopes to minimize the risk of landslides.

(5) Operators shall stabilize road fills as needed to prevent fill failure and subsequent damage to waters of the state using compaction, buttressing, subsurface drainage, rock facing or other effective means.

(6) Operators shall utilize end-haul construction and not place fill within the riparian management area of a stream or within 75 feet of a stream channel where a riparian management area is not required. Fill may be placed in the riparian management area or within 75 feet of streams where a riparian management area is not required for approaches to crossings and at crossings.

OAR 629-625-0320
Water Crossing Structures

(1) All new or reconstructed water crossings in all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals shall have a written plan reviewed by ODF. Operators shall consult Tech Note 4 for guidance on developing written plans.

(2) In addition to the written plan requirements of OAR 629-605-0170 (Statutory Written Plans), the written plan for water crossings shall include an assessment of:

> (a) Operator transportation needs, road location, road management objectives, and land ownership;
>
> (b) The specific resource(s) that may be impacted by construction or reconstruction of the water crossing, including aquatic species, habitats, and conditions; floodplain values, terrestrial species, and water uses;
>
> (c) The specific risk factors at the watershed-scale, including geologic or geomorphic hazards, event history, past and projected land management, crossing maintenance history,

regional channel stability, and projected watershed conditions over the life of the crossing structure;

(d) The specific risk factors at the site scale, including channel stability, potential for blockage by debris, floodplain constriction, large elevation changes across infrastructure, channel sensitivity to change, consequences of site failure to resources, and potential stream geomorphic changes over the life of the crossing structure;

(e) The specific techniques and methods employed for resource protection;

(f) Additional information as determined by ODF.

(3) Operators shall design and construct all water crossing structures in all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals to:

(a) Minimize excavation of side slopes near the channel.

(b) Minimize the volume of material in the fill.

(A) Minimizing fill material is accomplished by restricting the width and height of the fill to the amount needed for safe use of the road by vehicles, and by providing adequate cover over the culvert or other drainage structure.

(B) Fills over 15 feet deep contain a large volume of material that can be a considerable risk to downstream beneficial uses if the material moves downstream by water. Consequently, for any fill over 15 feet deep, operators shall submit to the State Forester a written plan that describes the fill and drainage structure design. Written plans shall include a design that minimizes the likelihood of:

(i) Surface erosion;

(ii) Embankment failure; and

(iii) Downstream movement of fill material.

(C) Armor fills against erosion where large fills over 15 feet deep are determined to be necessary by ODF.

(c) Prevent erosion of the fill and channel.

(d) Minimize hydrologic connectivity for adjacent roadway.

(e) Avoid or minimize unavoidable alterations or disturbances to stream channel, bed, bank, or bank vegetation to that necessary to construct the water crossing structure. Alteration or disturbance of stream bed, bank, or bank vegetation shall be limited to that necessary to construct the project.

(f) The banks shall be revegetated with native woody species or stabilized with other erosion control techniques.

(g) Ensure that streamflow cannot be diverted out of its channel if the crossing fails.

(h) Preserve water quality and unobstructed flow.

(i) Wastewater from temporary water crossing project activities and dewatering shall be routed and deposited to the forest floor in an upland area, or above the 100-year flood level if present, to allow removal of fine sediment and other contaminants prior to being discharged to waters of the state.

(j) When ODF determines that installing a water crossing in a flowing stream will result in excessive siltation and turbidity, and siltation and turbidity would be reduced if stream flow were diverted, ODF shall require the stream flow be diverted using a bypass flume or culvert, or by pumping the stream flow around the work area. This may include culvert installations that are within 0.25 miles of a Type F or SSBT Water or within two miles of a hatchery intake.

(k) For water crossing structures on fish streams (Type F and SSBT), operators shall, consistent with the rules in this section:

(i) Minimize impacts to spawning and rearing habitat.

(ii) Minimize the loss of fish life during the project.

(iii) Ensure free and unimpeded fish passage at all flows when fish are expected to move through the life of the structure.

(iv) Avoid or minimize impacts to fish.

(4) In selecting a crossing design strategy, operators constructing or reconstructing crossings in all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals shall first consider vacating the water crossings. For water crossings in all fish streams (Type F and SSBT) where vacating the water crossing is not feasible or desired by the landowner, permanent channel-spanning structures shall be prioritized before other crossing strategies. This section does not require the landowner to utilize any specific crossing design strategy.

(5) Operators shall design and construct permanent water crossings to:

(a) Permanent water crossings in non-fish streams (Type N and D) shall be designed to pass the 100-year peak flow. Guidance for determining the 100-year peak flow shall be updated, at a minimum, every ten years to incorporate the most recent available peak flow data.

(b) Permanent water crossings in fish streams (Type F and SSBT) shall be designed using the stream simulation approach. Water crossing design in fish streams (Type F and SSBT) shall consider and incorporate the stream's geomorphic processes and anticipated changes over the life of the structure. Water crossings in fish streams (Type F and SSBT) shall be designed to allow for the movement of water, wood, sediment, and organisms to the maximum extent feasible and minimize obstacles to stream processes. Water crossings in fish streams (Type F and SSBT) shall avoid fragmentation of aquatic habitats by replicating the natural conditions of the stream being crossed. Where it is not possible to meet stream simulation, operators may propose alternatives so long as the flow can accommodate a 100-year peak flow and does not obstruct fish passage.

(c) ODF may require a larger crossing design if it determines that the structure size designed to pass the 100-year peak flow would be inadequate to:

(i) avoid delivery of sediment to the water being crossed;

(ii) avoid stream diversion potential; and

(iii) provide opportunity for the passage of expected bed load and associated large woody debris during flood events;

(d) Permanent channel-spanning structures span the entire bankfull width of the stream. This water crossing strategy includes long and short-span bridges and open-bottom box culverts.

(i) Permanent channel-spanning structures shall have a minimum of three feet of clearance between the bottom of the bridge structure and the water surface at the 100-year peak flow, unless engineering justification shows a lower clearance will allow the free passage of anticipated sediment and large wood.

(ii) The bridge structure or stringers shall be placed in a manner to minimize damage to the bed.

(iii) One end of each new or reconstructed permanent log or wood bridge shall be tied or firmly anchored if any of the bridge structure is within ten vertical feet of the 100-year flood level.

(iv) When earthen materials are used for bridge surfacing, only clean sorted gravel may be used, a geotextile lining must be installed and curbs of sufficient size shall be installed to a height above the surface material to prevent surface material from falling into the stream bed.

(v) Wood removed from the upstream end of bridges will be placed at the downstream end of bridges in such a way as to minimize obstruction of fish passage and to the extent practical, while avoiding significant disturbance of sediment in connection with maintenance activities.

(vi) Abutments, piers, piling, sills, approach fills, shall not constrict the flow so as to cause any appreciable increase (not to exceed 0.2 feet) in backwater elevation (calculated at the 100-year flood level) or channel wide scour and shall be aligned to cause the least effect on the hydraulics of the watercourse.

(vii) Excavation for and placement of the foundation and superstructure shall be outside the ordinary high-water line unless the construction site is separated from the stream by use of an approved dike, cofferdam, or similar structure.

(xi) Wood or other materials treated with preservatives shall be sufficiently cured to minimize leaching into the water or bed. The use of creosote or pentachlorophenol is not allowed. Structures containing concrete shall be sufficiently cured prior to contact with water to avoid leaching.

(xii) Permanent channel-spanning structures in fish streams (Type F and SSBT) shall be designed using the stream simulation approach. For fish streams (Type F and SSBT):

(1) Channel-spanning structures shall not constrict clearly defined channels;

(2) Channel-spanning structures shall establish a low-flow channel that will allow for fish movement during low-flow periods. In streams with highly variable flows, the structure shall be designed to pass high flows while maintaining a defined low-flow channel similar to the natural stream bed.

(e) Permanent water crossing culverts:

(i) Culverts shall be designed and installed so they will not cause scouring of the stream bed and erosion of the banks in the vicinity of the project.

(ii) The culvert shall be designed to avoid stream diversion potential.

(iii) The culvert and its associated embankments and fills must have sufficient erosion protection to withstand the 100-year peak flow. Erosion protection may include armored overflows or the use of clean coarse fill material.

(iv) Wood removed from the upstream end of culverts will be placed at the downstream end of culverts in such a way as to minimize obstruction of aquatic organism passage and to the extent practical, while avoiding significant disturbance of sediment in connection with maintenance activities.

(v) Disturbance of the bed and banks shall be limited to that necessary to place the culvert and any required channel modification associated with it. Affected bed and bank areas outside the culvert and associated fill shall be revegetated with native woody species, or stabilized with other erosion control techniques. Native woody species shall be maintained one growing season.

(vi) No permanent water crossing culverts shall be installed less than 18 inches.

(vii) Permanent culverts in fish streams (Type F and SSBT) shall be designed using the stream simulation approach. For fish streams (Type F and SSBT):

(1) For no-slope culverts, the minimum culvert diameter shall be at least equivalent to the active channel width. For other culvert installations, the minimum culvert diameter shall be at least 1.2 times the active channel width, plus 2 feet.

(2) Alignment and slope. The alignment and slope of the culvert shall mimic the natural flow of the stream whenever possible. The slope of the reconstructed streambed within the culvert should approximate the average slope of the adjacent stream from approximately ten channel widths upstream and downstream of the site in which it is being placed, or in a stream reach that represents natural conditions outside the zone of the road crossing influence.

(3) Embedment. If a culvert is used, the bottom of the culvert should be buried into the streambed not less than 30% and not more than 50% of the culvert height for round culverts and for pipe arch culverts not less than 15% and no more than 30%. For bottomless culverts, the footings or foundation must be designed for the deepest anticipated scour depth.

(4) Maximum length. If the design for a new crossing on a new road would require a culvert longer than 150 feet, a channel spanning structure shall be utilized unless the site-specific design constraints preclude the use of a channel spanning structure.

(5) Culvert bed materials. Culvert bed materials should have a similar composition to natural bed materials that form the natural stream channels adjacent to the road crossing in the reference reach. The culvert should be designed to deliver sufficient transported bed material to maintain the integrity of the streambed over time. If natural accumulation is not feasible, then culvert bed materials must be mechanically placed during bed construction.

(6) Water depth and velocity**.** The maximum velocity in the culvert should not exceed the maximum velocity in the narrowest channel cross-sections.

(g) **Fords**

(i) The entry and exit points of a new ford must not be within one hundred feet upstream or downstream of another ford.

(ii) Fords shall only be used during periods of no or low stream flow (whether dry or frozen) to minimize the delivery of sediment to the stream.

(iii) Fords shall only be installed in a dry streambed or when a site is de-watered and for which sediment control and flow routing plans have been developed, reviewed, and meet the criteria outlined in written plan.

(iv) Approaches to the structure should not dam the floodplain where substantial overbank flow occurs.

(v) The structure should cross as near to perpendicular to the channel to minimize the disturbance area and reduce maintenance for post-installation.

(vi) The structure should avoid or minimize the acceleration of flow velocities through the structure.

(vi) For fish streams (Type F and SSBT), any ford structure shall

(1) be no wider than 16 feet and

(2) installed and maintained to ensure scour has not created a barrier to fish passage.

(6) Operators shall design and construct temporary water crossings in conformance with the following:

(a) Temporary water crossings in non-fish streams (Type N and D) shall be designed to accommodate flows expected during crossing use with a minimum culvert diameter of 18 inches.

(b) Temporary water crossings in fish streams (Type F and SSBT) shall only be used during the ODFW in water work period.

(c) Temporary water crossings must be identified on the forest practices notification and written plan, along with a vacating date.

(d) Temporary crossings on Type N and D streams shall only be used:

(i) In Western Oregon if installed after June 1st and removed by September 30th of the same year;

(ii) In Eastern Oregon if installed after July 1st and removed by October 15th of the same year;

(iii) At other times when ODF and applicant can agree to specific dates of installation and removal, and the extended dates result in equivalent levels of resource protection.

(e) Temporary water crossings shall be installed in the dry, or in isolation from stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area. An exception may be granted if siltation or turbidity is reduced by installing the culvert in the flowing stream. The bypass reach shall be limited to the minimum distance necessary to complete the project.

(f) Temporary water crossings shall be vacated to the specifications outlined in OAR 629-625-0650.

(g) ODF may waive removal of the water crossing if the applicant secures an amended written plan, and the structure and its approaches meet all of the requirements of a permanent water crossing structure.

(h) Disturbance of the bed and banks shall be limited to that necessary to place the temporary water crossing and any required channel modification associated with it.

(7) Other design strategies requiring additional approval

(a) Any alternative water crossing strategy that is not consistent with the above strategies shall be outlined in a plan for alternative practice, approved by ODF in consultation with ODFW.

(b) Alternative designs will be considered if they can be demonstrated to meet or exceed the proposed standards for the above strategies.

(8) Construction of Water Crossings

(a) Construction or reconstruction for all water crossings should comply with all relevant Forest Practice Rule (FPR) forest road requirements and ODF technical guidance before, during, and after construction. Nothing in this section affects existing requirements of ODFW.

(b) Stormwater, Erosion, and Sediment Control

(i) A site-specific erosion and sediment control plan is required as part of a written plan prior to beginning work. This plan may include but is not limited to a site plan with a description of the methods of erosion/sediment control; methods for confining, removing, and disposing of excess construction materials; or measures to disconnect road surface and ditch water from all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals.

(ii) Areas of bare soil, which could deliver sediment to all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals shall have effective drainage established or will be mulched and/or seeded before the start of the rainy season to reduce surface erosion. Native seed and invasive species-free mulch will be applied to sites with the

potential for sediment delivery to all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals upon completion of construction. Invasive species-free mulch will be applied to stay in place.

(c) Pollution Control

(i) A spill prevention plan shall be required on site during construction. For guidance on developing a spill prevention plan, refer to ODF Tech Note 4.

(ii) Uncured concrete or concrete by-products shall not be allowed to enter waters of the state at any time during construction. All forms used for concrete shall be completely sealed to prevent uncured concrete from entering waters of the state.

(iii) Operators shall take measures to ensure that all materials and equipment used for construction, monitoring, and fish salvage are free of aquatic invasive species.

(iv) Wood treated with creosote or pentachlorophenol shall not be used for parts of the structure in or over the active channel, including pilings, beams, structural supports, and decking.

(v) No chemicals or any other toxic or harmful materials shall enter or leach into waters of the state.

(d) In-Water Work, Worksite Isolation, and Dewatering

(i) Water crossings in all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals require an in-water work plan in the written plan that includes but is not limited to: fish salvage, worksite isolation, and dewatering. The submitted written plan shall address in detail all in-channel construction activities and how the activities will adhere to all relevant Forest Practice Rule (FPR) forest road requirements, ODF technical guidance, and all relevant on-water work period requirements and guidelines from ODFW.

(ii) Operators shall adhere to ODFW-approved in-water work timing guidelines and the stream protection rules (OAR 629-625-0430) any time that construction activity is required within the active channel width.

(iii) For all water crossings in fish streams (Type F and SSBT):

(1) Worksite isolation.

(a) Any work area within the width of the bankfull channel must be isolated from water in the active channel whenever fish are reasonably certain to be present in a Type F or Type SSBT stream.

(b) Water crossings in fish streams (Type F and SSBT) with any type of stream bypass shall have an exclusion and recovery plan to ensure safe capture and relocation of fish trapped in the work zone when stream flow has been diverted.

(c) Prior to construction site dewatering, fish shall be captured and relocated to avoid direct mortality to the maximum extent practicable.

(d) Fish must be salvaged to the maximum extent practicable at any in-water construction site where dewatering and resulting isolation of fish may occur.

(e) All isolation features shall be removed after construction is completed. A written salvage report shall be submitted to ODF.

(2) Dewatering.

(a) Dewatering shall not be implemented in areas known to be occupied by lamprey, except where the operator submits a lamprey salvage plan to ODF in consultation with ODFW using guidance from ODF Tech Note 4.

(b) Dewatering of the isolated area shall be conducted in a manner that prevents sediment-laden water from reentering the stream.

(c) Dewatering shall be limited to the shortest linear extent of the stream as practicable.

(d) Dewatering shall be conducted over a sufficient period of time to allow species to naturally migrate out of the work area.

(9) Monitoring

(a) Landowners shall develop and implement a monitoring program for periodic inspections of all Type F and SSBT crossings.

(b) The program shall rely on visual inspection to confirm that the crossing is functional.

(c) The frequency of monitoring shall be no more than five years.

OAR 629-625-0330 (and OAR 629-625-0420)
Drainage

(1) All active, inactive, and vacated forest roads and landings shall be hydrologically disconnected to the maximum extent practicable from waters of the state to minimize sediment delivery from road runoff and reduce the potential for hydrological changes that alter the magnitude and frequency of runoff. This will be accomplished by locating drainage structures based on the priority listed below.

When there is a conflict between the requirements of sections (2) through (7) of this rule, the lowest numbered section takes precedence, and the later-numbered and conflicting section shall not be implemented.

(2) Cross-drains and ditch-relief culverts must not have stream diversion potential.

(3) Operators shall not concentrate road drainage water into headwalls, slide areas, high landslide hazard locations, or steep erodible fillslopes.

(4) Operators shall not divert water from stream channels into roadside ditches.

(5) Operators shall install drainage structures at approaches to stream crossings to divert road runoff from entering the stream. If placement of a single drainage structure cannot be placed in a location where it can effectively limit sediment from entering the stream, then additional drainage structures, road surfacing, controlling haul, or other site-specific measures shall be employed so that the drainage structure immediately prior to the crossing will effectively limit sediment from entering the stream. Best management practices to manage sediment at the outflow of the drainage structure nearest to the crossing may also be used.

(6) Operators shall provide drainage when roads cross or expose springs, seeps, or wet areas.

(7) Operators shall provide a drainage system that minimizes the development of gully erosion of the road prism or slopes below the road using grade reversals, surface sloping, ditches, culverts and/or waterbars as necessary. For new road construction, outsloping shall be used to the maximum extent practicable when site specific conditions allow for its safe and effective use.

OAR 629-625-0410
Disposal of Waste Materials

(1) Operators shall place debris, sidecast, waste, and other excess materials associated with constructing, maintaining, or vacating roads in stable locations outside of the riparian management area where these materials may not enter all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals or otherwise degrade aquatic resources after construction.

(2) If other alternatives present are unstable or there is a higher potential for delivery of waste materials to all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals, operators may place waste materials within the riparian management area but no closer than 75 feet from all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals. Placement of waste materials within the riparian management area but no closer than 75 feet from a water of the state requires a written plan that describes site specific measures that prevent or minimize the entry of these materials to all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals.

(3) If a riparian management area is not required, operators shall place waste materials at a minimum of 75 feet from all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals.

(4) Temporary placement of waste materials within the riparian management area that is necessary for constructing or vacating roads and crossings requires a written plan that describes site specific measures that prevent or minimize the entry of these materials to waters of the state and the timeframe for removal of those waste materials.

(5) Woody debris, rocks, or other materials placed for erosion control or for habitat restoration are exempt from this provision.

OAR 629-625-0440
Stabilization

(1) Operators shall establish effective drainage to avoid potential delivery of sediment to waters of the state and stabilize exposed material which is potentially unstable or erodible by use of seeding, mulching, riprapping, leaving light slashing, pull-back, or other effective means, as soon as practicable after completing operations or prior to the start of the rainy season. These areas include, but are not limited to, unsurfaced road grades, cut slopes, fill slopes, ditchlines, waste disposal sites, rock pits, and other areas with the potential for sediment delivery to these waters.

(2) During wet periods, operators shall construct roads in a manner which prevents sediment from entering waters of the state.

(3) Operators shall not incorporate slash, logs, or other large quantities of organic material into road fills.

OAR 629-625-0600
Road Maintenance

(1) The purpose of this rule is to protect water quality and ensure hydrologic disconnection of roads from waters of the state to the maximum extent practicable by timely maintenance of all active and inactive roads. Road surface must be maintained as necessary to:

(a) Minimize erosion of the surface and the subgrade;

(b) Minimize direct delivery of surface water to waters of the state;

(c) Minimize sediment entry to waters of the state;

(d) Direct any groundwater that is captured by the road surface onto stable

portions of the forest floor;

(e) Ensure properly functioning and durable drainage features; and

(f) For existing roads with inboard ditch, avoid overcleaning of ditchlines.

(2) Operators shall inspect and maintain culvert inlets and outlets, drainage structures and ditches before and during the rainy season as necessary to diminish the likelihood of clogging and the possibility of washouts.

(3) Operators shall provide effective road surface drainage, such as water barring, surface crowning, constructing sediment barriers, or outsloping prior to the rainy and runoff seasons.

(4) When applying road oil or other surface stabilizing materials, operators shall plan and conduct the operation in a manner as to prevent entry of these materials into waters of the state.

(5) Operators shall maintain and repair active and inactive roads as needed to minimize damage to waters of the state. This may include maintenance and repair of all portions of the road prism during and after intense winter storms, as safety, weather, soil moisture, and other considerations permit.

(6) Operators shall place material removed from ditches in a stable location.

(7) Operators shall install drainage structures on ditches that are capturing groundwater.

(8) In order to maintain fish passage through water crossing structures, operators shall:

(a) Maintain conditions at the structures so that passage of adult and juvenile fish is not impaired during periods when fish movement normally occurs. This standard is required only for roads constructed or reconstructed after September 1994, but is encouraged for all other roads; and

(b) As reasonably practicable, keep structures cleared of woody debris and deposits of sediment that would impair fish passage.

(9) Where needed to protect water quality, as directed by the State Forester, operators shall place additional cross drainage structures on existing active roads within their ownership prior to hauling to meet the requirements of OAR 629-625-0330.

(10) Other fish passage requirements under the authority of ORS 509.580 through 509.910 and OAR 635-412-0005 through 635-412-0040 that are administered by other state agencies may be applicable to water crossing structures, including those constructed before September 1, 1994.

OAR 629-625-0650
Vacating Forest Roads

(1) The purpose of this rule is to ensure that when landowners choose to vacate roads under their control, the roads are left in a condition where road-related damage to waters of the state is unlikely.

(2) To vacate a forest road, landowners shall effectively block the road to prevent continued use by vehicular traffic, and shall take all reasonable actions to leave the road in a condition where road-related damage to waters of the state is unlikely.

(3) To vacate a water crossing, landowners shall completely and permanently remove all water crossing structures, including bridges, culverts, fords, and associated fills. Vacating water crossings will re-establish the natural drainage with no additional maintenance required.

(4) A vacated road is a road which the forest landowner has vacated in accordance with procedures of (a) through (c) of this subsection:

(a) Roads are outsloped, water barred, storm-proofed, or otherwise left in a condition suitable to control erosion and maintain water movement within wetlands and natural drainages;

(b) Ditches are left in a suitable condition to reduce erosion;

(c) Water crossing structures and fills on waters of the state are removed, except where ODF determines other measures would provide adequate protection to public resources; and

(5) A vacated water crossing is a crossing which the forest landowner has vacated in accordance with procedures (a) through (n) of this subsection:

(a) Re-establish channel connectivity;

(b) Ensure compliance with existing in-water work periods requirements;

(c) Ensure that vacating does not result in a fish passage barrier;

(d) Completely remove the water crossing structures and all imported road fill material;

(e) Re-slope the banks to the original valley width, or at a minimum, restore the flood-prone width of the stream to its natural capacity;

(f) Re-vegetate and/or replant exposed stream banks or valley walls with native trees and shrubs to help expedite development of a functioning riparian condition;

(g) Establish a natural transition to the channel upstream and downstream of the crossing;

(h) Create a channel that is similar in size and configuration to channel conditions upstream and downstream;

(i) Incorporate large wood, if appropriate, to expedite restoration of the channel and fish habitat;

(j) Ensure stable side slopes that do not exceed 2:1, unless matching the natural stream bank or valley walls;

(k) Re-establish the natural streambed as close to the original location as possible so it matches the up and downstream width and gradient characteristics;

(l) Require erosion control to address sediment delivery from exposed slopes; and

(m) Place all excavated material in stable locations and outside of the floodplain.

(n) Ensure zero or near-zero hydrologic connectivity at the entire site.

(5) The landowner shall notify ODF that a road or crossing has been vacated. ODF has 30 days to determine whether the road or crossing has been vacated and to notify the landowner in writing. If ODF does not respond within 30 days, the road is presumed to be vacated.

(6) Roads and crossings are exempt from maintenance under this section only after (5) of this section is completed.

[NEW RULE SECTION]

OAR 629-625-XXX
Construction in Wetlands

(1) Avoid or minimize all road and landing construction near or within Significant wetlands,[7] stream-associated wetlands,[8] or wetlands[9] greater than 0.25 acres in size. Where impacts are unavoidable, they must be first minimized and then mitigated in the following priority order:

(a) Avoid impacts to Significant wetlands, stream-associated wetlands, and wetlands greater than 0.25 acres in size by selecting the least environmentally damaging landing location, road location and road length. Landowners must attempt to minimize road length when avoiding wetlands; or

(b) When road or landing construction in a Significant wetland, stream-associated wetland, or wetlands greater than 0.25 acres in size cannot be avoided, the operator shall build a temporary road that:

(i) Minimizes impacts by reducing the subgrade width, fill acreage and spoil areas; and

(ii) Removes temporary fills or road sections upon the completion of the project.

(c) Permanent road construction in a Significant wetland, stream-associated wetland, or

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[7] OAR 629-600-0100 (70) "Significant wetlands" means those wetland types listed in OAR 629-680-0310, that require site specific protection, as follows: (a) Wetlands that are larger than eight acres; (b) Estuaries; (c) Bogs; and (d) Important springs in eastern Oregon.
[8] OAR 629-600-0100 (77) "Stream-associated wetland" means a wetland that is not classified as significant and that is next to a stream.
[9] OAR 629-600-0100 (95) "Wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, bogs, and similar areas. Wetlands do not include water developments as defined in section (93) of this rule.

wetlands greater than 0.25 acres in size must be mitigated by:

(i) Reducing or eliminating impacts over time by preserving or maintaining areas; or

(ii) Replacing affected areas by creating new wetlands or enhancing existing

wetlands.

(iii) Filling or draining more than 0.25 acres of a Significant wetland, any stream-associated wetland, or any wetlands greater than 0.25 acres in size requires replacement by substitution or enhancement of the lost wetland functions and values at the road or landing construction site. The objective of successful replacement by substitution of lost wetland area will be generally on a two-for-one basis and of the same type and in the same general location. The objective of enhancing wetlands function is to provide for an equivalent amount of function and values to replace that which is lost.

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CHAPTER 5: SMALL FORESTLAND OWNERS

5.1 Introduction

This chapter establishes a program for Small Forestland Owners (SFOs). It recognizes that Oregon's SFOs value their properties for a diverse array of benefits, including but not limited to timber production. The SFO program is designed to ensure that management of these lands achieves the objectives of the Habitat Conservation Plan (HCP) envisioned by the Private Forest Accord, and also to address the potentially disparate financial impacts that an HCP could have on some SFOs.

An estimated 3.6 million acres of Oregon's forestlands are owned by landowners who own less than 5,000 acres. This equates to approximately 12% of Oregon's total forestlands, and 35% of the state's privately-owned forestlands (OFRI 2021). Compared to industrial forestland owners, most SFOs harvest less often. The 12% of total forestlands owned by SFOs produce approximately 11% of total timber harvested from all land ownerships. The 22% of total forestlands owned by private industrial owners produces 65% of total timber harvested from all land ownerships (OFRI 2021). The spatial footprint of a harvest on an SFO's property is widely known to be considerably smaller, on average, than the size of the mean harvest on industrial ownerships.

The lower rates of harvests found on SFO properties are indicative of the diversity of values of the owners. SFOs value their properties for numerous reasons beyond simply the harvesting of forest products. These values include recreation, wildlife habitat, and ecological values. Nevertheless, many SFOs also rely on their properties as investments and/or supplemental sources of income (Edwards and Bliss, 2003; Elwood et al., 2003; Fischer, 2012; Fisher and Bliss, 2008; Fisher and Charnley, 2010).

The Authors agree that the State of Oregon should prioritize data collection and transparency on key SFO issues, such as rate of compliance with the Forest Practices Act and the adequacy of culverts for fish passage. Due to potential difficulties in assessing the full size of an individual's ownership, particularly if it is divided between multiple parcels or ownership entities, care will be needed to ensure individuals truly meet the SFO designation requirements set forth in this report.


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5.1.2 Designation of a Small Forestland Owner (SFO) for Purposes of this Report

There are multiple definitions and designations of SFOs in statute. The below criteria for designating an SFO are not intended to displace any of these pre-existing statutory provisions. Rather, the criteria below are intended to only apply for determining whether a landowner qualifies as an SFO for the purposes of this Chapter.

a. **Small Forestland Owner**: For the purposes of this Report, a "Small Forestland Owner" means a landowner that:

    1. Owns or holds in common ownership less than 5,000 acres of forestland in this state, and

    2. Has harvested no more than an average yearly volume of two million board feet of merchantable forest products from the landowner's forestlands in Oregon, when averaged over the three years prior to:

        a. The date the Oregon Department of Forestry (ODF) receives a harvest notification from the landowner; or

        b. If applying for a Small Forestland Investment in Stream Habitat (SFISH) Program grant, the date the landowner submits a grant application.

    And,

3. Certifies that they do not expect to exceed an average yearly volume of two million board feet of merchantable forest products to be harvested from the landowner's forestlands for ten years after ODF receives the harvest notification or grant application.

4. **Emergency exception:** Any landowner who exceeds the two million board feet average harvest threshold from their land in the three years prior to submitting a harvest notification or grant application to ODF, or who expects to exceed the threshold during any of the following ten years, shall still be deemed a "small forestland owner" if the landowner establishes to ODF's reasonable satisfaction that the harvest limits were, or will be, exceeded in order to raise funds to pay estate taxes or for a compelling and unexpected obligation, such as for a court-ordered judgment or for extraordinary medical expenses.

5.2 Goals

The primary goal of the SFO Program is to meet all of the objectives identified in the other chapters of this Report as well as the objectives of the Habitat Conservation Plan (HCP) envisioned by the Private Forest Accord. Given the inherent differences between SFOs and large industrial landowners, the Private Forest Accord framework envisions some different standards and strategies for SFOs, including differences in riparian and slope management requirements, eligibility for incentive programs, requirements for reporting, road measures, and the use of targeted outreach and educational efforts. It also proposes the establishment of the Small Forestland Owner Assistance Office, which will be a central administrative office at ODF to work with the broader community of both landowners who may be designated SFOs for purposes of this Report and other landowners of small forestlands.

Two additional goals for the SFO Program are to:

1) **Encourage adoption of standard harvest and road management rules:** While the Private Forest Accord framework includes optional prescriptions for SFOs who may face disproportionate economic impact from new harvest rules, it is also a goal of the program to provide SFOs with financial and educational encouragement to adopt standard harvest and road management rules. By selecting the standard harvest and road management rules that apply to large forest owners, SFOs will optimize environmental benefits and mitigate risks to natural resources that will most effectively meet the objectives of the Habitat Conservation Plan (HCP) envisioned by the Private Forest Accord.

2) **Minimize the conversion of timberlands to other uses:** Socioeconomic factors that result in increased demand for residential, commercial, and industrial development can lead to the conversion of forestlands to developed land uses (Kline and Alig 2005). Small forestlands provide an important suite of economic and ecological benefits to Oregon. These benefits can be diminished if small forestlands are converted to other land uses, such as residential subdivisions. While conversion to other land uses may occur for a wide variety of reasons, including the cost associated with forest ownership, the SFO Program seeks to diminish such conversion through a system of incentives, education, and regulatory stability for SFOs.

5.3 Private Forest Accord Commitments

5.3.1 Riparian Commitments

Chapter 2 of this Report identifies the Standard Practice that the Authors have agreed will apply when timber is harvested around riparian areas. SFOs may follow the Standard Practice as defined in Chapter 2, but they will also have two additional options related to riparian management. Aligned with the goals of this Chapter and the objectives of the envisioned HCP, SFOs may manage timber harvest around riparian areas under the Standard Practice Option in order to optimize environmental benefits and mitigate risks to natural resources, select the SFO Minimum Option, or select the Forest Conservation Credit (FCC) Option as defined below.

The following three options to manage timber harvest around riparian areas are available to SFOs:

1) **Standard Practice Option:** SFOs may choose to follow the Standard Practice used by large forest owners to manage timber harvest around riparian areas established under Chapters 2 and 3 of this Report.

2) **SFO Minimum Option:** SFOs may choose to manage to alternative minimum rules as defined below. This shall be known as the SFO Minimum Option.

3) **Forest Conservation Credit Option:** SFOs may choose to follow the Standard Practice used by large forest owners and claim a tax credit for some of the value committed to conservation. This shall be known as the Forest Conservation Credit (FCC) Option.

5.3.1.1 Statewide Riparian Prescriptions

This subsection establishes general riparian prescriptions that apply statewide to both Western and Eastern Oregon for SFOs.

a. For Type 1, 2, or 3 timber harvests that include a riparian area covered under the revised PFA rules as established in this Report, a landowner who qualifies as an SFO is encouraged to follow the Standard Practice Option. Landowners who qualify as an SFO may also select the SFO Minimum Option or the FCC Option.

b. SFOs who choose the SFO Minimum Option may harvest using the alternative prescriptions identified for Western Oregon in Section 5.3.1.3. The dividing line between Eastern and Western Oregon shall be the summit of the Cascade Mountains.

c. The use of the SFO Minimum Option will be limited to 5% of the horizontal lineal feet of streams owned by SFOs, over a five-year rolling average, in a defined fifth field watershed. The 5% will be tracked by ODF separately for fish and non-fish streams. These limits are further established under Section 5.3.4 "Requirements and Limitations on the Use of the SFO Minimum Option."

d. SFOs who select the FCC Option must follow the same prescriptions as the Standard Practice, but can apply for a Forest Conservation Credit for 100% of the Stumpage Value of merchantable forest products retained under the Standard Practice in excess to what would be retained under the SFO Minimum Option, in addition to the credits identified in Section 5.3.1.3(a)(2). *See generally* Tables 1 and 2 below.

e. Undesignated harvests are not eligible to claim a Forest Conservation Credit. There will be no limitations on the use of an Undesignated harvest within a Fifth Field Watershed.

5.3.1.2 Measurement of Riparian Prescriptions

a. Riparian Management Area (RMA) Widths

All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel or channel migration zone (CMZ), if present. The definition of CMZ is established in Chapter 2 of this Report. The RMA width shall be measured separately on each side of the stream.

b. Riparian Management Area Lengths

The measurements of RMA lengths on small perennial non-fish (Type Np) streams start from their confluence with the Type F or Type SSBT junction.

c. Forest Conservation Credit (FCC) Option

The area that may be eligible for the tax credit under the FCC Option is termed the Forest Conservation Area (FCA). The width of the FCA is the difference between the outermost edge of the Standard Practice Width and the outermost edge of the SFO Minimum Option Width. The length of the FCA is the length of frontage that follows the same lengths as the Standard Practice Option. Additional credits may be claimed in accordance with Section 5.3.1.3(a)(2).

5.3.1.3 Western Oregon Riparian Prescriptions for SFOs

The table below establishes the riparian prescriptions for SFOs in Western Oregon under the Standard Practice Option and the SFO Minimum Option, and the area that may be eligible for a tax credit under the FCC Option, which is termed the Forest Conservation Area (FCA).

Table 1. Western Oregon RMAs for SFOs[1]

Stream Type	Standard Practice Width	SFO Minimum Option Width	Forest Conservation Area[2]
Large SSBT	110 feet no harvest	100 feet no harvest	Area between 100 and 110 feet
Medium SSBT	110 feet no harvest	80 feet no harvest	Area between 80 and 110 feet
Small SSBT	100 feet no harvest	60 feet no harvest	Area between 60 and 100 feet
Large Type F	110 feet no harvest	100 feet no harvest	Area between 100 and 110 feet
Medium Type F	110 feet no harvest	70 feet no harvest	Area between 70 and 110 feet
Small Type F	100 feet no harvest	50 feet no harvest	Area between 50 and 100 feet
Large Type N	75 feet no harvest	70 feet no harvest	Area between 70 and 75 feet
Medium Type N	75 feet no harvest	50 feet no harvest	Area between 50 and 75 feet
Small Type Np, Tributary to SSBT	A 75-foot wide no-harvest RMA from the confluence with the SSBT stream for the first 500 feet, then a 50-foot wide no harvest RMA on the next 650 feet, for a total of up to 1,150' (the "RH Max" applicable to a Western Oregon Small Type Np, tributary to SSBT), with an R-ELZ and ELZ as defined and further described in Chapter 2	A 35-foot wide no-harvest RMA from the confluence with the SSBT stream for the first 500 feet, then a 35-foot wide no harvest RMA on the next 650 feet, for a total of up to 1,150' (the "RH Max" applicable to a Western Oregon Small Type Np, tributary to SSBT), with an R-ELZ and ELZ as defined and further described in Chapter 2	**Width:** Area between 35 feet and the outside edge of the Standard Option (either 50 or 75 feet) **Length:** Will follow same lengths as the Standard Practice Option See also 5.3.1.3(a)(2) below re: dry segments.

Small Type Np, Tributary to Type F	A 75-foot wide no-harvest RMA from the confluence with the Type F stream for up to the first 600 feet (the "RH Max" applicable to a Western Oregon Small Type Np, tributary to a Type F), with an R-ELZ and ELZ as defined and further described in Chapter 2	A 35-foot wide no-harvest RMA from the confluence with the Type F stream for up to the first 600 feet (the "RH Max" applicable to a Western Oregon Small Type Np, tributary to a Type F), with an R-ELZ and ELZ as defined and further described in Chapter 2	**Width:** Area between 35 feet and the outside edge of the Standard Option **Length:** Will follow same lengths as the Standard Practice Option See also 5.3.1.3(a)(2) below re: dry segments.
Type Ns	35 feet equipment limitation zone	35 feet equipment limitation zone	None

1. All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel or channel migration zone (CMZ), if present. The RMA width prescriptions established in Table 1 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone [CMZ], if present, upslope).

2. The width of the FCC Area is the difference between the outermost edge of the Standard Practice Width and the outermost edge of the SFO Minimum Option Width. The FCC Area is the length of frontage of the harvest unit on that stream type segment.

a. Non-Fish Perennial Stream Rules

Generally, SFOs will follow the same RMA rules for small non-fish perennial streams identified in Chapter 2 that apply to larger landowners, with the following additions:

1) If an Area of Inquiry extends beyond the SFO ownership boundary, and the last 100' before reaching the ownership boundary does not have a Flow Feature, then the no-harvest buffer will extend to the upper-most Flow Feature within the ownership boundary, or the RH Max, whichever is shorter, and an R-ELZ will extend beyond that to the ownership boundary; PROVIDED THAT prior surveys documented in ODF FERNS that evidence a Flow Feature upstream of the ownership boundary will alter the analysis per the above.

2) When a SFO selects the Standard Practice, and if 100' or more of surveyed dry channel between two Flow Features below the RH Max is given a no-harvest buffer, the SFO may apply for a Forest Conservation Credit (tax credit) for half of the stumpage value of the trees left between the inside edge of SFO Minimum Option (35' in Western Oregon) and the edge of the dry stream channel. The SFO may not cut trees within this inside zone in lieu of taking the tax credit.

b. **Type Np Streams Upstream of RMAs and All Type Ns Streams**

Whether and where a stream is defined as "perennial" will be determined under the methods established in Chapter 2. For sections of perennial streams upstream of the above identified RMAs and for seasonal streams, SFOs will follow the Standard Practice prescriptions identified in Chapter 2.

c. Seeps and Springs within RMAs

The Standard Option for seeps and springs found within RMAs is established in Chapter 2. SFOs may follow different prescriptions for seeps and springs found within RMAs under the SFO Minimum Option. The SFO Minimum Option requires that, if a seep or spring occurs within an RMA, then the RMA will be extended for 15 feet beyond the seep or spring, if the RMA is not already 15 feet beyond the seep or spring. ODF will provide a standardized form for SFOs to fill out when they do a harvest notification to guide the use of the SFO Minimum Option around seeps and springs. No tracking of this prescription is required as laid out in section 5.3.4 of this Chapter, related to the RMA SFO Option. There is no FCC option for additional seeps and springs buffers.

5.3.1.4 Eastern Oregon RMAs for SFOs

The table below establishes the riparian prescriptions for SFOs in Eastern Oregon under the Standard Practice Option and the SFO Minimum Option, and the area that may be eligible for a tax credit under the FCC Option, *i.e.* the Forest Conservation Area.

The Eastern Oregon riparian prescriptions establish an inner no-harvest zone and an outer managed-harvest zone. The basal area retentions in the outer managed harvest zone for the Standard Option are established in Chapter 2. The SFO Minimum Option requires the same basal area retentions in the outer managed-harvest zone as the Standard Option.

Table 2. Eastern Oregon RMAs for SFOs[1]

Stream Type	Standard Practice Width	SFO Minimum Option Width	Forest Conservation Area[2]
Large Type F and SSBT	30 feet no harvest and 70 feet managed area (100 feet total)	30 feet no harvest and 70 feet managed area (100 feet total)	None
Medium Type F and SSBT	30 feet no harvest and 70 feet managed area (100 feet total)	30 feet no harvest and 50 feet managed area (80 feet total)	Difference between 50 feet and 70 feet managed zone
Small Type F and SSBT	30 feet no cut and 45 feet managed area (75 feet total)	30 feet no harvest and 30 feet managed area (60 feet total)	Difference between 30 feet and 45 feet managed zone

Large Type N	30 feet no harvest and 45 feet managed area (75 feet total)	30 feet no harvest and 45 feet managed area (75 feet total)	None
Medium Type N	30 feet no harvest and 45 feet managed area (75 feet total)	30 feet no harvest and 30 feet managed area (60 feet total)	Difference between 30 feet and 45 feet managed zone
Small Type Np, Terminal[3]	A 30-foot inner no-harvest zone and 30-foot outer managed-harvest zone, for up to the first 500 feet length above junction with Type F or SSBT (the "RH Max" applicable to an Eastern Oregon Small Type Np Terminal), with an R-ELZ and ELZ as defined and further described below.	A 20-foot inner no-harvest zone and 20-foot outer managed-harvest zone, for up to the first 500 feet length above junction with Type F or SSBT (the "RH Max" applicable to an Eastern Oregon Small Type Np Terminal), with an R-ELZ and ELZ as defined and further described below.	None
Small Type Np, Lateral[4]	A 30-foot inner no-harvest zone for up to the first 250 feet length above junction with Type F or SSBT (the "RH Max" applicable to an Eastern Oregon Small Type Np Lateral), with an R-ELZ and ELZ as defined and further described below.	A 20-foot inner no-harvest zone for up to the first 250 feet length above junction with Type F or SSBT (the "RH Max" applicable to an Eastern Oregon Small Type Np Lateral), with an R-ELZ and ELZ as defined and further described below.	None
Small Type Ns	30 feet equipment limitation zone (ELZ). Within 30-foot ELZ, retain shrubs and trees under 6 inches DBH, where possible, for up to the first 750 feet length from the confluence with Type F or SSBT streams.	30 feet equipment limitation zone (ELZ). Within 30-foot ELZ, retain shrubs and trees under 6 inches DBH, where possible, for up to the first 750 feet length from the confluence with Type F or SSBT streams.	None

[1] All measurements of RMA widths shall be made using slope distance and shall be measured from the edge of the active channel or channel migration zone (CMZ), if present. The RMA width prescriptions established in Table 1 refer to the width of the RMA on one side of the stream (from the edge of the active channel or channel migration zone [CMZ)], if present, upslope).

[2] The area that may be eligible for the tax credit under the FCC Option is termed the Forest Conservation Credit Area. The width of the FCC Area is the difference between the outermost edge of the Standard Practice Width and the outermost edge of the SFO Minimum Option Width. The length of the FCC Area is the length of frontage of the harvest unit on that stream type segment.

[3]Terminal Type Np Streams are defined in Chapter 2.

[4] Lateral Type Np Streams are defined in Chapter 2.

a. Non-Fish Perennial Stream Rules

Generally, SFOs will follow the same RMA rules for small non-fish perennial streams identified in Chapter 2 that apply to larger landowners, with the following addition:

1) If an Area of Inquiry extends beyond the SFO ownership boundary, and the last 100' before reaching the ownership boundary does not have a Flow Feature, then the no-harvest buffer will extend to the upper-most Flow Feature within the ownership boundary, or the RH Max, whichever is shorter, and an R-ELZ will extend beyond that to the ownership boundary; PROVIDED THAT prior surveys documented in FERNS that evidence a Flow Feature upstream of the ownership boundary will alter the analysis per the above.

b. Type N Perennial Streams Upstream of Buffers and All Type N Seasonal streams

Whether and where a stream is defined as "perennial" will be determined under the methods established in Chapter 2. For sections of perennial streams upstream of the above identified buffers and for seasonal streams, SFOs will follow the Standard Practice prescriptions identified in Chapter 2. That Chapter also identifies an Eastern Oregon prescription for small Type N perennial streams that draws a distinction between laterals and terminals. The SFO Option adopts this approach and uses the same perennial identification rules.

c. Seeps or Springs Within RMAs

The Standard Option for seeps and springs found within RMAs is established in Chapter 2. SFOs may follow different prescriptions for seeps and springs found within RMAs under the SFO Minimum Option. The SFO Minimum Option requires that, if a seep or spring occurs within an RMA, then the RMA will be extended for 15 feet beyond the seep or spring, if the RMA is not already 15 feet beyond the seep or spring. ODF will provide a standardized form for SFOs to fill out when they do a harvest notification to guide the use of the SFO Minimum Option around seeps and springs. No tracking of this prescription is required as laid out in section 5.3.4 of this Chapter, related to the RMA SFO Option. There is no FCC option for additional seeps and springs buffers.

5.3.2 Timber Harvest on Steep Slopes Commitments

Chapter 3 of this Report identifies the Standard Practice that the Authors have agreed will apply when timber is harvested on steep slopes. This Report identifies the following three types of steep slopes prescription as defined in Chapter 3:

1) Designated Debris Flow Traversal Area;

2) Designated Sediment Source Area; and

3) Stream Adjacent Failures.

SFOs may choose to harvest timber on steep slopes under the Standard Practice Option in order to optimize environmental benefits and mitigate risks to natural resources. SFOs will have an alternative SFO Minimum Option for each of the three steep slopes prescriptions, as detailed below.

5.3.2.1 Modeling for Steep Slopes Prescriptions

For the purposes of the SFO Minimum Option steep slopes prescriptions, the modeling described in Chapter 3 will be used to determine prescription locations for Designated Debris Flow Traversal Areas and Designated Sediment Source Areas. The terms Designated Debris Flow Traversal Areas and Designated Sediment Source Areas will be given the same definitions and will be located in the same fashion as established in Chapter 3. SFOs will rely on the same FERNS maps to identify these features as would any other landowner.

5.3.2.2 Western Oregon SFO Minimum Option for Designated Debris Flow Traversal Areas

a. For Type 1, 2, or 3 Harvests, the SFO Minimum Option will require buffering of 50% of the length of the Designated Debris Flow Traversal Area that would be protected under the Standard Practice identified in Chapter 3. The width of the Debris Flow Traversal Area will be the same as the Standard Practice. This restriction applies at the harvest unit level.

b. ODF will determine if an SFO has a Designated Debris Flow Traversal Area in a planned harvest. ODF will assist SFOs in determining what areas need to be retained. The SFO Minimum Option is specific to each individual SFO, meaning that should a single Designated Debris Flow Traversal Area extend to a second SFO's property, each SFO shall protect half of the traversal path on their property, if they select the SFO Minimum Option.

c. There will be no Forest Conservation Credit available if an SFO chooses to use the Standard Practice for Designated Debris Flow Traversal Area**.**

d. There will be no Designated Debris Flow Traversal Area requirements for SFOs who have an Undesignated Harvest.

5.3.2.3 SFO Designated Sediment Source Areas

a. SFOs are exempt from the prescriptions identified in Chapter 3 related to Designated Sediment Source Areas. As such, SFOs are entitled to harvest within all Designated Sediment Source Areas on their properties.

5.3.2.4 Statewide SFO Minimum Option for Stream Adjacent Failures

a. Stream Adjacent Failures will be identified using the criteria identified in Chapter 3.

b. If a Stream Adjacent Failure is identified in an RMA, then the SFO will include an additional 30 feet within the RMA beyond the SFO Minimum Option or to the slope break, where applicable, whichever is shorter. The length of the RMA subject to the Stream Adjacent Failure prescription will be determined under the Standard Practice as established in Chapter 3.

c. ODF may assist SFOs in determining what areas need to be included in the RMA subject to the Stream Adjacent Failure prescription.

d. No tracking by fifth field watershed is required for this alternative prescription.

e. There will be no Forest Conservation Credit available if an SFO chooses to use the requirements in the Standard Practice for Stream Adjacent Failures.

5.3.2.5 Steep Slope Prescriptions in Eastern Oregon

a. There will be no steep slope prescriptions for Designated Debris Flow Traversal Areas or for Designated Sediment Source Areas for SFOs in Eastern Oregon. Eastern Oregon is defined as east of the summit of the Cascade Mountains.

b. The steep slope prescriptions for Stream Adjacent Failures established under 5.3.2.4 of this Chapter apply east of the summit of the Cascade Mountains.

5.3.3 Forest Conservation Credit Commitments

The Authors recognize the importance of SFOs to the State of Oregon. SFOs play a critical role in both land conservation as well as the forest products sector. Small forestland ownership is also culturally important to many Oregonians who take great pride in stewarding their forests. Financial hardships associated with the conservation commitments detailed in this Report have a high likelihood of disproportionately impacting some SFOs. These impacts may impact SFO decisions to convert their lands to non-forest uses, which often have more significant environmental impacts. Given these threats, this Report recognizes the need for durable financial assistance to SFOs to attain improved and durable conservation outcomes. The tax credit envisioned in this Report, termed the Forest Conservation Credit, is a critical element of the Private Forest Accord policy package.

The Forest Conservation Credit is established to incentivize SFOs to adopt the Standard Practice prescriptions provided for in this Report for riparian areas. When an SFO adopts the Standard Practice for management in those areas instead of the SFO Minimum Option, the SFO becomes eligible to receive a Forest Conservation Credit equal to the Stumpage Value, as defined in Appendix D, of the additional timber that is retained in the Forest Conservation Credit Area by adopting the Standard Practice.

Additional details regarding how the tax credit will function are identified in Appendix D to this Report, and many of the details are included in the PFA enabling legislation.

5.3.3.1 Duration of the Forest Conservation Credit (FCC)

It is the expectation of the Authors that the FCC will be available beginning on the date the rules implementing the provisions of this Report become operative, and will be continuously available until the termination of the envisioned 50-year HCP. The FCC will not have a sunset date. If a future legislature cancels the FCC and does not replace it with a similar compensation option for SFOs, all existing credits held by taxpayers will be retained by them and may still be used. Similarly, if the FCC program is canceled, all restrictions on using the SFO Minimum Option within a fifth field watershed will be removed for riparian areas where a credit has not been issued, though the frequency of harvests under the SFO Minimum Option will continue to be tracked. If a future legislature were to reinstate the Forest Conservation Credit, it is the expectation of the Authors that the system would be renewed.

5.3.4 Requirements and Limitations on the Use of the Riparian SFO Minimum Option

a. Reporting Requirements

ODF will create a standardized form that must be filled out by an SFO whenever the SFO Minimum Option is utilized for activities near riparian areas. The form will require identification of the horizontal lineal feet of riparian area in the harvest unit and whether the horizontal lineal distance is a two-sided harvest or a one-sided harvest. Within three months after the completion of the timber harvest, SFOs will report to ODF the actual horizontal lineal feet of riparian area where the SFO Minimum Option was used.

b. Fifth Field Watershed Cap

The use of the SFO Minimum Option will be limited to 5% of the horizontal lineal feet of streams owned by SFOs, over a five-year rolling average, in a defined fifth field watershed. The 5% will be tracked separately for fish and non-fish streams. ODF will track the actual horizontal lineal feet of riparian area managed using the SFO Minimum Option, in any fifth field watershed as discussed below. By rolling average it is intended that harvests occurring more than 5 years before are not used to calculate whether the cap has been reached, but instead harvests of that age will roll off the cap calculation.

c. SFO Minimum Option Tracking Distance and Reporting

Lineal feet will be tracked using each side of a stream such that a one-sided buffer will count as half the lineal feet of a stream segment. ODF will annually track and report the rolling average of fish (Type F and Type SSBT) and non-fish (Type N) streams managed using the SFO Minimum Option for each Fifth Field Watershed.

d. **Implications of Cap Being Reached**

Should the 5% threshold for the SFO Minimum Option in a fifth field watershed be reached, two options will exist for SFOs:

1) For an SFO that wants to utilize the SFO Minimum Option, they may elect to be placed on a waiting list to use the SFO Minimum Option in that fifth field watershed when the rolling 5-year threshold has lowered below 5%. This list will be maintained and updated by ODF on a first come, first served basis. SFOs will be notified by ODF when the opportunity to use the SFO Minimum Option becomes available. SFOs on the list will have priority to use the SFO Minimum Option before other SFOs, but once an SFO on the list is notified of the availability to use the option, they must elect to harvest or otherwise let other SFOs utilize the option.

2) The SFO can choose the FCC Option and receive a tax credit for 125% of the value that the SFO would have otherwise received utilizing the FCC Option.

5.3.5 SFO Forest Road Commitments

SFOs will comply with the Forest Practice Rules for forest roads as required to be established under Chapter 4 of this Report, with the following exceptions:

1) The Forest Road Inventory Assessment (FRIA) program identified in Chapter 4 will not apply to SFOs. Instead, SFOs will fill out a Road Condition Assessment (RCA) specific for SFOs, approved by Oregon Department of Forestry (ODF).

2) FRIA timelines for replacing or maintaining road infrastructure to the standards established in Chapter 4 will not apply to SFOs. However, SFOs will ensure that their roads are maintained to the standards of the Forest Practice Rules that are required to be established by this Report for any roads used for harvests. Culverts will be replaced consistent with Oregon law.

All new construction related to roads on forestland owned by SFOs must satisfy the same standards of the Forest Practice Rules for forest roads as required to be established under Chapter 4 of this Report.

5.3.5.1 Road Condition Assessments (RCAs)

a. The Forest Road Inventory Assessment (FRIA) program identified in Chapter 4 will not apply to SFOs. This includes the inventory and prioritization requirements, and the upgrade timeframes.

b. In lieu of FRIA, an SFO will fill out a Road Condition Assessment (RCA) worksheet when they submit a notification to ODF for a timber harvest that will result in the SFO using a road to haul timber. SFOs will be encouraged to complete an RCA without a planned timber harvest, but are not required to do so. The RCA worksheet will be a form that is developed and approved by ODF with stakeholder input. Notifications for activities other than timber harvest will not require an RCA.

c. The RCA will include all roads in the SFO's parcel where the harvest will take place and the condition of each road with specific regard to: 1) whether the road condition contributes to active or potential delivery of sediment to waters of the state and 2) the status of water crossings. ODF will assist SFOs in completing RCAs, when needed.

d. An RCA will also indicate potential fish passage barriers on fish streams (Type F and Type SSBT), abandoned roads, and roads with a perched fill that present a significant hazard to fish-bearing streams that may qualify for state funding. Potential fish passage barriers on fish streams (Type F and Type SSBT), abandoned roads, and roads with a perched fill that present a significant hazard to fish-bearing streams, identified in RCAs that may qualify for state funding grants will be reviewed by ODF in consultation with the Oregon Department of Fish and Wildlife (ODFW) for eligibility.

5.3.5.2 Road Condition Improvements

a. If a road on land owned by an SFO is used to haul timber, the SFO will ensure that their roads are maintained to the standards of the Forest Practice Rules that are required to be established under Chapter 4.

b. All new road construction must satisfy the same standards that apply to all landowners under the Forest Practice Rules that are required to be established under Chapter 4. Culverts will be replaced consistent with Oregon law.

c. The SFO is not required to undertake the three types of road improvements to be funded by the state:

    1) Replacement of fish stream culverts (Type F and Type SSBT);

    2) Repair of abandoned roads; or

    3) Reconstructing, vacating, or relocating roads with a perched fill that present a significant hazard to fish-bearing streams

    These road improvements will be 100% funded by the State and will be coordinated through the new Small Forestland Investment in Stream Habitat (SFISH) Program.

d. The timing of the above three types of projects will be dependent on the State's ability to fund and prioritize them.

e. If the State fails to fund eligible and approved projects on an SFO's road under the SFISH Program, the non-implementation of those projects will not preclude the SFO from using the road for any purpose unless:

i. The road is actively delivering sediment to waters of the state; or

ii. The road has one or more culverts with an imminent risk of failure, as defined in Chapter 4 of this Report.

f. If an RCA identifies necessary road repairs, there shall be no time limit in which the SFO must complete those repairs, though the obligation to improve roads when used for harvest remains.

5.3.5.3 Small Forestland Investment in Stream Habitat (SFISH) Program

a. The SFISH Program will be managed by the Small Forestland Owner (SFO) Assistance Office, in consultation with ODFW. State funding will be made available to qualified SFOs to: 1) replace fish stream culverts (Type F and Type SSBT) that are no longer functioning or still functioning but not designed consistent with the Forest Practice Rules required to be established consistent with this Report, 2) repair abandoned roads, and 3) reconstruct, vacate, or relocate roads with a perched fill that present a significant hazard to fish-bearing streams.

b. SFISH projects will be 100% funded by the State at the rate of $10 million per year. If state funding is not available, SFOs will have no obligation to make such repairs on their forestland until funding is available, unless otherwise required by the FPA. No more than 10% of available SFISH funds may be used for perched fill remediation projects in any year.

c. An outreach program through the Partnership for Forestry Education will be developed to inform SFOs about the SFISH Program and to encourage SFOs to voluntarily complete RCAs.

d. If an SFO submits an RCA, they will be eligible for participation in the SFISH program.

e. The SFO Assistance Office, in consultation with ODFW, will track projects identified in RCAs related to potential fish passage barriers on fish streams (Type F and Type SSBT), abandoned roads, and perched fill that present a significant hazard to fish-bearing streams that may qualify for state funding.

f. In order to optimize state funding that results in the greatest environmental benefits for covered species and mitigates risks to natural resources, the Assistance Office, in coordination with ODFW, will prioritize funding culvert replacements on fish streams, repair of abandoned roads, and perched fill that present a significant hazard to fish-bearing streams under the SFISH Program that are on high conservation value sites. Coordination and data sharing with other state agencies may be necessary to determine project

prioritization. SFOs may also work with other partners to coordinate and plan projects funded by SFISH.

g. For purposes of the SFISH Program, a site will be designated a high conservation site if, upon evaluation under the SFISH Program, the site is identified as:

   1) An area of known chronic sedimentation;

   2) A fish passage barrier.;

   3) An ongoing stream diversion at stream crossings or an area with high stream diversion potential;

   4) An area of known hydrologic connectivity; or

   5) A road with a perched fill that presents a significant hazard to fish-bearing streams.

h. The SFISH Program will prioritize a project at a high conservation value site for funding if the project will:

   1) Remove fish passage barriers consistent with ODFW requirements under ORS 509.585 and OAR 635-412-0015 (2), as implemented through the Forest Practice Rules;

   2) Minimize the potential for sediment delivery to waters of the state;

   3) Minimize stream diversions at water crossings;

   4) Minimize hydrologic connectivity between roads and waters of the state;

   5) Remove perched fill that presents a significant hazard to fish-bearing streams through reconstruction, relocation, or vacating;

   6) The length of time that grant has been submitted and waiting for funding; or

   7) Meet other relevant criteria for prioritization as determined by ODF in consultation with other state and federal agencies.

i. When a grant application has been submitted by an SFO and the Assistance Office has identified that project as a priority, the SFO will collaborate with the Assistance Office and other technical service providers to determine the project specifications, timing of project, hiring of contractors, other project issues, and oversight of the project. The SFO and the Assistance Office may mutually agree on the best and most efficient way to complete the project, under the direction of the Assistance Office. The SFO's involvement in completing the project can vary depending upon the mutual agreement. The actual timing of the project will be determined by contractor availability and other factors. An extension of time may be needed due to factors outside the control of the SFO or ODF.

j. All completed SFISH projects will be annually reported by ODF with cost and miles of streams improved. Funding for SFISH will not interfere with similar programs at the Oregon Watershed Enhancement Board (OWEB), but OWEB participants, such as Watershed Councils and others, may partner with SFOs to coordinate projects funded by SFISH.

5.3.6 Small Forestland Owner (SFO) Assistance Office

a. Creation of Assistance Office within ODF

An SFO Assistance Office will be established by statute, to be housed within the Oregon Department of Forestry. The Assistance Office will provide assistance and coordination for both landowners that meet the criteria for designation as an SFO under section 5.1.2 of this Report, and for other landowners that own or hold in common ownership less than 5,000 acres of forestland in this state.

b. Purpose of the SFO Assistance Office

A primary focus of the Assistance Office will be to implement the financial incentives and technical assistance programs that support the Private Forest Accord and Habitat Conservation Plan.

c. Supporting Services

ODF already supports several programs for owners of small forestlands including the Partnership for Forestry Education, forest management planning, partnership development and program funding, outreach and education through stewardship foresters, and the Committee for Family Forestlands. Existing programs will be housed within the new Assistance Office and will be leveraged to support programs associated with fish passage, barrier removal, road maintenance, and data collection associated with the HCP.

d. Monitoring and Reporting

The Assistance Office will be responsible for building and maintaining a database of SFOs, their ownerships, roads, streams, and other information as determined to be necessary to support compliance with the HCP.

5.3.7 Effectiveness Monitoring

Access to land for the purpose of conducting studies and monitoring shall be encouraged. The AMPC or the IRST (described in Chapter 10) can prepare a report to the Board of Forestry describing instances where access to land has been insufficient to achieve the purposes of this section. If presented with such a report, the Board shall consider rulemaking to address any research and monitoring problems arising from lack of access to land. SFOs that use the SFO Minimum Option or FCC Option, or receive grants for stream crossing or road work, may be required to allow access to land for effectiveness monitoring, specifically tailored to the riparian management or the grants taken, as outlined by AMPC.

5.3.8 Miscellaneous

A. Highly Disproportionate Impacts

The Authors recognize that in some rare circumstance an SFO ownership may become highly encumbered by the new rules in the PFA. This high encumbrance is most likely to be true in ownerships with a dense concentration of streams. The Authors recognize that this change could be especially problematic when the new encumbrances affect an owner of modest means who is highly dependent on revenue from the encumbered locations. In recognition of these more extraordinary cases, the Authors agree to work with ODF and others before full implementation of the rules in 2024 to develop ways to address this encumbrance. Policy options will include consideration of plans for alternate practice based on a forest plan, expanded tax credits, or compensation via grants or other direct payments. The focus will be addressing cases where the encumbrance can be shown to restrict revenue from a location on which the owner is highly dependent for basic income.

B. Natural Flow

The Authors recognize that in some cases impoundments upstream of SFO parcels may create perenniality where none naturally exists, or might alternatively end perenniality where it once existed. Stream typing based on these flows may lead to findings at odds with the natural state of flow. Therefore, the Authors recommend that ODF investigate the extent of this problem and develop methods to correctly classify perennial small non-fish streams on SFO land.

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CHAPTER 6: BEAVER CONSERVATION

6.1 Introduction

The American beaver (*Castor canadensis*) is a keystone species that has played a critical role in shaping landscapes across Oregon and North America. From maintaining wetland and riparian ecosystems to recharging groundwater, beavers can impact multiple biological, physical, and chemical processes. The importance of beavers in Oregon's history is reflected in its status as the official state symbol.

The distribution of the American beaver includes the United States as well as portions of northern Mexico and Canada, stretching from the Atlantic to the Pacific Oceans. Conservative estimates of beaver abundance in North America pre-European settlement suggests approximately 60 million beavers, although estimates as high as 400 million have been made (Seton, 1929). Fur trapping in the 18th and 19th centuries led to rapid declines of beavers across North America. By 1948, an estimated population of only 1.1 million beavers remained in North America (Denney, 1952). With interest in reintroduction of beavers and natural population growth in the 20th century, there was an estimated population of between 9.6 million and 50 million beavers by 2000 (Whitfield et al., 2015).

6.1.1 Impacts of Beaver on Landscapes

Beavers are often referred to as "engineers" because they physically modify their environment through dam, lodge, and canal building (Naiman et al., 1986). These modifications can have significant influence upon other stream- and riparian-dependent species. Beaver dam sites are more commonly found in streams less than 7 meters wide, valley widths greater than 30 meters, and stream gradients from two to four percent (Dittbrenner et al. 2018).

Multiple studies have documented the benefits that beaver dam and pond systems have for salmonid habitat and other wildlife species (Pollock et al., 2003, 2004, 2007, and 2012). The benefits of beaver habitat modification include the following (ODFW, "Living with Beaver"):



- **Pond creation**. Beaver dams protect fish from winter flows and increase water storage, resulting in more stable water supplies and the availability of higher flows over longer periods of time.

  Availability of large woody debris. Beaver dams provide large woody debris that juvenile fish can use to evade predators. They also provide winter pool habitat critical for species such as cutthroat trout and coho.

- **Storage of leaf litter**. Beaver ponds store leaf litter and support aquatic insect production. This acts as an important food source for fish, amphibians, bats, and birds.

- **Nesting and rearing areas for waterfowl**. Beaver dams and ponds support the creation of nesting and brooding habitat for waterfowl. Increased vegetation growth as a result also provides increased forage and cover for wildlife.

- **Wildlife habitat**. Beaver ponds provide habitat for wildlife species including mink, river otter, muskrats, turtles, frogs, and salamanders.

- **Food source for wildlife species**. Rising water levels behind beaver dams may cause trees to die that attract insects and become a food source for wildlife species, such as woodpeckers. Dead and dying tree snags become wildlife habitat for cavity-nesting birds.

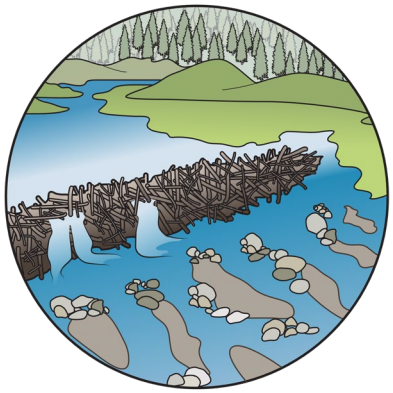
  Aquatic habitat associated with beaver dams is low-velocity, with varying depths, and complex cover. For coho salmon (*Oncorhynchus kisutch*), studies have demonstrated increased juvenile rearing densities,

and growth associated with beaver ponds (Bustard and Narver, 1975; Murphy et al., 1989; Pollock et al., 2004; Malison et al., 2016), increased survival (Quinn and Peterson, 1996), and increased production (Nickelson et al., 1992; Bouwes et al., 2016).

In the Pacific Northwest, beavers are especially important on the landscape in arid regions where they are successful in storing water through deepening stream channels and creating wetlands important for plant and tree communities. Riparian zones established by beavers are more resistant to drought and wildfires (Fairfax and Whittle, 2020). At the local scale, beavers also reduce hydrologic seasonality (Naiman et al., 1988; Baker and Hill, 2003). These impacts have been identified as important to mitigate the effects of climate change on stream ecosystems (Hood and Bayley, 2008).

While natural recolonization of beavers may be a slow process, translocation of beavers is not necessarily successful due to low survival of translocated beavers (Petro et al., 2015). The science pertaining to translocation of beaver is evolving with an increased focus on maintaining the integrity of family units during translocation and pair bonding individual translocated beavers in captivity prior to release. With uncertainty in the success of beaver translocation to date, monitoring and adaptive management will be crucial in evaluating management techniques and philosophies applied to HCP covered forestlands in Oregon.

6.1.2 Beavers and Private Landowners



Elizabeth Morales

Beavers can provide multiple benefits to private landowners, including:

- **Wetland creation to control downstream flooding**. Beaver dams create wetlands that can help to manage downstream flooding by storing and releasing water slowly over time. This reduces the severity of high stream flows, particularly after winter storms and spring snow melt.

- **Improve water quality**. Wetlands that result from beaver dam creation can remove or transform excess nutrients, bind to and remove toxic chemicals, as well as store and filter sediment.

- **Improve groundwater recharge**. By storing water, beaver dams can facilitate groundwater recharge and raise groundwater tables. This can promote vegetation growth, stabilizing stream banks and minimizing erosion.

- **Reduce water velocity**. By storing and releasing water slowly over time, beaver dams reduce water velocity. This reduces stream bank erosion and channel scouring.

- **Wildlife habitat**. Wetlands created by beaver dams provide habitat for fish and wildlife that also provide recreational and aesthetic values for landowners. (ODFW, "Living with Beaver.")

At the same time, beaver activity can also result in conflicts between beavers and private landowners. Beaver activity may result in cutting down trees and shrubs, blocking culverts, and flooding roads and developed areas (Enk et al., 1997; Harbrecht, 1991; Jonker et al., 2006). Efforts to identify and mitigate current and potential conflicts between beavers and private landowners are ongoing (Needham and Morzillo, 2011).

6.1.1 Beavers in Oregon

Although beavers can be found in virtually all of Oregon's waterways, no current population estimate for beavers in Oregon exists (6-12-20 ODFW Staff Presentation to ODFW Commission). However, recent studies have identified abundant unoccupied habitat for beavers. These studies include, but are not limited to:

- Oregon coastal streams using ODFW's Aquatic Habitat Inventory (AHI) to assess recent location of beaver dams and ponds.
- North Fork Burnt River watershed in eastern Oregon using the peer-reviewed Beaver Restoration Assessment Tool (BRAT) to assess existing beaver dam potential.
- John Day Basin in east-central Oregon also using the BRAT to assess existing beaver dam potential.


Gareth Curtiss

Under the Oregon Conservation Strategy (OCS), beavers were identified as a key component of the conservation strategies under Goal 2 to maintain and restore floodplain functions. Specifically, the OCS includes Action 2.6 to "support and encourage beaver dam-building activity" (p. 67). The OCS identifies multiple benefits to floodplain functions from beaver dams, including reduced sedimentation, wetland restoration, and improved water quality and habitat for fish. The OCS acknowledges potential conflicts between beavers and landowners and lists strategies to minimize conflicts. Further, ODFW estimates that beaver activity benefits 82 of the 294 (28%) Strategy Species listed in the OCS (see Petition to Initiate Rulemaking to Amend OAR 635-050-0070 to Permanently Closure of Beaver Trapping and Hunting on National Forests, Bureau of Land Management lands, National Monuments, Federal Wildlife Refuges, National Parks, and National Grasslands within the state of Oregon, 2020).

Under current Oregon law, beavers have a dual status. On public lands, beavers are classified as a furbearer (ORS 496.004 and OAR 635-050-0050). On private land, beavers are classified as predatory animals (ORS 610.002). Take of beaver on public land requires a permit while take of beaver on private lands is unregulated.

6.2 Goals

The goals of the PFA regarding beavers are to:

1) Recognize the important role that beavers play in creating habitat for listed salmonids as well as other species;

2) Document the number of beavers taken on private forestlands;

3) Support and allow for the expansion of beaver populations on private forestlands; and

4) Reasonably allow forest landowners to address beaver-related conflicts when they arise.

Specific actions that support the continued expansion of beavers aligned with the goals of this Chapter and the commitments of the PFA include:

1) The prohibition of beaver trapping, except on forestland owned by small forestland owners, under many circumstances, and requiring consultation with the Oregon Department of Fish and Wildlife (ODFW) before trapping under other circumstances;

2) Promotion of reintroduction strategies where landowners are amenable to such actions;

3) ODFW and landowner evaluation of non-lethal measures in circumstances where beavers are creating a risk to infrastructure, prior to resorting to lethal take.

6.3 PFA Commitments

6.3.1 Reporting Requirements

Any person that takes a beaver on privately owned forestland shall report the take to the Oregon Department of Fish and Wildlife (ODFW) to enter into a central database to keep track of the occurrences. The person who commits the take shall report the take, not the landowner who may contract for the removal of the beaver(s).

Reporting requirements include:

a. The name of the person who committed the take of the beaver;
b. The location of the take;
c. The reason for the take;
d. The number of beavers taken; and
e. Other reporting requirements as identified by ODFW

6.3.2 Prioritization of Conflict Resolution and Non-Lethal Removal Methods

Where conflicts exist between private forest landowners and beavers:

a. For a beaver that is causing or may cause damage on privately owned forestland, other than small forestland, ODFW has 30 days to initiate and complete non-lethal removal actions. This may include *in situ* conflict resolution with technical assistance from ODFW to help the

landowner resolve conflicts on site. After 30 calendar days, forest landowners, at their discretion, may choose to lethally remove beaver. For purposes of both this provision and the commercial trapping limitation set forth below, "small forestland" means forestland that has an owner that holds or holds common ownership in less than 5,000 acres of forestland in this state.

b. Where a beaver threatens landowner infrastructure (e.g., blocking culverts, etc.), the landowner may 1) destroy the beaver dam; 2) install mitigation devices such as beaver deceivers; or 3) lethally remove the beaver without the advance notification to ODFW discussed in section a. above.

6.3.3 Commercial Trapping Limitations on Select Private Forestlands

Commercial trapping on private forestlands is prohibited, except for on small forestland. Beaver trapping on private forestlands, other than small forestlands, must be for personal use only. No sale or trade of beaver trapped on private forestlands, other than small forestlands, is allowed.

6.3.4 Beaver Research in Adaptive Management

Beaver research shall be incorporated into the adaptive management framework established in Chapter 10. This approach will be used to provide science-based recommendations and technical information to the Board in determining if and when it is necessary or advisable to adjust rules, guidance, and training programs to achieve resource goals and objectives identified in the Habitat Conservation Plan (HCP).

6.3.5 Establish Voluntary Beaver Relocation Program for Private Forestlands

ODFW will establish a voluntary beaver relocation program for private forestlands. This program should include:

a. Promotion of beavers as an important tool for habitat restoration and recovery of listed species;

b. Promotion of non-lethal beaver management strategies; and

c. Development of a list of private forest owners willing to receive relocated beavers.

6.4 Revised Rules in Conformance with PFA Commitments

Rules associated with wildlife management need to be included in the Wildlife Title 41, Chapter 458 where trapping laws are specified. Requirement of reporting and tracking incidences of lethal take may require revision.

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CHAPTER 7: AMPHIBIAN CONSERVATION

7.1 Introduction

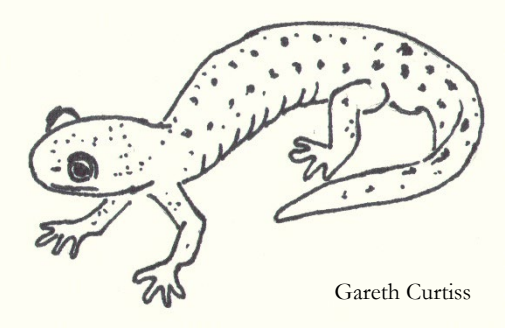
The Authors were able to reach agreement regarding protections for five stream-dwelling amphibian species sufficient to support coverage under a Habitat Conservation Plan (HCP). These species are: Columbia torrent salamander (*Rhyacotriton kezeri*), Southern torrent salamander (*Rhyacotriton variegatus*), Coastal giant salamander (*Dicamptodon tenebrosus*), Cope's giant salamander (*Dicamptodon copei*), and Coastal tailed frog (*Ascaphus truei*). In Western Oregon forests, these species are stream-obligates during early development (eggs and larvae). Upon metamorphosis, they can occur in or along streams and use riparian and upland forests for foraging, dispersal, overwintering and aestivation. However, in some cases, mature life forms of giant salamanders remain in streams for their entire lives ("neoteny").

At the time of the PFA agreements, these species had the following status:

- Columbia torrent salamander: Under review for listing under Federal Endangered Species Act, Oregon Sensitive, ORBIC 4, IUCN near threatened;
- Southern torrent salamander: Oregon Sensitive, ORBIC 4;

- Coastal giant salamander: No special status designations;
- Cope's giant salamander: Oregon Sensitive, Special Status/Sensitive Species; ORBIC 2 (Imperiled); and
- Coastal tailed frog: Oregon Sensitive, ORBIC 4.

The Authors considered issues related to riparian buffers, connectivity, roads, culverts, and water quality and temperature that informed the approach of this Chapter. The Authors also considered other approaches to protection of stream-dwelling amphibians, including the draft Western Oregon Forest Habitat Conservation Plan and the Washington Forest Practices Habitat Conservation Plan. This Chapter is not intended to be a comprehensive literature review of the variable response of amphibians to disturbance.


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At watershed scales, stream-dwelling amphibian habitat includes streams that occur higher up in the stream network than federally protected fish species and therefore, protections and management approaches focused on fish are not necessarily sufficient to protect stream-dwelling amphibians. Coastal giant salamanders and Coastal tailed frogs can co-occur in reaches with fish, but the entire assembly of stream-dwelling amphibians also frequently relies on non-fish-bearing headwater streams. As a result, specific strategies to avoid, minimize, or mitigate impacts to stream-dwelling amphibians are largely absent under the current Oregon Forest Practices Act and related regulations.

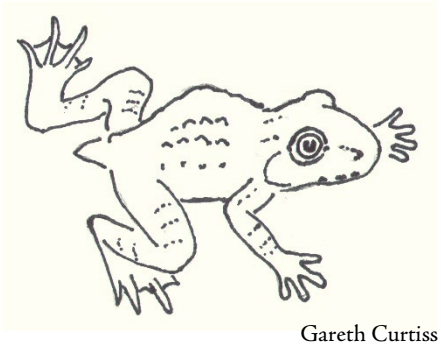
Stream habitat for tailed frogs, torrent salamanders, and giant salamanders includes cool, clear surface water flow with instream microhabitat complexity, such as coarse stream substrates with interstitial spaces. Yet, the heterogeneity of small headwater streams warrants recognition relative to these species' occurrences. More specifically, Coastal tailed frogs and Coastal giant salamanders are more often associated with perennial stream reaches with larger substrates and more down wood, and torrent salamanders have been found in smaller waters with smaller substrates, less down wood, and spatially intermittent streamflow patterns (Olson and Weaver, 2007; Thompson et al., 2018). After larval metamorphosis, many stream-breeding amphibians also are found within upland forests and have been trapped to 400 meters upslope of streams (Olson et al., 2007). The Authors have differing opinions regarding the conclusion that genetic analyses documented broader landscape-scale dispersal patterns in the following studies (Coastal tailed frog recolonization of Mount St. Helens post-eruption: Spear et al., 2012; torrent salamanders in the Oregon Coast Range: Emel et al., 2019).

Stream-dwelling amphibians are also found within upland forests of the Pacific Northwest, with older-forest associations of these species supporting risks of historical forest management practices (Blaustein et al., 1995). For example, Pollett et al. (2010) found Coastal tailed frog and Cascade torrent salamander densities were 2-7 times lower in streams within managed forests than in streams in unharvested forests.

There is often variability in responses of stream-dwelling amphibians to disturbance. Existing uncertainties around responses of stream-dwelling amphibians to the collective disturbances associated with forest management prescriptions in Oregon is confounded by the variability in the contexts of individual studies, including a lack of studies that explicitly test contemporary treatments while controlling for high variability in landscape and site conditions (Schmidt and Garroway, 2021; Martin et al., 2021). Martin et al. (2021) evaluated the relationship between riparian buffering regimes, stream temperatures, and stream-associated amphibians and found no evidence to support that abundance of amphibian populations are positively correlated with larger buffers.

Due to the late publication of Olson and Ares (2022) during the course of the negotiations, not all of the Authors were able to review and evaluate this work. In a western Oregon study initiated in 1994 with a before-after-control-impact design across 8 sites and 54 stream reaches, Olson and Ares (2022) reported support for decadal lag-time effects on stream amphibians of buffer widths with upland thinning. Both Coastal giant salamanders and torrent salamanders were found in higher densities in streams with a one potential-tree height riparian buffer compared to narrower buffers, and torrent salamanders had associations with streams in unthinned control units as well.

In a western Oregon study, Olson and Burton (2014) reported reduced densities of *Rhyacotriton spp.* in stream reaches with the narrowest buffer they examined (6 m wide on each side of streams) with two sequential entries of upland secondary-forest thinning. The Authors have differing opinions on the conclusion that the data in this study supported the use of the wider buffers that they examined in their study, a minimum of 15 m wide on each side of streams, to retain sensitive headwater stream amphibians.


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In a second comprehensive before-after-control-impact (BACI) study of riparian buffers in hard rock lithology in western Washington, McIntyre et al. (2021) found riparian buffers adjacent to non-fish-bearing perennial stream buffers of second growth timber were important for tailed frogs, but no demographic effects were found for torrent and giant salamanders. This study emphasizes the importance of reviewing changes to salamander populations over an extended time period, as impacts may not manifest in the years immediately following harvest. However, when genetic analysis was applied over the same time period, evidence was not found for any population level effects for Coastal tailed frogs or any amphibian species following the harvest prescriptions (Spear et al., 2019). Though interpretations of these results differ, these results support the fact that there is often variability in responses of amphibians to disturbance (Schmidt and Garroway, 2021) and the different response parameters and their time elements may warrant consideration.

The uncertainties surrounding amphibian population characteristics, distribution, productivity, survival, and abundance, as well as the variable response of amphibians to disturbance informed the approach of the Authors established in this Report. These uncertainties underpin the decision to prioritize research under the adaptive management process to ensure that the efficacy of protection strategies will be evaluated and adjusted as needed in a timely manner.

7.2 Goals

The goal of riparian management practices and other conservation measures described in this section is to protect and conserve stream and riparian habitats important for all life stages of Columbia (*Rhyacotriton kezeri*) and Southern (*R. variegatus*) torrent salamanders, Coastal *(Dicamptodon tenebrosus)* and Cope's *(Dicamptodon copei)* giant salamanders, and Coastal tailed frog (*Ascaphus truei*).

7.3 PFA Commitments

7.3.1 25-Year Term for Coverage of Amphibians Under HCP

The Authors agree to support a 25-year term for coverage for the following stream dwelling amphibians under a Habitat Conservation Plan (HCP):

- Columbia torrent salamander (*Rhyacotriton kezeri*)
- Southern torrent salamander (*Rhyacotriton variegatus*)
- Coastal giant salamander (*Dicamptodon tenebrosus*)
- Cope's giant salamander (*Dicamptodon copei*)
- Coastal tailed frog (*Ascaphus truei*)

7.3.2 No Agreement on Cascade Torrent Salamander

This agreement will not cover Cascade torrent salamander (*Rhyacotriton cascadae*).

7.3.3 Conservation Measures to Support Protection of Stream-Dwelling Amphibians

Conservation measures to support the protection of stream-dwelling amphibians include riparian prescriptions that protect fish and non-fish-bearing streams as identified in Chapter 2 of this Report. That Chapter includes conservation measures for seasonal and perennial streams that provide important habitats for stream-dwelling amphibians. Additional protections for seeps, springs, and stream-associated wetlands are established in Chapter 2.

Additional conservation measures to conserve stream-dwelling amphibians include:

a. The Slope Retention Areas, Designated Debris-Flow Traversal Areas, and Stream Adjacent Failure prescriptions which are identified in Chapter 3.
b. The wetland protections, including the 2:1 replacement for filling or draining wetlands, identified in Chapter 4.
c. The updated culvert design standards identified in Chapter 4.
d. The reduction of fine sediment through the hydrologic disconnection of roadside conveyance systems from streams as identified in Chapter 4.

7.3.4 Adaptive Management

Uncertainty exists around amphibian population characteristics, distribution, productivity, survival, and abundance. A robust effectiveness monitoring plan as part of an adaptive management program will be used to better understand the relationship between forest management and covered

amphibian species. To support this program, it is recommended that $1.5 million be initially applied to research through the first funding cycle of the adaptive management program to better understand how riparian and unstable slope protections of at least the current and proposed rules for private forestland impact persistence of populations. The Authors agree that the $1.5 million will be used to fund an initial study and that ongoing research over appropriate intervals of time beyond this initial study will be necessary to understand research outcomes over long periods of time. The priority species for monitoring will be the Columbia and Southern torrent salamanders. With consideration to funding constraints and other priorities, this research could also include other species covered by the HCP. Additionally, it could include Cascade torrent salamanders, which are not covered by the HCP.

7.4 Revised Rules in Conformance with PFA Commitments

The conservation measures summarized in Section 8.3.3 will be promulgated into rule consistent with those Chapters.

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CHAPTER 8: COMPLIANCE MONITORING

8.1 Introduction

A compliance monitoring program (CMP) is fundamental to understanding whether forest practice rules identified in the Habitat Conservation Plan (HCP) are correctly implemented. Comprehensive compliance monitoring is robust and provides information without systematic bias and with sufficient precision to be representative of forest practice activities. A successful CMP provides information as a foundational element in improving training protocols, enhancing public trust in forest practices implementation, and ensuring forest operators are following the rules.

8.2 Goals

The following goals are established for compliance monitoring:

a. Compliance monitoring assesses whether the rule groups identified in the HCP and the broader Forest Practices Act and rules are being implemented as intended. The CMP provides feedback to the Oregon Department of Forestry (ODF), the federal services, and stakeholders to aid in targeting specific areas for guidance, training, clarification, and/or enforcement.

b. The CMP should provide an objective assessment of rule compliance. The CMP does not report on the effectiveness of the rules.

c. The infrastructure to support the CMP will include adequate compliance monitoring, enforcement, training, education, and budget.

8.2.1 Objectives

Aligned with the established goals for compliance monitoring, the following objectives are developed for compliance monitoring:

a. Verify compliance with the rule groups identified in the HCP.

b. Provide an informed and systematic basis for targeted training efforts to increase compliance with Forest Practices Act and rules.

c. Improve compliance with the HCP and broader Forest Practices Act and rules.

d. Provide data that can be used in reporting, including to the Board of Forestry (Board), the Oregon Legislature, and the federal services under the terms of an HCP.

The Authors expect that as these objectives are met, the public's trust in the implementation of Forest Practices Act and rules will improve.

8.3 Private Forest Accord Commitments

8.3.1 Process for Compliance Monitoring Program (CMP)

In order to develop a compliance monitoring program (CMP) aligned with the above goals and objectives, the Authors established the following process:

a. Every two years, ODF should conduct a statistically sound, biennial compliance and performance audit and prepare a report to the Board.

b. In addition, compliance monitoring data will support other ODF reporting requirements, including the following:

    i. An annual report to the public on overall HCP performance;

    ii. Rolled up, cumulative reports every 8 years; and

    iii. Other reports as required by the terms of the HCP.

c. The CMP process should:

    i. Be informed by the recommendations of the "Oregon Forest Practices Act Implementation Study: History, Issues, and Potential Solutions" final report

prepared by Mount Hood Environmental and submitted to the Board on June 15, 2021, and similar reviews of other compliance monitoring programs in nearby states (e.g., Washington and Idaho).

ii. Explicitly define all sampling elements.

iii. Utilize remote sensing or modifications to the FERNS notification system to identify completed activities.

iv. Accommodate ODF, cooperating state agencies, or contractor access to land for purposes of assessing compliance with Forest Practices Act and rules.

v. Analyze compliance rates at the appropriate temporal and spatial scale to reduce autocorrelation, variance, and systematic bias that has impacted monitoring programs across the Pacific Northwest. Continue to pursue ODF's Key Performance Metrics, however defined, with an initial target of 95% compliance at the 8-year roll-up report.

vi. The Board can direct the CMP to conduct analysis at the rule and unit level as appropriate to determine levels of compliance.

vii. When identified, examine areas of noncompliance to determine if they represent a specific set of circumstances or if they are a systemic response that might warrant new training, guidance, rule clarification, or other appropriate action.

viii. Produce a roll-up report every 8 years that includes compliance trends since the beginning of the CMP.

d. ODF has discretion to identify additional rules for review according to this process.

8.3.2 Outcomes for Compliance Monitoring Program (CMP)

The Authors establish the following outcomes for the compliance monitoring program (CMP):

a. Reporting on the implementation of HCP-identified forest practice rules on the ground.

b. Identify opportunities to improve compliance as needed through education for landowners, regulators, consultants, and operators as suggested by non-compliance rates.



c. Provide information that revises rules and technical guidance, when appropriate.

d. Provide the biannual and 8-year reports to the federal services assessing compliance with the HCP.

8.3.3 Administration of Compliance Monitoring Program (CMP)

The Authors establish the following process for administration of the compliance monitoring program (CMP):

a. The CMP administration is led by ODF personnel. Specific monitoring field work can be conducted by ODF personnel, through hired contractors, or some mix of both.

b. ODF should hire an external, qualified statistician to aid in developing sample selection and evaluation criteria to ensure a high level of confidence in the statistical modeling and final reported compliance numbers.

c. The CMP is supported by a stakeholder group comprised of representatives that have expertise in the purpose for and implementation of the rules that are being monitored, including but not limited to agency staff, landowners, and operators.

d. Funding needs for the CMP will be influenced by the number of rules evaluated, acceptable statistical precision, and frequency of reporting.

8.4 Revised Rules in Conformance with Private Forest Accord Commitments

The Authors identified the following activities and rules to review for conformance with the goals, objectives, and Private Forest Accord commitments described above. The compliance monitoring program (CMP) must, at a minimum, assist in the monitoring of rule implementation related to rule groups identified in the HCP. The following rule groups should be prioritized in the CMP:

a. Riparian rules that are required to be established under Chapter 2 of this Report.

b. Steep slope rules that are required to be established under Chapter 3 of this Report.

c. Road rules that are required to be established under Chapter 4 of this Report.

d. In addition to the rule groups outlined above, other rules may be evaluated in the CMP according to the process identified in Section 8.3.1.



CHAPTER 9: ENFORCEMENT

9.1 Introduction

Enforcement of the Forest Practices Act and rules is necessary to ensure the integrity of the regulatory framework. Currently, ODF lacks staffing and statutory authority to adequately enforce laws and rules. Education for landowners and operators should be a foundational component of any enforcement program with financial penalties and stop work orders focused on egregious violations and repeat violators.

9.2 Goals

The Authors establish the following goals for enforcement:

a. Ensure that rules are being followed.

b. Improve training and the clarity of technical guidance so that implementation expectations are transparent and easily understood by landowners and operators.

c. Provide confidence to the public that the Forest Practices Act and rules are being followed.

9.2.1 Objectives

Aligned with the established goals for enforcement, the Authors establish the following objectives:

a. Utilize the enforcement process as an educational tool and a training opportunity.

b. Focus penalties on egregious violations and repeat violators.

c. Ensure that the enforcement process deters future violations.



Gareth Curtiss

9.3 Private Forest Accord Commitments

9.3.1 Process for Enforcement

In order to develop a framework for enforcement aligned with the goals and objectives stated above, the Authors establish the following enforcement process:

a. ODF will establish a mechanism to determine the underlying cause of the violation, including to determine whether the infraction could have been avoided by:

    i. More explicit training on rule implementation.

    ii. Rule clarification or improvement in language.

    iii. Additional communication efforts for specific site conditions.

b. ODF will retain its existing statutory powers to enforce the Forest Practices Act within the following framework:

    i. Written Statements of Unsatisfactory Condition should continue to be used as a communications and corrective tool in instances where resource damage has not occurred, can be corrected, or is minor.

    ii. Civil penalties, orders prohibiting new operations, and criminal prosecution should focus on repeat violators; landowners and operators who fail to comply with corrective actions and/or pay penalties; and landowners and operators who willfully violate rules or statutes.

c. **Repeat Violators** – Recognizing that current enforcement actions tend to accumulate among repeat violators, ODF should focus its resources and attention on this set of

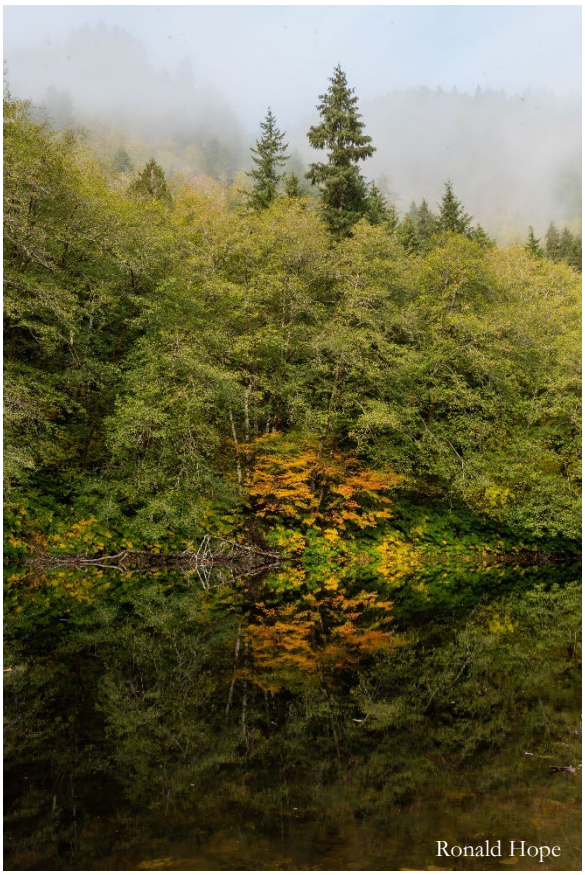
landowners or operators (e.g., after training, rule clarification, and communication efforts have been attempted, as applicable).

i. A Repeat Violator is a landowner or operator with a history of significant violations that, taken together, show a pattern of ignoring the rules or the Forest Practices Act. In evaluating a landowner's or operator's history of significant violations, ODF should take into account company organization, the proportion of total operations that are in violation compared to the total number of operations conducted, and the degree, if any, to which the landowner or operator derived significant economic benefit from the significant violation.

ii. "Significant violations" means operating without providing proper notification of a forest practices activity (other than an unintentional operation outside of an approved boundary of such notification), the continuation of operations in breach of the terms of an ODF citation and order, or resource damage that is major in effect and self-restoration takes more than 10 years.

iii. ODF should maintain a list of Repeat Violators. The rule implementing this section must include a process and criteria for removing a Repeat Violator from the list.

d. **Penalties** – During the PFA process, various concerns about the adequacy of penalties to deter noncompliance for deliberate violators were raised. To ensure that penalties have adequate deterrent effect, the Authors agree on various penalty amounts that have been included in the PFA authorizing legislation.


Ronald Hope

e. **Tracking** – ODF should ensure that its process for tracking operators and landowners that change name and location is sound.

f. **Remote Sensing and Notification of Completion of a Forest Practice** – The Forest Practice Rules in effect as of the date of this Report require landowners and operators to notify ODF of plans to execute any forest practice activity. To aid in compliance monitoring and enforcement, ODF should do one of the following:

i. Require notification of completed forest practice activities within a reasonable timeframe of

completion. Notification of completed activities could apply only to a subset of activity types that ODF is most concerned with tracking;

ii. Use remote sensing to identify landowners who have completed forest practice activities to prioritize agency personnel time; or

iii. Otherwise develop a program that determined when operations for which notifications have been filed have been conducted.

g. **Access to land** – Amendments to state law will be necessary to explicitly allow ODF, cooperating state agencies, or contractor access to land for the purpose of enforcing the Forest Practices Act and rules when a forest practice notification is active and some period thereafter not to exceed three years.

9.3.2 Enforcement Program Administration

The Authors support the establishment of the following process for administration of the enforcement program:

a. Staffing at ODF to support enforcement and training may need to be increased. To adequately administer the program, ODF needs:

   i. 1.0 FTE additional Civil Penalties Administrator to ease the workload and backlog for the current administrator.

   ii. 1.0 FTE FPA Coordinator to be specifically dedicated to enforcement, support Stewardship Foresters in the field with enforcement issues, and act as a liaison between Stewardship Foresters and the Civil Penalties Administration office.

   iii. 1.0 FTE in new training staffing. Training staffing will support internal staff (i.e., Stewardship Foresters) and external stakeholders in understanding the forest practices act and rules.

b. Stewardship Foresters will continue to be an essential element in the Enforcement Program by working to better understand compliance and ways to reduce infractions.

9.4 Revised Rules in Conformance with Private Forest Accord Commitments

The activities and rules identified in this Report will be reviewed for conformance with the goals, objectives, and Private Forest Accord commitments described in this Chapter. The enforcement program must, at a minimum, assist in the monitoring of rule implementation related to rule groups identified in the HCP.



CHAPTER 10: ADAPTIVE MANAGEMENT FRAMEWORK

10.1 Introduction

The National Research Council (2004) defines adaptive management as "flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process."

The Authors support establishment of an adaptive management framework to provide science and technical information to support Board of Forestry decisions when needed to adapt rules, guidance, and training programs to achieve the resource goals and objectives identified in the Habitat Conservation Plan (HCP).

The adaptive management program will be driven by two primary questions:

1. **Effectiveness Monitoring:** Do the rules facilitating particular forest conditions and ecological processes achieve program goals and resource objectives?

2. **Research Inquiry and Validation Monitoring:** Are the resource objectives the correct ones to achieve overall program goals? What additional scientific inquiry is needed to fill in knowledge gaps that can add or prioritize resource objectives that will aid in achieving overall program goals?



Effectiveness monitoring seeks to determine if existing rules are meeting program goals and resource objectives. Studies to determine effectiveness will be most readily accomplishable when the causal link or links between a certain forest practice and its impact on the resource is well-documented. While the feedback loop should be responsive and efficient, research data and sample size will need to be adequate to determine the need for rule or guidance change. Research may test whether less operationally expensive alternative prescriptions can effectively meet resource objectives and may evaluate whether more conservative prescriptions are necessary.

Research inquiry and validation monitoring seek to better understand the relationship between certain forest practices and their impact on resources. Validation monitoring is especially useful when goals and objectives are based upon hypotheses that have not received adequate testing. Careful evaluation in these instances is important to improve the monitoring program and provide feedback and appropriate context for decision making. Research inquiry and validation monitoring can highlight emerging areas of emphasis in the forest practices realm and may improve understanding of whether and to what extent causal links exist between forest practices and observed impacts on resources. Results from studies will need time to be verified and for any implications to be understood. The feedback loop for research inquiry and validation monitoring will evolve more deliberately as new findings build on one another. Changes to rule or guidance that result from this segment of adaptive management will require clear documentation and rigor.

10.2 Goals

The purpose of the effectiveness monitoring program and adaptive management framework developed by the Authors is to provide science-based recommendations and technical information to assist the Board in determining if and when it is necessary or advisable to adjust rules, guidance, and training programs to achieve resource goals and objectives identified in the Habitat Conservation Plan (HCP). The Board may also use this program to adjust other rules, guidance, and training programs.

Within 6 months following the completion of this Report, the Authors in consultation with the Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality and other agencies as appropriate will define resource objectives that will enable attainment of the Goals of this Chapter and the PFA Report that will support an approvable HCP, consistent with the requirements of the Endangered Species Act.

10.2.1 Desired Outcomes for Adaptive Management Program

The Authors establish four desired outcomes for the adaptive management program:

1. Ensure timely and effective change as needed to meet resource objectives;
2. Predictability and stability of the process of changing regulations so that landowners, regulators, and interested members of the public can understand and anticipate change;
3. Application of best available science to decision-making; and
4. Effectively meeting resource objectives with less operationally expensive prescriptions when feasible.

10.3 Private Forest Accord Commitments



Gareth Curtiss

10.3.1 Adaptive Management Program Structure

Oregon's adaptive management program will rely on an Adaptive Management Program Committee (AMPC) and an Independent Research and Science Team (IRST).

10.3.1.1 Adaptive Management Program Committee (AMPC)

The AMPC will fulfill the following primary roles:

a. Set the research agenda, including priorities, for the IRST and guide the overall adaptive management process; prepare a budget for the IRST for Board consideration and approval;

b. Assess the scientific outcomes reported by the IRST and prepare a report for the Board that identifies alternatives (including no action) that could address identified problems;

c. Help the Board in the ongoing process of identifying and modifying resource objectives; and

d. Review CMP and enforcement reports and prepare any recommendations to the Board for rule adjustment, guidance, or training.

The AMPC will set the scientific agenda, but will play no part in designing actual research projects, carrying out the inquiry, or the IRST's report of findings to the Board and AMPC. The AMPC sets the research agenda for the IRST, assesses scientific outcomes reported by the IRST, and prepares reports to the Board regarding rule adjustment, guidance, or training. As directed by the AMPC, the IRST conducts scientific inquiry, including but not limited to literature reviews and original research, and also prepares reports to the Board.

The AMPC will consist of 10 voting members and up to three non-voting members. The Board shall select as a voting member one representative from each of the following interest areas nominated by stakeholder caucuses:

- Industrial forest landowner community nominated by the Oregon Forest and Industries Council
- A timber operator nominated by the Associated Oregon Loggers
- Small forestland owner community nominated by the Oregon Small Woodlands Association
- Conservation landowner (i.e., land trust) nominated by the Coalition of Oregon Land Trusts
- Tribal representative nominated by the Legislative Commission on Indian Services
- Conservation community, representative collectively nominated by Beyond Toxics, Cascadia Wildlands, Klamath Siskiyou Wildlands Center, Oregon League of Conservation Voters, Oregon Stream Protection Coalition, Oregon Wild, Portland Audubon, and Umpqua Watersheds
- Commercial or recreational angling community, representative collectively nominated by Northwest Guides and Anglers Association, Pacific Coast Federation of Fishermen's Associations, Trout Unlimited and Wild Salmon Center
- County government nominated by the Association of Oregon Counties
- Oregon Department of Forestry (ex officio)
- Oregon Department of Fish and Wildlife
- Oregon Department of Environmental Quality
- NOAA Fisheries (ex officio)
- USFWS (ex officio)

Committee members shall serve four-year terms, and may serve an unlimited number of terms. The State Board of Forestry shall appoint the first voting members of the Adaptive Management Program Committee on or before November 30, 2022. Of those appointed in 2022, two shall serve for terms ending one year after the date of appointment, two shall serve for two years after date of appointment, and three shall serve for terms ending three years after date of appointment. The remaining three 2022 appointees shall serve full four-year terms.


Wild Salmon Center

The AMPC will be led by a program administrator. This position will be a neutral facilitator whose primary program function is to assist forward progress in a timely manner by engaging communication among program entities; ensuring responsiveness from participants at the AMPC and IRST; and providing the Board with an annual report about program budgets and schedule.

10.3.1.2 Independent Research Science Team (IRST)

The IRST will be tasked with, and adequately funded to oversee, the research projects that the AMPC prioritizes and delineates. The IRST may be, but need not be, housed at a state agency or an independent research university.
The makeup of the IRST will be determined by the Board based on an evaluation of qualifications and recommendation by the AMPC to establish membership in the IRST. The IRST will be required to set up its own operating protocols emphasizing peer-review of findings, testable hypotheses, and reporting back to the AMPC and Board in lay terms that aids in the applicability of the science to questions of rule changes.



Morgan Heim

The IRST may conduct their inquiry through literature review, field monitoring, original research, commissioned studies, and other means of scientific inquiry. When reporting out findings to the Board and AMPC, the IRST should include, as applicable, the following:

- Methods sufficient to allow others to understand what was done and to evaluate the results and conclusions

- Detailed description of the results
- Discussion and conclusions about:
    - **Effectiveness:** In studies examining alternative prescriptions, the likely effectiveness of each will be reported
    - **Causal links:** Assess how the results of relevant new research findings developed by the IRST or through outside research clarify or support causal links between forest practices and aquatic resources, and implications with regard to how well forest practices rules or rule sets are likely to address these linkages.
    - **Magnitude of impact**: Assess the magnitude of impact on covered species or resource objectives on a sliding scale (e.g., Very High, High, Modest, Low, Very Low).
    - **Urgency of action needed:** Assess the urgency of action needed.
    - **Scientific uncertainty versus confidence:** Assess scientific uncertainty versus confidence.

Reports from the IRST will be submitted to the Board for consideration along with a report on alternative options for possible rule changes from the AMPC.

IRST members will serve four-year terms that can be extended as described below. After the initial selection of IRST members by the AMPC and the Board, all new members and the approval of extended terms for existing members will be voted on by the existing IRST members. IRST members can be removed before the end of a term by a super majority (two-thirds vote) of IRST peers or by a vote of the Board. New IRST members (either to fill a vacancy or to add a new scientific or technical discipline) will be appointed by the Board from a list of candidates submitted by the team.

IRST members must have adequate qualifications to serve on the IRST. These qualifications include demonstrated subject matter expertise in a relevant field and a graduate-level degree in a relevant natural resources-related field such as forestry, silviculture, ecology, hydrology, wildlife, fisheries, and geology.

The IRST, and any subcommittees it forms, will include a representative employed or contracted by one of each of the following: a public institution, a public interest non-governmental organization that promotes conservation of freshwater aquatic habitat, and the timber industry.

10.3.2 Adaptive Management Program Decision-Making Structure

Scientific inquiry aimed at understanding complex ecological relationships takes time to produce results in part because of frequent time lags in the ecological responses. Thoughtful, evidenced-

based decision making is critical to ensuring stability of forest practice rules over time. However, the adaptive management process must be rigorous, not calcified.

10.3.2.1 Consensus Continuum Model

Oregon's adaptive management process should pursue a decision-making framework that uses alternatives to full consensus. The consensus continuum model aims for full consensus at steps along the decision-making path and allows stalemates to be broken by supermajority (two-thirds) votes.

A consensus continuum model would be applied at the AMPC level where the multi-stakeholder nature of the committee may be ripe for stalemate. The consensus continuum approach will apply to decisions related to designing research agendas, setting budgets, and finalizing reports to the Board. The consensus continuum approach explicitly leaves open the ability for any stakeholder on the AMPC to put forward a minority report to the Board.

Fixed timeframes will be developed for all AMPC and IRST process stages. While all parties agree that striving for a consensus solution can provide for a more enduring regulatory system and help forge a cooperative change management process, fixed timeframes need to be established for all process stages to avoid procedural delays in the decision-making process.

10.3.3 Aquatic Rulemaking and Non-Aquatic Rulemaking

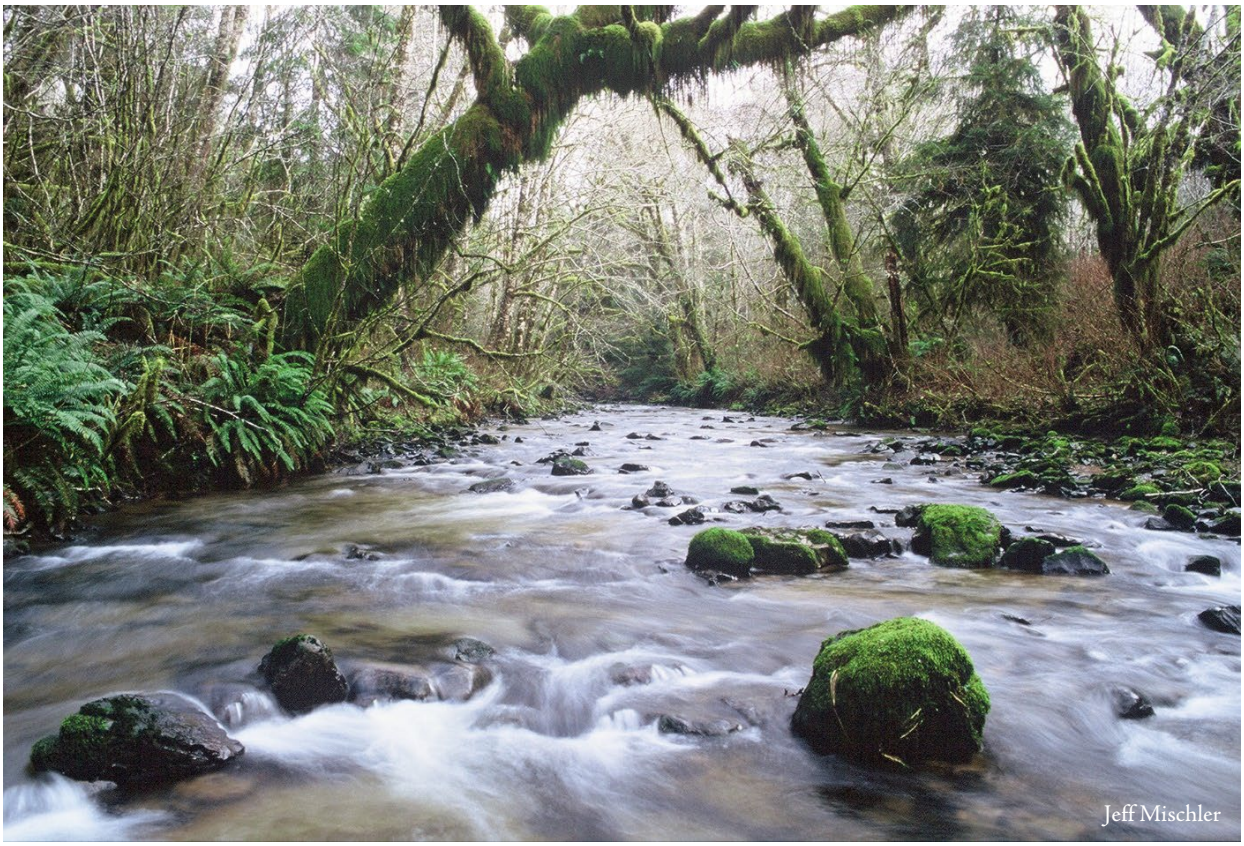
The Board is required to use the adaptive management process for all aquatic-related (HCP-covered) species issues, other than those that are the result of a petition by the Environmental Quality Commission under ORS 527.765(3)(e). For such an EQC petition, the Board may, but is not required to, use the adaptive management process. If it chooses to use the adaptive management process for an EQC petition, the 2-year timeline for completing that work must either be met or extended as provided in ORS 527.765(3)(e). The Board can also choose to use the adaptive management process for other issues. The Board must ensure that the use of the adaptive management process for non-aquatic issues does not impair the ability of the program to provide the required elements of the incidental take permit. If the Board directs the AMPC and the IRST to address non-aquatic issues, the IRST should consult with experts in that non-aquatic issue area to support IRST projects and reports.

10.3.4 Access to Land

Access to land for the purpose of conducting studies and monitoring contemplated by this section shall be encouraged. The AMPC or the IRST can prepare a report to the Board describing instances where access to land has been insufficient to achieve the purposes of this section. If presented with such a report, the Board shall consider rulemaking to address any research and monitoring problems arising from lack of access to land. Small forestland owners that take advantage of alternative minimum practices or financial incentives from the state shall be required to allow access to land for effectiveness monitoring specific to the alternative minimum practices used or the financial incentives received from the state.

10.4 Literature Cited

National Research Council, 2004. Adaptive Management for Water Resources Planning. The National Academies Press, Washington



CHAPTER 11: MITIGATION

11.1 Introduction

The Habitat Conservation Plan (HCP) Handbook developed by the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries (2016) defines "mitigation" as "avoiding, minimizing, rectifying, reducing over time, and compensating for impacts on natural resources" applied sequentially with compensatory measures considered after all "appropriate and practicable" avoidance and minimization measures have first been considered (p. 9-3). The HCP Handbook provides that "[m]itigation measures in the HCP must be based on the biological needs of covered species and should be designed to offset the impacts of the take from the covered activities to the maximum extent practicable" (p. 9-14).

The HCP Handbook goes on to suggest seven major categories of mitigation measures:

1. Restoration of degraded habitat to natural condition/function, or to a condition likely to be resilient to projected changes.

2. Land preservation.

3. Enhancement of habitat.

4. Creation of new habitat or new populations.

5. Threat reduction or elimination.

6. Translocation of affected individuals or family groups to establish new or augment existing populations.

7. Repatriation of species to formerly occupied and still suitable or enhanced habitat.

11.2 Goals



Aligned with the HCP Handbook, the Authors acknowledge that mitigation measures for the purposes of the PFA must be based on the biological needs of the Covered Species. To the maximum extent practicable, mitigation measures must be designed to offset the impacts of the take of covered species from the Covered Activities.

11.3 Private Forest Accord Commitments

For purposes of the PFA, mitigation efforts will focus on items 1, 2, 3, and 5 of the major categories of mitigation measures identified in the HCP Handbook:

- Category 1: Restoration of degraded habitat to natural condition/function, or to a condition likely to be resilient to projected changes.

- Category 2: Land preservation.

- Category 3: Enhancement of habitat.

- Category 5: Threat reduction or elimination.

11.3.1 Mitigation Efforts for the Purposes of the PFA

Mitigation efforts for the purposes of the PFA will include the following practices described below, and such other measures that effectively conserve or restore habitat for aquatic organisms covered by the habitat conservation plan issued pursuant to this Report.

11.3.1.1 Restoration or Enhancement

The HCP Handbook states that "restoration is focused on returning habitat to its natural or historic state." This may include re-establishing a former resource or improving a degraded resource to a natural or historic structure and function (HCP Handbook, p. 9-15). Habitat enhancement often "involves manipulation of the physical, chemical, or biological characteristics of a resource" with the goal of increasing or improving specific habitat functions (HCP Handbook, p. 9-17).

The Authors identified the following mitigation efforts related to restoration or enhancement for the purposes of the PFA:

a. **Aquatic organism passage:** Habitat connectivity is often reduced or eliminated when structures are placed instream or in-stream-adjacent wetlands. These structures frequently include culverts associated with road development, or dams and tidegates that are designed to divert or manage water. Investments to remove, repair, or replace structures that block fish and aquatic organism passage that improve habitat connectivity beyond the requirements of the HCP will provide mitigation for habitat loss or impacts on adjacent populations of covered species.

b. **Wood augmentation:** In reaches of the forested landscape where natural stream functions are altered by the lack of wood supply and recruitment due to legacy forest practices, large wood may be actively placed into streams as mitigation. Such placements should consider inclusion of root wads and be designed to simulate natural wood recruitment as feasible.


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c. **Beaver conservation and reintroduction:** Beavers (*Castor canadensis*) are a keystone species that play a critical role in shaping natural landscape. The role that beavers play in creating habitat for salmonids is well documented (e.g., page 3-3 of the Recovery Plan for Oregon Coastal Coho, 2016). Conservation, active recruitment and reintroduction of beavers will restore landscapes to sustain and recover aquatic species covered by the HCP.

d. **Wildfire resiliency:** Uncharacteristically severe wildfires reduce the viability of aquatic species due to increases in fine sediment inputs, loss of riparian vegetation, and loss of wood to recruit to the system. Resiliency can be increased for aquatic species by developing and sustaining healthy riparian corridors and wet meadow complexes to reduce burn intensity during fires and protect streams from excess sediment inputs post-fire. Active recruitment and/or reintroduction of beavers, installation of beaver dam analogues, and completion of Stage 0 stream restoration projects are some tools available to accomplish these mitigation objectives.

e. **Restoration Treatments in Riparian Conservation Areas:** Densely stocked single-species stands of trees may provide riparian function more quickly if subjected to targeted treatments. The locations, character, and timing of such treatments needs further discussion (*See,* Chapter 2, Section 3.4(d)).
f. **Riparian thinning**: Restoration treatments within the Riparian Management Area that are designed and intended to enhance historic species diversity.

11.3.1.2 Land Preservation

The HCP Handbook describes land preservation as a "mechanism for preventing the impacts of development threats to covered species and their habitats on a particular property" (p. 9-15).

The Authors identified the following mitigation efforts related to land preservation for the purposes of the PFA:

a. **Conservation easements:** Riparian conservation easements outside of the covered lands may be used to mitigate impacts associated with timber practices. Easements on covered lands may be useful to help small forestland owners comply with new standards.

11.3.1.3 Threat Reduction or Elimination

The HCP Handbook also includes a category of mitigation measures related to the "removal or reduction of threats to improve the health of the system or reduce direct effects on covered species" (p. 9-17).

The Authors identified the following mitigation efforts related to threat reduction or elimination for the purposes of the PFA:

a. In-stream flow: Alterations to in-stream flow conditions can impact water temperature as well as the availability of habitat for aquatic species. The acquisition and in-stream transfer of water rights to improve in-stream flow conditions where lack of flow is currently a limiting factor or projected to be a limiting factor in the future can provide mitigation for timber practices that alter hydrologic and geomorphic functions.

b. **Grazing management:** Unrestricted grazing in riparian areas can degrade water quality because the loss of streamside vegetation reduces the stability of stream banks leading to increased sediment inputs and geomorphic changes such as increases in the width to depth ratio and straightening of stream channels. These geomorphic changes along with the loss of shade normally provided by woody vegetation, may also degrade


Brian Kelley

water temperature. Fencing off and grazing exclusion in riparian areas, and around seeps and springs, as well as the installation of off-stream stockwater systems or hardened watering gaps may be used to reduce the threat of grazing practices on aquatic species.

11.3.1.4 Other Mitigation Categories

The Authors identify the above specific mitigation categories and types, but nothing in this Chapter is intended to specifically preclude other mitigation measures that meet the objectives of the habitat conservation plan.

11.3.2 Mitigation Implementation

Mitigation will include both permittee-implementation, as well as in-lieu fee mitigation.

11.3.2.1 Permittee-Implementation

Under permittee-implementation of mitigation measures, the permittee is responsible for successfully completing the required compensatory mitigation to offset the incidental take (HCP Handbook, p. 9-19). Permittee-implementation may include wood augmentation, beaver reintroduction, riparian restoration, and other practices identified above on covered lands by private forestland owners.

11.3.2.2 In-Lieu Fee Mitigation

Under in-lieu fee mitigation, the permittee does not complete project-specific mitigation themselves. Instead, the permittee directs funds to an in-lieu fee mitigation sponsor that channels funding from an individual permittee or a collection of permittees towards a project or multiple projects. The permittee supervises the in-lieu fee mitigation project(s) managed by the mitigation sponsor and remains responsible for its mitigation obligations (HCP Handbook, p. 9-22).

For the purposes of the PFA, in-lieu fee mitigation may include all mitigation practices supported by money deposited in the Private Forest Accord Mitigation Subaccount of the Oregon Conservation and Recreation Fund (OCRF).

Industry shall pay $2.5 million per year for mitigation before the issuance of the incidental take permit, and $5 million per year after issuance of the incidental take permit. The funding shall continue at the $5 million annual level for the duration of the incidental take permit until an aggregate of $250 million in mitigation (counting both pre- and post-permit payments) has been paid. The State shall also contribute $10 million per year for mitigation.

a. **Establishment of the Private Forest Accord Mitigation Subaccount**

The Oregon Conservation and Recreation Fund (OCRF) was established by the Oregon Legislature in 2019 and is administered by the Oregon Department of Fish and Wildlife (ODFW). The OCRF

Advisory Committee advises the Oregon Fish and Wildlife Commission on the disbursement of funds from the OCRF.

As part of the PFA, a subaccount entitled the Private Forest Accord Mitigation Subaccount (PFAMS) shall be created in the OCRF to receive and dispense funds for the purposes of the PFA mitigation commitments.

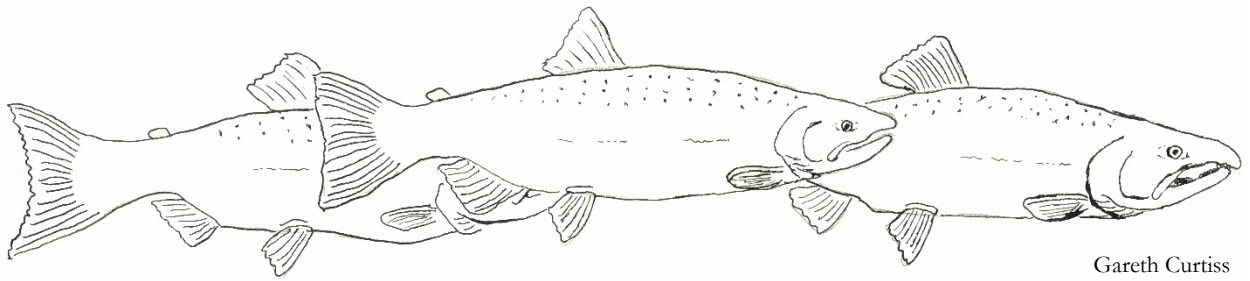
b. Establishment of the Private Forest Accord Mitigation Advisory Committee (MAC)

The Private Forest Accord Mitigation Advisory Committee (MAC) will be established by the PFA legislation as an advisory committee to the Oregon Fish & Wildlife Commission to make recommendations to the Commission regarding grants utilizing funds in the PFAMS. The MAC shall be organized in accordance with the following:

- **Purpose:** The purpose of the MAC is to assure that funds are invested in the projects that will generate the highest degree of mitigation for timber practices. Funds may also be used to conduct active outreach to landowners of fish passage barriers in order to meet fish passage targets, and other landowners who may participate in the mitigation efforts of the PFAMS.

- **Membership:** The MAC consists of seven voting members who may only be removed for cause. Three members of the MAC will be appointed by the Governor from non-governmental organizations that promote conservation of freshwater aquatic habitat. Three members of the MAC will be appointed by the Governor from the timber industry. One member of the MAC will be appointed by the Governor from the Oregon Conservation and Recreation Advisory Committee from among its members. Ex officio members may include a representative from NOAA, USFWS, ODF, OWEB, and ODFW. The initial cohort of MAC members shall be chosen by the Governor from the Authors. Future appointments made by the Governor shall be based on names solicited from relevant communities to maintain the balance of three members that represent non-governmental organizations that promote conservation of freshwater aquatic habitat, three members that represent the timber industry, and one member from the Oregon Conservation and Recreation Fund Advisory Committee.

- **Membership Terms:** The first cohort of members of the MAC shall include two members to serve terms ending one year after date of appointment, two members to serve terms ending two years after date of appointment, and two members to serve terms ending three years after date of appointment. All members will serve four-year terms following the



Gareth Curtiss

completion of the first term of members of the initial cohort. Members may be reappointed, but no one person may serve as a member for more than two full terms.

- **MAC Officers:** Officers are elected by the MAC and include a Chair and a Vice-Chair.
    - The Chair creates the agenda in consultation with the Vice-Chair.
    - The Chair is re-elected by members of the MAC every two years.

- **MAC Meetings:** At times and places fixed by the Chair, the MAC will meet four times per year. Of those four meetings, the MAC will hold no more than two rounds of grant funding per year. The Chair may also call for additional field trips. All MAC meetings are public meetings and subject to Oregon's public meetings laws.

- **Voting:** Each of the seven voting members of the MAC shall be entitled to one vote on any decision presented at meetings at which the member is present. Vote will be by roll call. Final decisions will be made by voice vote. Members of the advisory committee should not abstain from voting except on a matter involving potential conflict of interest, in which case the reason for abstention will have been disclosed. Members must declare conflicts of interest and recuse from votes on projects in which they have a personal or professional stake.

- **MAC Duties:**
    - The MAC shall solicit on regular intervals applications for grant funding to support projects that will further the purpose described above.

    - The MAC will proactively identify and target investment opportunities in areas it identifies as important in furthering the purposes described above.

    - All applications to the PFAMS received by public solicitation by the MAC shall be ranked or scored under criteria developed by members of the MAC no more than one year after the enacting legislation and prior to soliciting the first round of applications to the PFAMS.

    - The MAC shall ensure that funds are invested in the projects that will generate the highest degree of mitigation for aquatic species covered by the habitat conservation plan envisioned by this Report. Funds may also be used to conduct active outreach to landowners of fish passage barriers in order to meet fish passage targets, and other landowners who may participate in the mitigation efforts of the PFAMS.



- The PFAMS is eligible for matching to the main OCRF if matching funds are necessary to fully implement the proposed project are required.

- The MAC shall receive and consider recommendations from the OCRF Advisory Committee.

- The MAC shall seek out and identify opportunities to leverage funds in the PFAMS to obtain additional or matching funding for conservation efforts qualifying under this chapter. Such additional or matching funds may be managed within the PFAMS.

11.3.3 Timeline for Mitigation

The HCP should endeavor to provide for implementation of mitigation such that the offset would be achieved before the impacts of the taking occur, recognizing that funding will begin prior to receipt of the incidental take permit.

Annual tracking of mitigation implementation for both in-lieu fee and permittee implementation should be completed, with a comprehensive report of progress completed in coordination with the jurisdictional agencies every 5 years.

11.4 Literature Cited

U.S. Fish and Wildlife Service and NOAA Fisheries. 2016. Habitat Conservation Planning and Incidental Take Permit Processing Handbook. Available online < https://www.fws.gov/endangered/what-we-do/hcp_handbook-chapters.html >.



CHAPTER 12: FUNDING

12.1 Introduction

The Private Forest Accord (PFA) envisions a remaking of the Oregon Forest Practices Act in order to achieve approval of an aquatic-oriented Habitat Conservation Plan (HCP) for all of Oregon's private forestlands. The programs, oversight, and on-the-ground work envisioned in the PFA requires an increase in funding for the Oregon Department of Forestry, the Oregon Department of Fish and Wildlife, and the Oregon Department of Environmental Quality to meet the task ahead.

The Authors envision increased funding coming from multiple sources, including state and federal funds. The funding requested as part of the PFA will be used to augment current agency staffing, and it is likely that existing funding may be reprogrammed and integrated into new efforts envisioned under the PFA.

The Endangered Species Act requires that HCP applicants "ensure that adequate funding for the plan will be provided" (Section 10(a)(2)(B): (iii)). The negotiating parties encourage the State to sustain adequate funding for the life of the HCP to meet this requirement.

12.2 Goals

12.2.1 Federal Funding

The Authors envision that federal funding will be pursued by the State, in coordination with state agencies and the Authors, to support specific needs of the PFA and to augment agency budgets for programs under the PFA that are eligible for federal match or federal contribution. Specifically, federal funding will be pursued for: HCP application costs, data modeling, Small Forestland Investment in Stream Habitat program, small forestland owner fish passage, small forestland owner office agency staffing, LiDAR data, and other needs for which federal funding sources are later identified. Total estimated federal funding: $3 million for initial program roll-out and $7.5 million per year for ongoing implementation.

12.2.2 State Funding

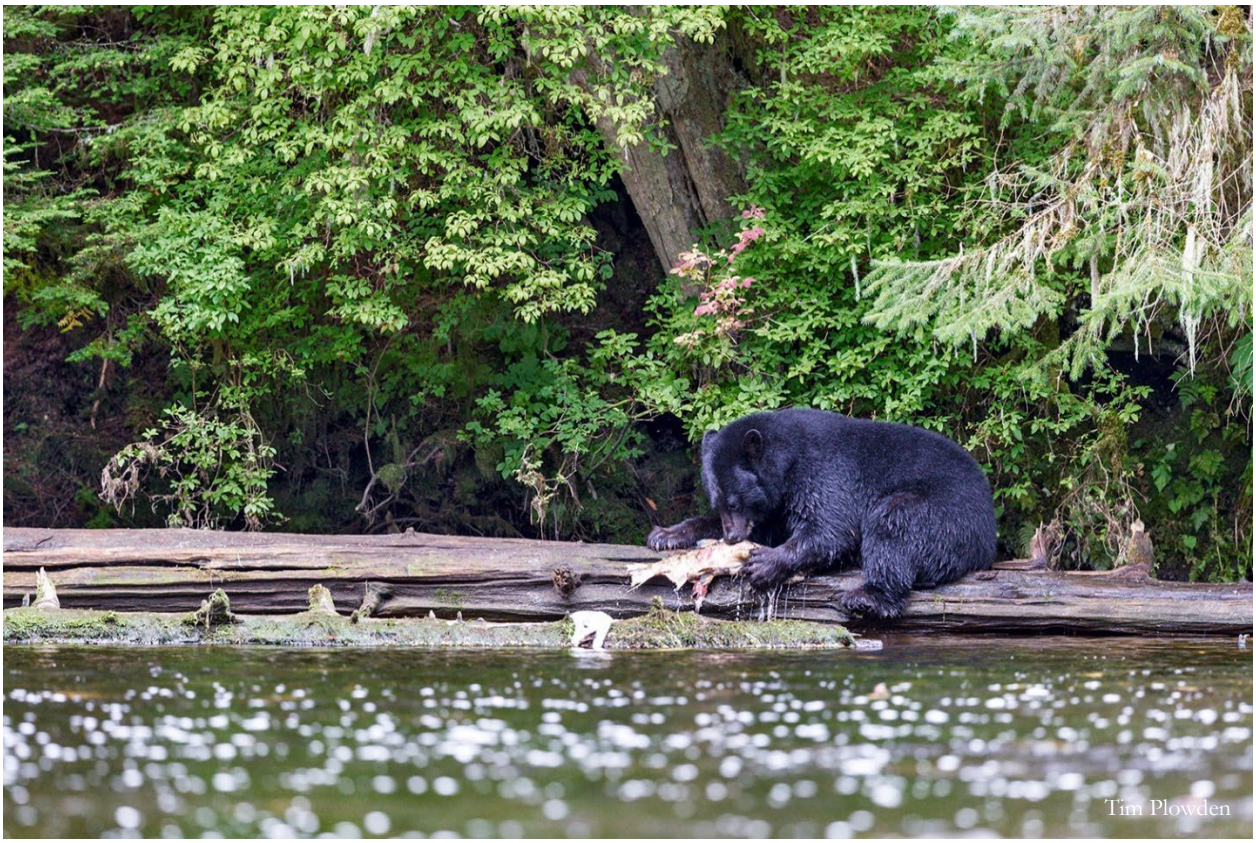
Many PFA needs are unlikely to be covered by federal funding and thus will require commitment from state funding sources. These programs likely include: updates to the FERNS notification system; hydrology and slopes modeling; staffing support for the roads inventory program; staffing for the small forestland owner office; compliance monitoring; enforcement; effectiveness monitoring, scientific research, and adaptive management; and administration and training for new rules. Total estimated state funding: $9.95 million for initial program roll-out and $16.17 million per year for ongoing implementation.

12.2.3 Mitigation

The goals and commitments of the Authors for mitigation are established in Chapter 11 of this Report. In addition to direct investments in PFA programs and staffing, the Authors agree to a mitigation fund to be supported by state dollars ($10 million per year beginning January 1, 2023) and a private industry pledge ($2.5 million per year beginning January 1, 2023, before issuance of an incidental take permit, and $5 million per year after issuance until reaching the cap of $250 million in aggregate). As contemplated in Chapter 11 and to be established by statute, the Private Forest Accord Mitigation Subaccount (PFAMS) will be created in the Oregon Conservation and Recreation Fund (OCRF) to receive and dispense funds for the purposes of the PFA mitigation commitments. Mitigation will include both permittee-implementation, as well as in-lieu fee mitigation. More details regarding the establishment and administration of the PFAMS are included in Chapter 12 of this Report.

12.2.4 Small Forestland Owner Tax Credits

The Authors have agreed to a Forest Conservation Credit, which will be a tax credit created by the PFA legislation for small forestland owners under various circumstances. The details of that tax credit program are detailed in Chapter 5 of this Report and SB 1502.



APPENDIX A: MEMORANDUM OF UNDERSTANDING

Appendix A: Memorandum of Understanding

The undersigned, being members of the Oregon timber industry and conservation communities (the "**Cooperating Parties**"), recognize and acknowledge the following:

A. The Cooperating Parties are presently embroiled in a costly and unpredictable battle over competing initiative petitions that would appear on the November 2020 ballot.

a. On July 9, 2019, Vikram Anantha, Micha Elizabeth Gross, and Kate Crump (the "**Forest Waters Petitioners**") filed three initiative petitions with the Secretary of State (the "**Secretary**") that the Secretary would assign initiative petitions numbers 35, 36, and 37 (the "**First Round IPs**"). The First Round IPs propose to make consequential changes to the regulatory regime surrounding Oregon forest practices, including aerial pesticide spray.

b. On September 24, 2019, the Secretary found that the First Round IPs do not comply with constitutional procedural requirements. On October 11, 2019, two of the Forest Waters

c. Petitioners filed a legal challenge to the Secretary's finding on the First Round IPs and the challenge is now pending in the Oregon Court of Appeals.

d. On October 2, 2019, the Forest Waters Petitioners filed three more initiative petitions that the Secretary would assign numbers 45, 46, and 47 (the "**Second Round IPs**," and together with the First Round IPs, the "**Forest Waters IPs**"). The Second Round IPs include most of the substantive provisions of the First Round IPs, but exclude certain provisions to comply with the Secretary's finding on the First Round IPs.

e. On November 5, Jim James, Scott Russell, and Neil Westfall (the "**Landowner Petitioners,**" and together with the Forest Waters Petitioners, the "**Petitioners**") filed initiative petitions that the Secretary would assign numbers 53, 54, and 55 (the "**Landowner IPs**" and together with the First Round IPs and the Second Round IPs, the "**Initiative Petitions**"). IP 53 would require state compensation for certain regulations. IP 54 would alter the procedure for adopting new forest practice regulations. IP 55 would change the composition of the Oregon Board of Forestry.

f. On January 13, the Secretary found that IP 54 does not comply with constitutional procedural requirements.

g. Certified ballot titles for the Second Round IPs, IP 53, and IP 55 have all been appealed to the Oregon Supreme Court (the "**Appeals**").

B. The Cooperating Parties acknowledge that they have an incentive to reach a compromise on historically difficult issues without risking adverse outcomes in an election.

C. The Cooperating Parties believe that any compromise must be built on mutual trust and respect, and to that end must achieve the following overall goals:

a. Greater business certainty: Provide a greater level of certainty to forest landowners and industries that depend on Oregon forests without compromising the viability of Oregon's manufacturing infrastructure.

b. Greater environmental certainty: Provide a greater level of certainty for the survival and recovery of threatened and endangered species, and ensure that drinking water, and aquatic resources are protected.

c. Process to resolve future issues: Provide a durable framework and process leading to substantive outcomes to address current and future issues related to achieving greater business certainty and greater environmental certainty as described herein that is outside the initiative process and legal system.

d. Complete a stand-down from pursuing changes through the initiative process, related legal actions, and certain other relevant legislative and regulatory proceedings while the facilitated process is working.

D. The Cooperating Parties stand to gain by pursuing an alternative path informed by science with a mutual willingness to compromise that achieves high quality environmental outcomes and certainty for everyone involved.

NOW, THEREFORE, the Cooperating Parties share the following intentions:

1. The Cooperating Parties will pursue a science-informed policy development process, rooted in compromise, to evaluate and jointly recommend substantive and procedural changes to Oregon forest practice laws and regulations as outlined below:

    a. A mediated series of meetings over the course of no more than eighteen months. The object of these meetings is to finalize a plan to prepare an application to the federal services through changes to Oregon's Forest Practices Act and implementing regulations that will provide a rational basis for an approvable Habitat Conservation Plan, or other mechanism for federal regulatory assurances, covering listed salmonids and other aquatic and riparian-dependent species.

    b. The mediated meetings will include representatives of the federal services and relevant state agencies.

    c. The mediated meetings will include discussion of forest practices that impact waters of the state and at risk species including, but not limited to, forest roads, near-stream operations, and steep/unstable slope activities affecting streams.

    d. The Cooperating Parties will develop their final plan so that interim legislation implementing the agreements reached will be enacted on or before the February 2022 Legislative session. Such implementing legislation will include:

        i. Elements that decrease the risk to listed species and the aquatic resources upon which they rely while increasing certainty and durability of forest practice laws and regulations going forward.

        ii. An adaptive management component that involves a rigorous look at the efficacy of existing and future forest practice regulation, and a science-driven process for analyzing the need for any changes.

        iii. Recognition of the potential for disproportionate impacts to small forest landowners and provision for alternative compliance paths and mitigation of financial impacts.

        iv. A sunset for the 2022 legislation if the federal services fail to issue a final record of decision approving a statewide habitat conservation plan, or other federal mechanism for regulatory assurance, by December 31, 2027, or the incidental take permit is otherwise revoked on appeal.

    e. The Cooperating Parties will present an update on the mediated process and their progress toward accomplishing goals during the 2021 Legislative session.

f. The Cooperating Parties recognize the importance of forestry and aquatic resources to Native American tribes, and understand that the state and federal governments will consult with tribal governments on these issues as this process moves forward and any resulting policy changes.

2. The Cooperating Parties will observe the ground rules attached as Exhibit A, and any other ground rules mutually agreed to in the subsequent mediation. The Cooperating Parties will publicly support:

    a. Pesticide spray legislation that includes the components described in the attached Exhibit B.

    b. Enabling legislation for the process described in Section 1 that includes public funding for third party or public staffing and technical resources.

    c. Legislation that directs the Board of Forestry to extend as interim rules the 2017 salmon, steelhead and Bull trout stream rules to the Siskiyou Georegion at the soonest possible date consistent with current administrative procedures, and suspension of the Siskiyou riparian review process. These rules may be changed as part of the implementing legislation envisioned by 1.d. above.

3. The Cooperating Parties will agree to a mediator to facilitate the process described in Section 1.

4. Provided the legislation described in Section 2 passes the Oregon legislature no later than March 9, 2020, and the Cooperating Parties agree to the mediator in Section 3, the undersigned will:

    a. Endeavor to cause:

        i. The Petitioners to withdraw and terminate the Appeals and any then-pending litigation concerning the Initiative Petitions, except for litigation regarding the First Round IPs, which the Forest Waters Petitioners intend to prosecute to final resolution in the normal course.

        ii. The Forest Waters Petitioners to withdraw the Forest Waters IPs, except that this subsection will not apply to the First Round IPs until the associated litigation is fully and finally resolved.

        iii. The Landowner Petitioners to withdraw the Landowner IPs.

        iv. The Petitioners to close any political action committee connected to the Petitions.

    b. Testify before the Board of Forestry in support of suspending work on the coho rulemaking, and opposing any new petitions for resource site protection rulemakings for aquatic species, during the pendency of this process or the passage of the 2022 Legislative session, whichever concludes earlier.

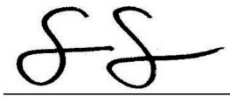
c. Encourage the Board of Forestry to analyze the safety and efficacy of aerial pesticide application by unmanned aerial vehicle if and when such technology becomes commercially viable.

d. Not initiate or support new proposals for regulation of aerial pesticide applications on Oregon forestlands until the earlier of (i) the Cooperating Parties ceasing work on an approvable Habitat Conservation Plan pursuant to Section 1(a) above, or (ii) December 31, 2027.

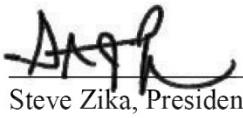
5. Except as provided in Section 1.e., the expressions of intent set forth in this Memorandum of Understanding, although containing an agreement in principle, shall not be binding on the Cooperating Parties.

[SIGNATURES BEGIN ON FOLLOWING PAGE]

COOPERATING PARTIES



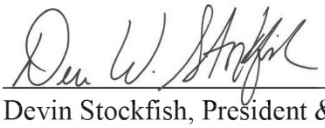
Sean Stevens, Executive Director
Oregon Wild



Steve Zika, President & CEO
Hampton Lumber



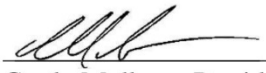
Bob Van Dyk, Policy Director for Oregon
Wild Salmon Center



Devin Stockfish, President & CEO
Weyerhaeuser



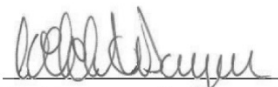
Mary Scurlock, Coordinator
Oregon Stream Protection Coalition



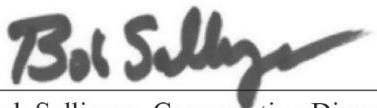
Grady Mulbery, President & CEO
Roseburg Forest Products



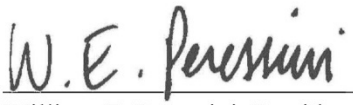
Lisa Arkin, Executive Director
Beyond Toxics



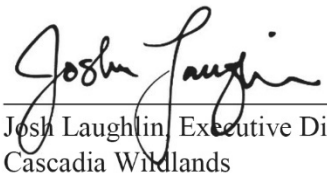
Todd Payne, President & CEO
Seneca Sawmill Company



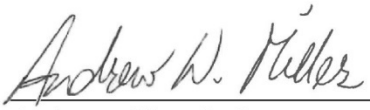
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Audubon Society of Portland



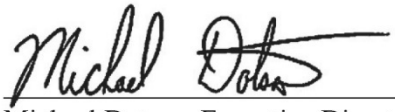
William E. Peressini, President & CEO
Hancock Natural Resource Group



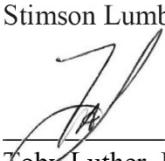
Josh Laughlin, Executive Director
Cascadia Wildlands



Andrew Miller, CEO
Stimson Lumber



Michael Dotson, Executive Director
Klamath Siskiyou Wildlands Center



Toby Luther, President & CEO
Lone Rock



Glen Spain, Northwest Regional Director
Pacific Coast Federation of Fishermen's
Associations



Jeff Nuss, President & CEO
Greenwood Resources

Chandra Ferrari, Senior Policy Advisor
Trout Unlimited

John Gilleland, CEO
Campbell Global

Stan Petrowski, Board Representative
Umpqua Watersheds

Randy Hereford, President & CEO
Starker Forests, Inc.

Bob Rees, Executive Director
Northwest Guides and Anglers

Tom Ringo, President & CEO
Pope Resources

Stacey Detwiler, Conservation Director
Rogue Riverkeeper

Court Stanley, President, US Forestry
Port Blakely

Doug Moore, Executive Director
Oregon League of Conservation Voters

Jim James, Executive Director
Oregon Small Woodlands Association

EXHIBIT A
Ground Rules

Each of the participants to these discussions agree to these ground rules:

1. We will attempt to develop a system which provides:
* Minimum guarantees for everyone;
* Incentives which maintain and enhance timber, fisheries and wildlife resources;
* Future flexibility, accountability, better management, compliance with regulations and resource goals.
2. All participants in the negotiation are to bring with them the legitimate purposes and goals of their organizations. All parties recognize the legitimacy of the goals of others and assume that their own goals will also be respected. These negotiations will try to maximize all the goals of all the parties as far as possible.
3. This effort will receive priority attention, staffing and time commitments.
4. Give the same priority to solving the problems of others as will your own.
5. Commitment to search for opportunities: without creativity there will be no plan or agreement.
6. Commitment to listen carefully: ask questions to understand and make statement to explain or educate.
7. All issues identified by any party must be addressed by the whole group.
8. State needs, problems and opportunities, not positions — positive candor is a little-used but effective tool.
9. Commitment to attempt to reach consensus on a plan.
10. Commitment to be an advocate for an agreed plan.
11. Attempt to protect each other and process politically with constituencies and general public.
12. Weapons of war are to be left at home (or at least at the door).
13. Anyone may leave the process and the above groundrules, but only after telling the entire group why and seeing if the problem(s) can be addressed by the group.
14. All communications with news media concerning these discussions will be by agreement of group. Everyone will be mindful of the impacts their public and private statements will have on the climate of this effort.
15. No participant will attribute suggestions, comments or ideas of another participant to the news media or non-participants.
16. All rights, remedies, positions and current prejudices are available to everyone if the effort is unsuccessful.
17. Participants are free to, and in fact are encouraged to, seek the best advice from their friends and associates informed of the progress of the discussions.
18. All of the individuals who are participants accept the responsibility to keep their friends and associates informed of the progress of the discussions.
19. If you hear a rumor, call facilitator before acting on it.

EXHIBIT B
OREGON FOREST HELICOPTER PESTICIDE LEGISLATION COMPONENTS

Initial Notification

1) Concerned Oregonians (each, a "**Recipient**") may register with the Oregon Department of Forestry ("**ODF**") to receive notifications of nearby helicopter applications of pesticides (as defined in ORS 634.006 (8)), but not including helicopter applications of fertilizers, by providing to ODF (a) a description of the relevant parcel (b) proof of residency on that parcel, and (c) contact information, including the Recipient's mailing address, email address, and phone number. These parcels ("**Flagged Parcels**") will be reconciled by ODF with tax lots that will be flagged in a geospatial layer maintained within ODF's Forest Activity Electronic Reporting and Notification System ("**FERNS**"). Similarly, a person in control of the surface water intake for a permitted water right, or who owns and operates a spring box that the person certifies is an exempt use of Oregon water (each, a "**Water User Recipient**"), may register with ODF to receive notifications of helicopter pesticide applications by providing to ODF (a) the Global Positioning System ("**GPS**") coordinates of the intake or spring box, (b) proof of the Water User Recipient's ownership or control of the intake or spring box, and (c) contact information, including the Water User Recipient's mailing address, email address, and phone number. ODF will log the location of the registered intakes or spring boxes (the "**Flagged Water Sources**") in FERNS.

2) For all notifications of helicopter pesticide applications on forestlands, the operator must identify a ninety-day window within which the operation will occur (the "**Application Window**"). Operations outside the Application Window would require a new notification. All notifications of helicopter pesticide applications on units with at least one Nearby Recipient (as defined below) must be made at least thirty days prior to conducting an operation, unless the operation was previously notified within the same calendar year and not completed, in which event the operation must be notified at least one week prior to conducting an operation (notwithstanding ORS 527.670(9)).

3) Today, when a landowner or operator files a notification with FERNS, it produces a list of intersects with other resources and regulatory layers (e.g., streams, resource sites). Under the proposed legislation, for all helicopter pesticide applications, FERNS would create for the notifier a list of (a) all Recipients with a Flagged Parcel within one mile of the boundary(ies) of the proposed operation(s), and (b) all Water User Recipients with a Flagged Water Source within one mile of the boundary(ies) of the proposed operation(s) and within the same drainage basin (each described by (a) and (b), a "**Nearby Recipient**"). The landowner and/or operator would have the first opportunity to reach out to any Nearby Recipients in person, but two weeks following the notification, FERNS would automatically generate an email to each Nearby Recipient notifying them of the proposed operation, the Application Window, and the contact information for the landowner and operator.

4) All notifications of helicopter pesticide application should only list pesticides reasonably likely to be used.

Real-Time Notification

5) To perform a helicopter pesticide application on any given day, a landowner and/or operator must, prior to 7:00 pm on the preceding day, make an election within FERNS to perform a helicopter pesticide application the following day (a "**Go Election**"). The Go Election may be made for single or multiple units within each notification (a single notification frequently contains many units). A Go Election will immediately prompt an email to each Nearby Recipient within one mile of the boundary of the relevant unit(s), notifying them of the possibility of an application the following day. A Go Election would not require the operator complete an application the following day. Provided that the application would still occur within the Application Window, an operator may make a Go Election on multiple or succeeding days.

Post Application Completion Reporting

6) Within 24 hours of completion of a helicopter pesticide application, an operator must identify within FERNS the units completed. FERNS will offer the operator the list of the operator's units for which a Go Election was made from which the operator may select the completed units.

7) All units identified by the operator for helicopter pesticide application in FERNS will be designated "available," "pending," or "completed." During an Application Window, but prior to a Go Election, a unit will be designated as "available." Between a Go Election and the reporting required by the preceding section, a unit will be designated as "pending." A unit for which the operator has reported a completion will be marked as "completed." If an operator does not make any report following a Go Election, then at 11:59 pm on the second day following the Go Election the unit will automatically be re-designated as "available."

8) An operator who makes a Go Election and then makes a helicopter pesticide application but who does not timely report the unit's completion shall be subject to graduated penalties for each day they fail to report, that begin with a warning, and increase to $1,000 for the second day in a single season, and $5,000 for each additional day in a single fall or spring spray season.

9) The legislation would (a) explicitly provide a mechanism for the request of daily spray records by state agencies, law enforcement, and licensed health care providers by request to the Pesticide Analytical Response Center (b) require production of daily spray records within twenty-four (24) hours of request to the operator, (c) require production of any unit spray pattern data, including but not limited to any GPS information within five (5) business days of request, (d) increase financial penalties for failure to timely produce a daily spray record or flight path data upon request, and (e) provide that such information is not otherwise public record subject to request.

Penalties for Interfering with Helicopter Pesticide Applications

10) Any person who intentionally interferes with a helicopter pesticide application may be ticketed for a violation with a presumptive fine of $1,000 for the first offense, and $5,000 for any additional offense within a five-year period, and may be liable to the operator for any actual damages resulting from the interference or other remedies available at law. Any interference by a Nearby Recipient shall be deemed to be intentional. There shall be a rebuttable a presumption that any interference is intentional if caused by a Recipient or a Water User Recipient who registers a Flagged Parcel or Flagged Water Source pursuant to Section 1 above.

Miscellaneous

11) The "go-live" date for the foregoing software enhancements for FERNS would be no less than one year following the enabling legislation. The "go-live" date may be extended twice in six-month increments should the state Chief Information Officer, in consultation with the Cooperating Parties, determine that the software enhancements are not ready for use in the field. Until the "go-live" date, current rules will continue to apply.

12) Particularly with respect to the Real-Time Notification and Post Application Reporting described above, ODF would be specifically instructed to create an application for iPhone and Android that is convenient to use on a cell phone in the field anywhere a data connection is available.

13) Software development would require adequate funding.

14) The legislation would establish helicopter pesticide application buffers (no direct application zones) of 300 feet around inhabited dwellings and schools that are not owned by the landowner receiving the application and around any Flagged Water Source within the same 6th level hydrologic unit. Inhabited dwellings and schools have the definitions currently appearing in Oregon Department of Forestry Guidance for ORS 527.672 Aerial Herbicide Applications dated May 25, 2018, but would exclude trespassers.

15) The legislation would, subject to any product label or federal law requiring more stringent standards, establish the following helicopter pesticide application buffers (no direct application zones) adjacent to streams on forestland governed by the Oregon forest practices act:

    a) On fish bearing streams and on Type-D streams, the larger of (i) the riparian management area as of the implementation date of the buffers required by Section 2(c) of the Memorandum of Understanding to which this Exhibit B is appended., (ii) the required vegetated buffer, or (iii) 75 feet; and,

    b) On flowing Type-N streams that are not Type-D streams, 50 feet.

16) The provisions of sections 14 and 15 above will go into effect on January 1, 2021.



APPENDIX B: DELINEATING LANDSLIDE AND DEBRIS FLOW SUSCEPTIBILITY

Appendix B. Delineating Landslide and Debris Flow Susceptibility in Western Oregon in Support of the Private Forest Accord

TerrainWorks, January 27, 2022

Governor Brown states that "*this agreement* (the Private Forest Accord, PFA) *will help to ensure that Oregon continues to have healthy forests, fish, and wildlife, as well as economic growth for our forest industry and rural communities, for generations to come*"[10]. To meet these goals requires an understanding of how human interactions with the landscape will affect forests, fish, and wildlife for generations to come. In

[10] https://www.oregon.gov/newsroom/pages/NewsDetail.aspx?newsid=64523

Oregon, landslides and timber harvest are important components of this interaction. This document presents an overview of the background, approach, and methods concerning the prediction of landslide and debris flow susceptibility in Western Oregon. The focus here is on fish, and hence on interactions between landslides, forests, and river-stream environments.

1.0 Background

The ecology of river systems is driven by spatial and temporal variations in water flow – the flow regime (Poff et al., 1997). River ecology also responds to variations in channel and riparian morphology (Montgomery, 1999; Vannote et al., 1980). Sediment supply is an important control on this morphology, so the ecology of river systems is also driven by spatial and temporal variations in sediment supply. Numerous studies find that landslides and associated debris flows[11] dominate the supply of sediment to streams in the Oregon Coast and Cascade Ranges naturally, even in the absence of land use (Benda and Dunne, 1987; Swanson et al., 1982). The same is found for mountainous terrain throughout the world (Kirchner et al., 2001; Lehre, 1982; Miller et al., 2002). In these environments, sediment supply varies dramatically in time and space, controlled by the timing and location of landslide events – the disturbance regime (Benda et al., 1998). This disturbance regime is a fundamental factor in the ecology of river systems in these landscapes (Reeves et al., 1995), so knowledge of how this regime functions is necessary to anticipate the consequences of land use decisions.

When they occur, debris flows overwhelmingly alter channels and riparian zones: steep channels may be completely scoured of bed material and riparian vegetation stripped for meters on either side. Deposition can bury channels and riparian zones under meters of debris, destroying whatever habitat was there before. These are the obvious impacts; less obvious is what happens next. Neighboring populations of plants and invertebrates can rapidly recolonize impacted zones, with fish quickly following (Everest and Meehan, 1981; Foster et al., 2020). Loss of riparian trees results in greater insolation with higher water temperatures and increased primary productivity (Kiffney et al., 2004; Lamberti et al., 1991). Riparian vegetation grows rapidly, with shifts in species composition and abundance (Pabst and Spies, 2001), eventually reestablishing shade and lower water temperatures (Johnson and Jones, 2000). Flowing water rearranges sediment in the deposit, reforming pools and other channel features important to fish habitat (Roghair et al., 2002).

Each debris flow event can dramatically alter local channel and riparian environments, initiating a decades-long trajectory of changing vegetation and aquatic habitat conditions. Each event affects only a small part of the channel network, but there may be thousands of debris flow sites, so the temporal sequence, spatial distribution, and abundance of debris flows sets, in part, the patterns of riparian and channel habitat diversity within a basin (Swanson et al., 1998). Large storms can simultaneously trigger vast numbers of landslides and associated debris flows (Robison et al., 1999; Turner et al., 2010). Particularly if associated with widespread forest disturbance such as wildfire (Benda and Dunne, 1997a, b), these spates of landsliding might produce changes in habitat type throughout an affected basin, potentially shifting for example, bedrock-dominated systems to

[11] Landslides in Oregon often involve failure of shallow soils, typically less than 2 meters in depth, overlying bedrock on steep slopes. If the failed debris enters a topographically constrained channel on the hillslope, it can evolve into a fluidized slurry of mud, rocks, and logs, called a debris flow (also a debris torrent), that can travel long distances downslope, in some cases to deposit in channels and debris fans on the valley floor.

channels buried in gravel (Reeves et al., 1995). Gravel is essential for spawning, but too much results in loss of surface water during low-flow seasons with consequent fish mortality (May and Lee, 2004). In debris flow terrain, the history of debris flow events acts in part to determine the abundance, distribution, and diversity of channel and riparian habitat types, both within a basin and across a region, a dynamic regime that fish species occupying these environments have evolved to capitalize on (Flitcroft et al., 2016; Miller et al., 2008; Naiman et al., 1992; Reeves et al., 1995).

Debris flow deposits also form an important geomorphic template for channel systems. These deposits create fans and terraces that strongly influence stream and associated habitat characteristics (Benda et al., 2003a; Benda et al., 2004; Grant and Swanson, 1995; May and Gresswell, 2004). The large wood and boulders carried to the valley floor with these deposits create sources of roughness in channels that can persist for centuries (Benda, 1990). Large wood and boulders create flow diversions that form pools and obstructions that store sediment, adding to habitat diversity (Beechie and Sibley, 1997; Montgomery et al., 1996; Nakamura and Swanson, 1993; Roni et al., 2006). Thus, accumulations of boulders and large wood found at debris flow fans (Bigelow et al., 2007), even in the absence of any recent debris flow events, are associated with locally increased sediment accumulations and pool abundance (Benda et al., 2003).

Debris flow-triggering landslides primarily occur during intense rainstorms (Robison et al., 1999; Turner et al., 2010). Forest cover reduces landslide potential through the tensile strength provided by dense mats of roots (Schmidt et al., 2001) and by modulating peaks in soil pore pressures during storms (Dhakal and Sullivan, 2014; Keim and Skaugset, 2003; Keim et al., 2004). Loss of forests to wildfire, disease, and windstorms can thus locally increase storm-driven landslide rates for a decade or more until tree cover is re-established (Sidle and Ochiai, 2006). The cadence of landsliding across a basin is thereby driven by the sequence and spatial distribution of storms and forest disturbances. Timber harvest can alter this cadence by increasing landslide rates with consequent increases in sediment supply to streams (Benda and Cundy, 1990; Ketcheson and Froehlich, 1978; Montgomery, 1994; Oregon Department of Forestry, 2006; Reid and Dunne, 1984; Robison et al., 1999; Swanson et al., 1987; Swanson and Fredriksen, 1982; Swanson et al., 1977; Turner et al., 2010). Landslides have typically been viewed as hazards in the context of forestry activities (Benda and Cundy, 1990; Montgomery et al., 2000; Sidle et al., 1985) and mitigation is a high priority at locations where lives and property are at risk, as reflected in Oregon Forest Practice Rules (OAR 629-623-0000 through 0800, Forest Practices Technical Note Number 2 and Number 6).
Debris flow interactions with forests affect channels in a variety of ways. Large trees carried to channels by debris flows provide long-term sources of roughness, serving to enhance sediment retention and pool formation (as described above), but the relative importance of these debris flow sources for overall channel morphology varies with the availability of large wood from riparian zones: the proportion of large wood from debris flows increases as the supply of large wood by channel-adjacent tree fall decreases (Montgomery et al., 2003). In industrial forests, which may currently lack riparian sources of large wood due to past timber harvests, debris flows can thus provide the only source of wood large enough (e.g., > 0.6m diameter) to effectively alter channel morphology and create fish habitat in many channels.

This highlights the importance of riparian sources of large trees and of a supply of large wood for recruitment by debris flow for establishing and maintaining channel morphologies conducive to development of high-quality habitat. Debris flows pick up down wood that accumulates in the steep headwater channels they traverse (May and Gresswell, 2003). Wood from trees and sediment falling

into these channels accumulates over time, until a debris flow scours accumulated material and transports it downstream. Some portion of the accumulated wood is lost to decay, but wood buried in these small channels can persist for long periods. May (2002) found that the volume of wood in debris flow deposits increased with longer runout length and that the diameter distribution of pieces in the deposit was independent of tree size in the stand traversed, indicating that much of the wood in the deposit originated from down wood from pre-harvest stands stored in the traversed channel. The size distribution and abundance of trees in currently growing stands adjacent to debris flow-prone headwater channels today thus dictate the size of wood carried to fish-bearing channels by debris flows in the future. Likewise, once a debris flow occurs, accumulation of sediment in the scoured channel initially occurs upslope of trees that fall into the channel (May and Gresswell, 2003). Scoured channels lacking sources of large wood to act as sediment dams may persist as passageways for water-transported sediment to downstream channels.

Forests also affect debris flow runout. Large wood incorporated into a debris flow from standing and down trees reduces runout length (Booth et al., 2020; Ishikawa et al., 2003; Lancaster et al., 2003; May, 2002). Debris flow volumes tend to increase with runout length, so deposit volumes tend to be larger for debris flows that traverse stands of smaller trees (May, 2002).

Historical context is also an important factor when evaluating the effects of landslides on channel environments in western Oregon. Streams and rivers in the Coast and Cascade Ranges have a history of splash dams and log drives between the mid-1800s and the early twentieth century (Miller, 2010b; Phelps, 2011; Sedell and Luchessa, 1981). These required the removal of wood jams and rocky obstructions from channels. The lack of riparian buffers, in association with logging through the 1970s, led to slash and debris entering streams. This motivated the practice of stream cleaning, which continued until the late 1970s (House and Boehne, 1987). Between 1956 and 1976, the Oregon Game Commission removed large wood from channels for the mistaken purpose of enhancing fish habitats and passage (Oregon Department of Forestry, 2003). These activities have contributed to the generally low volumes of large wood in Western Oregon streams today.

These past practices caused many channels to be scoured to bedrock (Miller, 2010a) and the lack of large wood now further contributes to lower volumes of gravel storage (Montgomery et al., 2003). Consequently, in-channel restoration efforts often place log structures in streams (Banks et al., 2001; Oregon Department of Forestry, 2003) to catch sediment and stream-transported wood and to create pools. Boulders have also been placed in channels to mimic debris flow deposits and to enhance habitat complexity (Mueller, 2009). The artificial deposits of wood and boulders have been shown to create larger pool areas and to attract higher densities of juvenile coho and trout (Roni et al., 2006). Ultimately, strategies for habitat restoration and maintenance in a managed landscape must seek to identify and preserve the processes and process rates that create and maintain needed habitats (Beechie et al., 2010).

Recognition of the ecological role of landslides and debris flows has led to calls to modernize the management of steep slopes in Oregon. To maintain the shallow-rapid landslide processes and rates that create and preserve habitats in fish-bearing streams, one approach is to reduce the amount of timber harvest on landslide-prone terrain. Another is to maintain sources of large wood along the corridors traversed by debris flows (Burnett and Miller, 2007). These approaches have been adopted by Oregon State Forest Management Plans and by HCPs that are in development as of 2021 on State Forest Lands, the Elliott State Forest, and private commercial forests (Private Forest Accord).

Together, these HCPs involve over 50,000 km^2 of forest lands in Oregon. Effects of forest management on landslide processes and consequences for fish habitats are important issues in all three. The approach and methods described below were developed with the recognition that landslides and debris flows are intrinsic drivers of ecological processes in these landscapes. The models are applied to quantify landslide initiation and runout potential to aid in development of prescriptions for forest management acting in concert with ecological processes.

2.0 Predicting Shallow Landslide and Debris Flow Runout

Development of models for predicting locations of shallow landslides and debris flow runout in Western Oregon began in the early 1990s (Benda and Cundy, 1990). By the mid-1990s, digital elevation models were being employed for predicting susceptibility to shallow failures (Montgomery and Dietrich, 1994). Comprehensive landslide inventories (including landslides under forest canopy) following the large 1996 storms in the Coast Range (Bush et al., 1997; Robison et al., 1999) were used to build empirically calibrated landslide susceptibility and debris flow runout models (Miller and Burnett, 2007, 2008). The advent of these tools, combined with the newly available higher-resolution digital elevation models (DEMs) from LiDAR, led to calls to identify and protect upland landslide and debris flow sources of large wood to fish streams (Burnett and Miller, 2007; Reeves et al., 2016). As part of the PFA prescriptions for steep slopes, the models of Miller and Burnett (2007, 2008) are being used to delineate areas susceptible to shallow failures and the runout of debris flows delivering to fish-bearing streams.

The Miller and Burnett (2007) model of shallow landslides is based on recognized causes of shallow landslide initiation in the Coast Range (Dietrich and Dunne, 1978; Dunne, 1991; Montgomery and Dietrich, 1994; Pierson, 1977). Shallow landslide potential is defined in terms of a topographic index that is based on hillslope steepness, planform curvature, and critical drainage area (area per unit contour length) (Miller and Burnett, 2007). Landslide locations from the field-based landslide inventories (Robison et al., 1999) were used to calibrate the index for the purpose of associating landslide susceptibility (in terms of landslide density, number per km^2) to terrain attributes and forest cover. Landslide susceptibility is quantified in terms of the relative proportion of all landslides predicted to occur within particular topographic zones.

The Miller and Burnett (2008) model of debris flow runout is used to identify stream channels susceptible to traversal and deposition from debris flows. The model integrates susceptibility to landslides (as described above) into debris flow initiation and estimates of runout probability. Thus, the two models are coupled. Critical parameters for predicting debris flow runout include channel steepness, channel confinement, tributary junction angles, and rates of debris scour and deposition (Miller and Burnett, 2008). For a watershed, the model predicts channel susceptibility to debris flow traversal in terms of the proportion of total debris flow-track length expected within any subset of headwater streams (Burnett and Miller, 2007). The Miller-Burnett model is used to rank channels in terms of relative frequency of traversal by debris flows that travel to fish-bearing channels. In the PFA prescriptions, the Miller-Burnett models were used to: 1) identify source areas for landslides and debris flows that could potentially travel to fish-bearing streams, and 2) identify travel paths for debris flows that could deliver sediment and large wood to those streams. The modeling is intended to identify and rank specific landslide initiation source areas and debris flow runout in headwater channels in USGS HUC 4th field (8-digit) basins. This basin size was selected to match the NOAA-

Fisheries designations for watersheds that contain ecologically significant independent populations of coastal coho salmon in the Oregon Coast Range.

3.0 Model Application

3.1 Creation of a Synthetic River Network and Virtual Watershed

Basin hydrography is represented in digital form as a synthetic network, a stream layer in GIS (**Figure 1**), derived from high-resolution (1-m) Lidar-generated DEMs. Delineated channels must accurately follow actual channel courses, they must extend upstream to include channelized portions of potential debris flow corridors, and they must include attributes for determining likelihood of fish use and flow duration (perennial flow).

The DEM-traced channel courses follow geomorphic indicators of channel presence derived from the DEM. These indicators are used by the US Geological Survey for elevation-derived updates to the National Hydrographic Dataset[12] and include plan curvature (Florinsky, 2016) and flow accumulation calculated using the D-Infinity flow-direction algorithm (Tarboton, 1997). We preclude dispersion of flow along channelized flow paths, so once the criteria for channel initiation are met, D-8 flow directions are used (Clarke et al., 2008), in which flow path out of a DEM cell is directed to one of the eight adjacent cells. This introduces a bias for flow paths that do not follow one of these eight directions, which is corrected by tracking deviations along traced flow paths (Orlandini and Moretti, 2009).
Upstream extent of traced channels is determined using three criteria (Clarke et al., 2008; Miller et al., 2015).

1. Threshold for the product of specific contributing area and gradient squared $(A/b)S^2$, where A = contributing area to DEM cell, b = contour length crossed by flow out of the cell, S = surface gradient, calculated over a length scale appropriate for channel-forming processes (e.g., 20m).
2. Threshold for plan curvature. Topographic evidence of a channel is manifest as a crenulation in a contour line, defined as plan curvature. High curvature measured over a length scale appropriate for resolving a channel is interpreted as evidence of a channel.
3. Threshold for flow length. The hillslope length scale over which the $(A/b)S^2$ and plan curvature thresholds must be met.

The product of contributing area and gradient squared is representative of the erosion potential of processes that create channels (Montgomery and Foufoula-Georgiou, 1993). This threshold is determined by plotting threshold value versus channel density on a log-log plot; an inflection in the plot indicates the point where delineated channels extend onto planar (unchannelized) hillslopes (Clarke et al., 2008). This inflection provides a rough measure of the degree to which the DEM can

[12] Methods for derivation of NHD flow paths from high-resolution elevation data are still in development and a citation is not currently available.

resolve valley and hillslope swale features. Plan curvature is a measure of local topographic convergence (i.e., degree of crenulation of a contour line) and serves to further delineate potential channels resolved by the DEM. Finally, these two thresholds must persist for a specified flow length so that small depressions (e.g., tree-throw pits) are not identified as channel initiation sites. The area-slope threshold is calibrated from the DEM; the plan curvature and minimum length thresholds are set subjectively so that traced channels persist upslope to a point consistent with the expected upslope extent of channelized debris flows. Thresholds may be spatially variable to reflect different processes that form channels, e.g., landslides on steep slopes, overland flow and subsurface piping on low-gradient slopes (Clarke et al., 2008). Likewise, threshold values vary regionally, reflecting differences in local conditions and in DEM characteristics.

The channel network is represented digitally as a set of linked nodes; one node for each DEM grid point traversed by each channel (**Figure 2**). This data structure maintains information at the smallest spatial grain available from the elevation data. Channel attributes for each node, such as gradient and confinement, are calculated from the DEM[13]. These attributes are then applied in the models used for the PFA analyses. Fish-bearing streams (anadromous and resident), for example, are delineated using a fish presence/absence model (Fransen et al., 2006), augmented by existing presence/absence survey data. Data attached to other GIS stream data can also be conflated to the synthetic network.

Flow paths are traced from every hillslope DEM cell so that all cells are associated with the channel node they drain to. This provides an explicit linkage between modeled hillslope processes, such as landslide and debris flow runout, and the channels affected by these processes. Collectively, the integrated channel network-terrestrial environment is referred to as a virtual watershed (Barquin et al., 2015; Benda et al., 2015).

The model software implements a hydro-conditioning of the DEM that delineates flow paths out of all closed depressions (Soille, 2004). The DEM itself is not modified, because the original elevation data are necessary to accurately determine channel features. The resulting raster of flow directions provides the information needed for flow routing and creation of the synthetic network. The modeling described below does not require DEMs that were previously hydro-conditioned.

3.2 Delineate Landslide Initiation Sites and Debris Flow Traversal Corridors

Shallow landslides of the type that trigger debris flows tend to occur in particular landscape locations. Landslide initiation locations correlate well with topographic attributes of gradient and specific contributing area, but with contributing area for a DEM cell calculated from within a local radius of the cell. To quantify this correlation, we predict landslide density (number per square kilometer as a measure of susceptibility) as a function of these topographic attributes (Miller and Burnett, 2007).

[13] TerrainWorks has developed and implemented methods to estimate a large variety of attributes; descriptions are available at http://www.netmaptools.org/Pages/NetMapHelp/netmap_tools.htm

The calculated landslide density depends on the number of landslides observed, which varies with the number and magnitude of landslide-triggering storms that occur during the period of observation. Therefore, landslide density is used as a relative measure of spatial variation in susceptibility to landslide initiation. To provide a quantitative measure of susceptibility, landslide density is translated to proportion of landslide occurrences found within any specified area (Burnett and Miller, 2007) (**Figure 3**).

Debris flows tend to scour material and bulk up when traversing steep, confined channels. Debris flow runout length correlates with scoured sediment volume; larger debris flows travel farther (May, 2002). Debris flows tend to lose material to deposition when traversing lower-gradient, unconfined channels and when they change direction at channel junctions (Benda and Cundy, 1990). The probability that a debris flow will reach any point downslope decreases with distance and the rate of decrease is a function of gradient, confinement and changes in channel direction integrated along the flow path (Miller and Burnett, 2008).

From each DEM cell with a calculated landslide density greater than zero, the "*Debris Flow Traversal Areas"*[14] are traced downslope to a fish-bearing channel or until the calculated probability of continued runout goes to zero. If the probability is greater than zero at the intersection of the flow path with a fish-bearing stream, the value is assigned to the originating DEM cell. For all cells along the runout path, this prediction is then used to calculate the probability that a debris flow-initiated upslope traverses the cell and continues to a fish-bearing stream (**Figure 4**). Traversal probability increases as the number and initiation potential of upslope initiation sites increases (**Figure 5**).

The predicted probability of *Debris Flow Traversal Areas* is used to delineate the expected path lengths of debris flows and to estimate the proportion of debris flow length that occurs within a specified range of traversal probabilities. Headwater, non-fish channel corridors are ranked according to the proportion of future debris flow lengths (modified from Burnett and Miller, 2007). For example, from the PFA negotiations, "*Designated Debris Flow Traversal Areas"* include those with a modeled proportion in the upper 50% (**Figure 6**). Over any period, only a portion of these channels will experience debris flows, but those within the 20% bracket should contain 20% of the total debris flow-track length within the basin and these channels should have the highest debris flow-track density (length of debris flow track divided by total length of channels in this bracket). Likewise, channels in the 20-50% bracket should contain 30% of the total debris flow-track length observed in the basin and have a lower debris flow-track density than the 20% bracket, and a higher density than any higher percentage brackets.

As described above, loss of forest cover can increase landslide initiation potential and increase debris flow runout lengths. The influence of forest cover is included in the Miller and Burnett (2007, 2008) landslide-initiation and debris flow-runout models. To characterize debris flow source areas and traversal corridors for the PFA modeling, a uniform mature forest cover is applied. Model outcomes thus focus on the immutable controls of topography on landslide initiation and debris flow runout. Use of mature forest cover also focuses on those forest conditions associated with the lowest landslide susceptibility and the shortest debris flow-runout lengths. These are the conditions sought

[14] Terms in italics are also used in Chapter 3 of the PFA Report.

with use of riparian and upslope leave-tree buffers. If the models were run with a different forest cover, no forest for example, as long as the applied forest cover is uniform – the same everywhere – model outcomes used for the PFA would vary little because the PFA prescriptions rely on predicted relative rates. If the calculated rates change the same amount everywhere, the relative values remain the same. If the models were run with spatially variable forest conditions, model outputs would change: predicted traversal probabilities would increase, and the associated debris flow corridor, subbasin, and source-area designations would be altered. The degree of alteration would depend on the spatial distribution of forest types. A uniform forest cover was used for the PFA modeling to provide a single delineation of process zones and relative process rates for designing prescriptions, rather than delineations that would vary a bit with each proposed buffer strategy.

The Miller-Burnett models were originally calibrated to the 1996 storm data (Bush et al., 1997; Robison et al., 1999) with topographic attributes derived from line-trace 10-m DEMs. The LiDAR DEMs available now provide much greater accuracy and precision for resolving topographic features. For application to the PFA, the models should be recalibrated using the best-available digital data.

3.3 Ranking Landslide Initiation Areas for Sediment Delivery to Fish-Bearing Streams

Each DEM cell with modeled landslide density and probability of delivery greater than zero (**Figure 6**) is assumed to lie within a potential landslide – debris flow initiation site. The volume of material within a debris flow that travels to a fish-bearing channel is estimated for each potential initiation site. Debris flow volume is assumed to change with travel length through the flow path (starting from the initiation point)[15], increasing through zones with a modeled probability for scour (a function of channel gradient and confinement) and decreasing through zones with a modeled probability of deposition (Miller and Burnett, 2008). The rate of increase is assumed to be proportional to travel length weighted by the probability of scour. The rate of sediment decrease is proportional to travel length weighted by the probability of deposition. The volume deposited in a fish-bearing channel is the volume scoured to that point minus the volume deposited. This represents deposit volume for a single debris flow event.

Estimates of single-event volumes are useful for anticipating the degree to which single events may impact the receiving channel and for ranking source areas in terms of the potential magnitude of those impacts. It is also useful to examine these volumes in the context of the frequency with which the events are likely to occur. Over time, a small-volume event that occurs more frequently may provide as much sediment to the fish-bearing channel as a large-volume event that occurs infrequently. We can expand this perspective to the population of sites across a basin to characterize landslide source areas in terms of the total flux of sediment and wood carried to the fish-bearing network by landslides and debris flows over any increment of time. Frequency of occurrence provides an estimate of the probability that an event will occur within any time interval: if the average frequency for an initiation site is once every 100 years, then the probability of an event in

[15] Lacking data otherwise, we assume the volume per unit length of the initiating landslide is similar to the average volume per unit length available for scour along the runout path.

any year is 0.01. When we look at delivery of sediment to fish-bearing channels over some interval of time – a year, a harvest rotation – from a population of sites, we can translate relative frequency to likely number of events: in any year, or over a harvest rotation, we are likely to see a higher proportion of high-frequency sites triggering debris flows than low-frequency sites. The total flux of sediment and wood to fish-bearing channels within a basin thus depends on both the likelihood of occurrence and the event volume associated with all potential initiation sites. To characterize spatial patterns in the rate at which source areas deliver material to fish-bearing streams, we need to account for both the volume and likelihood of occurrence of a delivering debris flow from each potential initiation site. We do this by multiplying the modeled single-event volume for each site by the estimated probability of landslide occurrence and debris flow delivery in any year, or equivalently, dividing by the recurrence interval. This gives a modeled mean annual volume delivered to the fish-bearing network for each initiation site. We can then rank initiation sites in terms of their likely contribution to the annual basin-wide supply of sediment and wood by debris flow to the fish-bearing channel network.

The volume deposited in the fish stream is thus translated to an average annual volume by dividing it by the estimated recurrence interval of the debris flow depositional event. This average annual volume is then assigned to the originating DEM cell. The recurrence interval is a function of the modeled landslide density and runout probability and is therefore assumed proportional to the calculated probability of traversal. Intervals are typically on the order of centuries to millennia for an individual initiation site (Benda and Dunne, 1987; Montgomery et al., 2000; Reneau and Dietrich, 1991). Traversal by debris flows through downslope channels may occur considerably more frequently, because these channels receive debris flows from multiple upslope initiation sites, so recurrence intervals for debris flow deposition in valley-floor streams may be considerably shorter: decades to a couple of centuries. The constant of proportionality relating probability of traversal to a recurrence interval was set so that the average estimated recurrence for debris flow deposition at 2nd- and 3rd-order channel junctions matched those estimated from other studies (Lancaster et al., 2010; May and Gresswell, 2004) (**Figure 7**).

The average annual volume is summed across all DEM cells in potential initiation sites (with delivery to fish streams) within specific non-fish headwater catchments called "*Designated Debris Flow Traversal Areas*". These subbasins are associated with the predicted highest 20% *Debris Flow Traversal Areas* (**Figure 8**). This gives a modeled mean annual material flux by debris flow to fish-bearing channels for each *Debris Flow Traversal Area Subbasin*. DEM cells within potential initiation sites in each subbasin are ranked according to the modeled, time-averaged mean annual delivered volume. A cumulative distribution is created by summing the ranked values, from smallest to largest. The value for each DEM cell thus indicates what proportion of cells within the subbasin have smaller time-averaged mean annual delivered volumes, or what proportion have larger volumes by subtracting from one. This ranking thus delineates zones within each *Debris Flow Traversal Area Subbasin* in terms of the proportion of the total modeled mean annual sediment volume carried by debris flows to the fish-bearing channel at the base of the subbasin. These zones are referred to as "*Sediment Source Areas*".

For the negotiated PFA prescriptions, *Sediment Source Areas* that contribute the highest 33% of the proportion of time averaged delivered sediment from each *Debris Flow Traversal Area Subbasin* to fish streams, and are greater than ¼ acre in size, are further classified as "*Designated Sediment Source Areas"* (**Figure 9**).

The *Designated Sediment Source Areas* are further delineated to identify those zones within them having the highest modeled susceptibility to initiation of delivering debris flows. This susceptibility is calculated in a manner similar to the ranking of source areas by modeled delivered volume (following the methods described in Burnett and Miller, 2007): the product of modeled landslide density and delivery probability is calculated for each DEM cell in the *Designated Sediment Source Area*. This gives the spatial density of initiation sites for landslides that can trigger debris flows that travel to the fish-bearing stream at the mouth of the subbasin. DEM cells are then ranked from low to high density, the density values are summed to obtain a cumulative distribution, and the distribution is divided by the total. The resulting values delineates zones, ranked by potential for initiation of a delivering landslide, in terms of the proportion of all delivering debris flows originating from within each *Designated Sediment Source Area*. The zones containing the most susceptible fifth (20%) of these initiation sites are referred to as *Trigger Sources* (**Figures 9 and 10**). These *Trigger Sources* are used to differentiate sensitivity to logging within *Designated Sediment Source Areas* during harvest unit layout.

4.0 Summary

To summarize, the models are used to identify two process zones and to rank those zones in terms of process rates:

1. ***Debris Flow Traversal Areas***. These are headwater channels with a modeled probability of traversal by a debris flow originating upslope that continues to a fish-bearing stream downslope. Flowing water through these ephemeral channels generally lack the transport capacity to move the sediment and wood that falls into them, so this material accumulates over time until picked up by a debris flow. Riparian zones along these corridors are thus source areas for wood carried by debris flows to fish-bearing streams. Over any period of time, only a portion of the identified debris flow traversal corridors will be traversed by a debris flow; the corridors are ranked by the modeled probability that they will be traversed. This probability is expressed in terms of the proportion of the total debris flow-track length included within any subset of the corridors, starting from those with the greatest probability of traversal. This measure provides a physical quantity with which to interpret and test model predictions: 20% of observed debris flow track length should lie within those channels ranked from zero to 20%; 50% of the track length should lie within those ranked from zero to 50%, and so on. The modeled proportion is related to the relative frequency of traversal: channels in lower percentage brackets experience more frequent debris flows.
2. ***Sediment Source Areas***. The surface area draining to each debris flow traversal corridor is delineated from the confluence of the corridor with a fish-bearing stream. The delineated area defines a subbasin within the much larger 4th-field HUC analysis basin. Within each subbasin, the initiation sites for debris flows that can carry material to the fish-bearing stream at the subbasin mouth are identified. These are the sediment source areas for that subbasin. Ideally, leave-tree buffers intended to prevent increased rates of sediment production will be targeted for those sites from which initiated debris flows will deliver the most sediment; these buffers are intended to prevent increased rates of landsliding caused by timber harvest in those zones. To identify those zones, the source areas are ranked in terms of the proportion of material

carried to the fish-bearing stream originating from each initiation site within the subbasin. The volume of material delivered to the fish-bearing stream varies from year to year; none in most years, a lot in others. Likewise, the volume potentially delivered varies across the source areas; debris flows from some sites are likely to deliver only a small volume, those from other sites can deliver a huge volume. In those years that debris flows occur, the specific sites from which they originate are unknown beforehand, but based on the modeling, it is known which sites are more or less likely to fail. To identify those sites from which increased rates of landsliding will result in the largest increased rate of sediment delivery, we account for both the likely volume of delivered material and the likelihood that a site will fail and trigger a debris flow. To do this, we rank initiation sites in terms of the estimated mean annual volume of sediment delivered: the calculated delivery volume associated with a debris flow event from the initiation site divided by the recurrence interval of delivering debris flows from that initiation site. Summed over all initiation sites within a subbasin, this gives the mean annual volume of debris flow-delivered sediment for the subbasin. The source areas are then delineated into zones based on the proportion of the mean annual total volume originating from within each zone, ordered from highest mean-annual volume to lowest.

Based on relative process rates estimated with the models, the PFA prescriptions identify four specific zones:

1. ***Designated Debris Flow Traversal Areas***. These are the debris flow traversal corridors falling within the greater-than-zero to 50% proportion bracket. According to the current model calibration, these include the headwater channels with the highest probabilities of debris flow traversal and should contain half of the total track length of debris flows that reach fish-bearing streams within the analysis basin (4th-field HUC) over some monitoring period.

2. ***Debris Flow Traversal Area Subbasin.*** Those subbasins draining to *Designated Debris Flow Traversal Areas* in the top 20% bracket are identified as *Debris Flow Traversal Area Subbasins*. These subbasins feed the top-ranked traversal corridors and are therefore expected to produce delivering debris flows more frequently than subbasins feeding lower-ranked corridors.

3. ***Designated Sediment Source Areas***. Within *Debris Flow Traversal Area Subbasins*, the sediment source area zones that contribute the highest 33% of the proportion of mean annual delivered sediment and are greater than ¼ acre in size are classified as "*Designated Sediment Source Areas".*

4. ***Trigger Sources.*** The *Designated Sediment Source Areas* are typically located high in the headwalls of the *Debris Flow Traversal Area Subbasins*, just below the ridge-top landings used for cable yarding of logs out of these subbasins. Leave-tree buffers in these source areas can block access to a large portion of the subbasin, so it is expected that yarding corridors might be placed through some *Designated Sediment Source Areas*. The *Designated Sediment Source Areas* have already targeted those zones where timber harvest would have the greatest expected impact on the rate of sediment delivery out of the subbasin by debris flow, but there is still variability in susceptibility to increased rates of landsliding within these zones. *Trigger Sources* are delineated to identify those *Designated Sediment Source Areas* with the greatest expected sensitivity to tree removal so that needed yarding corridors can be placed through less sensitive zones.

Susceptibility to increased rates of landslide initiation and associated debris flow delivery is based on modeled variability in the spatial density of delivering landslide initiation sites solely within the set of *Designated Sediment Source Areas* in a subbasin. Those *Designated Sediment Source Area* patches containing the top 20% of the initiating sites within all patches in the subbasin are flagged as *Trigger Sources* to flag those most sensitive to placement of yarding corridors.

This set of methods incorporates three key factors for providing information to guide development of forest practice prescriptions in landslide-prone terrain:

1. The linkages between upslope zones of landslide initiation and downslope zones of deposition are explicitly recognized and quantified. The potential for debris flow delivery of material to a fish-bearing stream is calculated for every potential initiation site and the potential for traversal by a debris flow that travels to a fish-bearing stream is calculated for every non-fish channel. Upslope source areas for landslides and debris flow corridors can be ranked by both the potential for landslide initiation and the potential for delivery to a downslope resource.
2. The interaction of all initiation sites and runout zones are explicitly recognized and quantified. A single depositional site in a fish-bearing stream may receive debris flows from dozens of upslope initiation sites. The calculated probability for debris flow traversal of a non-fish channel and deposition in a fish-bearing channel represents the cumulative potential of all upslope initiation sites and runout paths.
3. Results of these linked models are testable. The models predict where a certain proportion of landslide-initiation and debris flow-depositional events will occur. In an adaptive-management context, these methods can be tested and improved using data obtained by monitoring of landslide and debris flow events over time.

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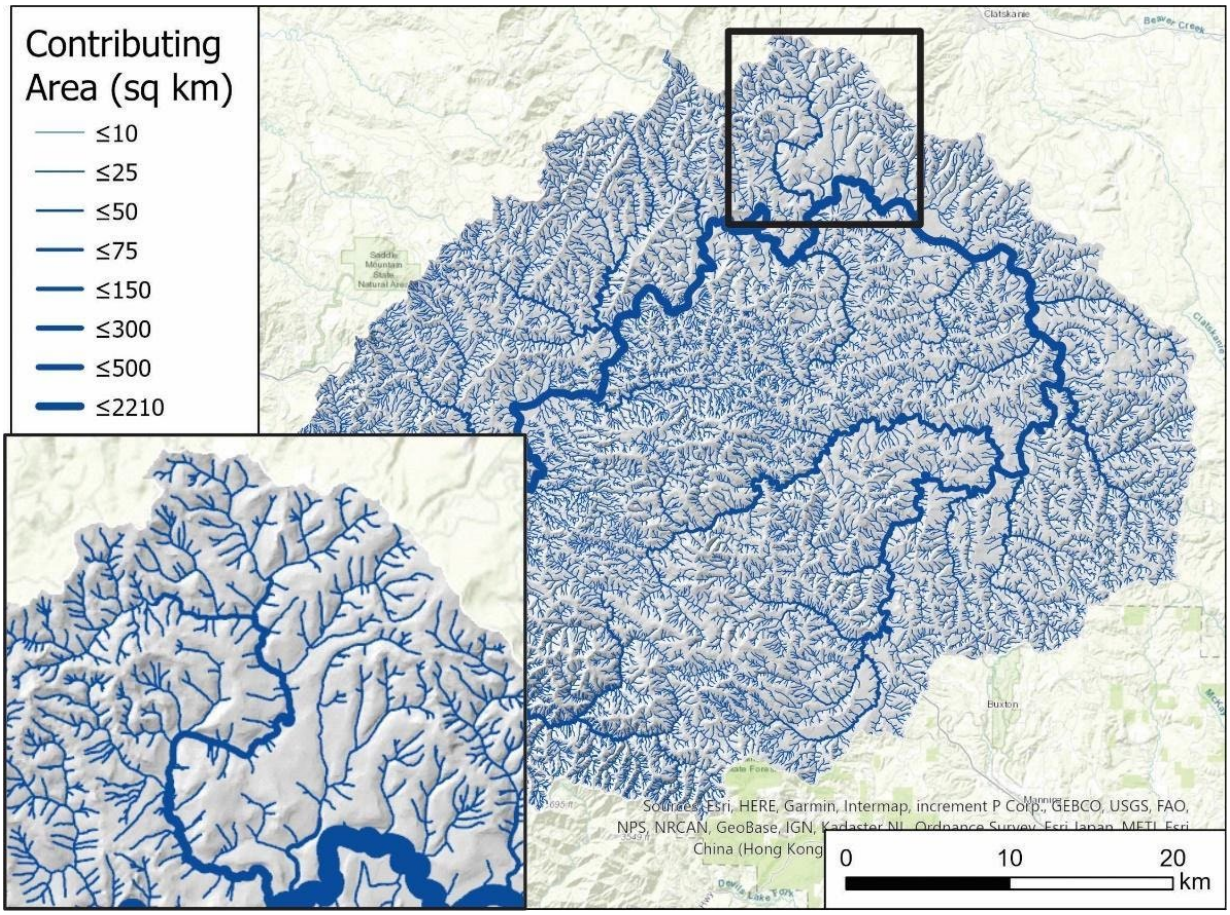


Figure 1. A synthetic stream network is shown for the Nehalem River watershed in northwest Oregon.

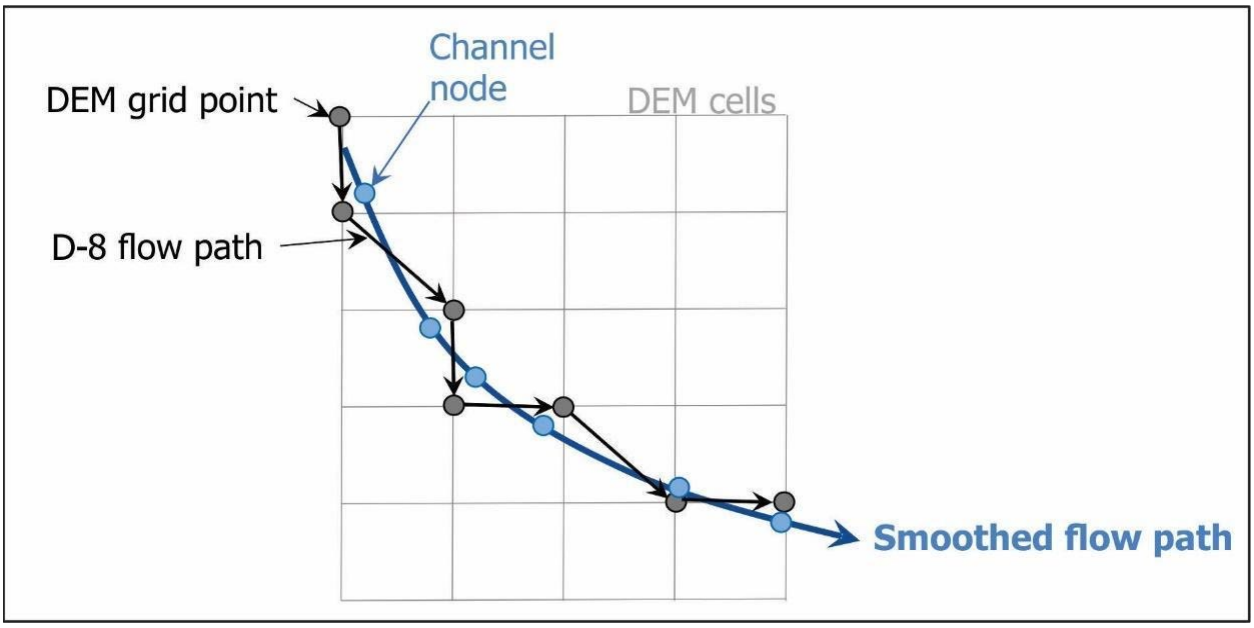


Figure 2. A digital channel network is typically represented in a GIS (Geographic Information System) as a set of connected lines (arcs). Each arc can be assigned a set of attributes, such as channel size and gradient, etc. In the FPA analysis, a synthetic channel network is represented as a set of linked nodes; one node for each DEM grid point traversed by each channel.

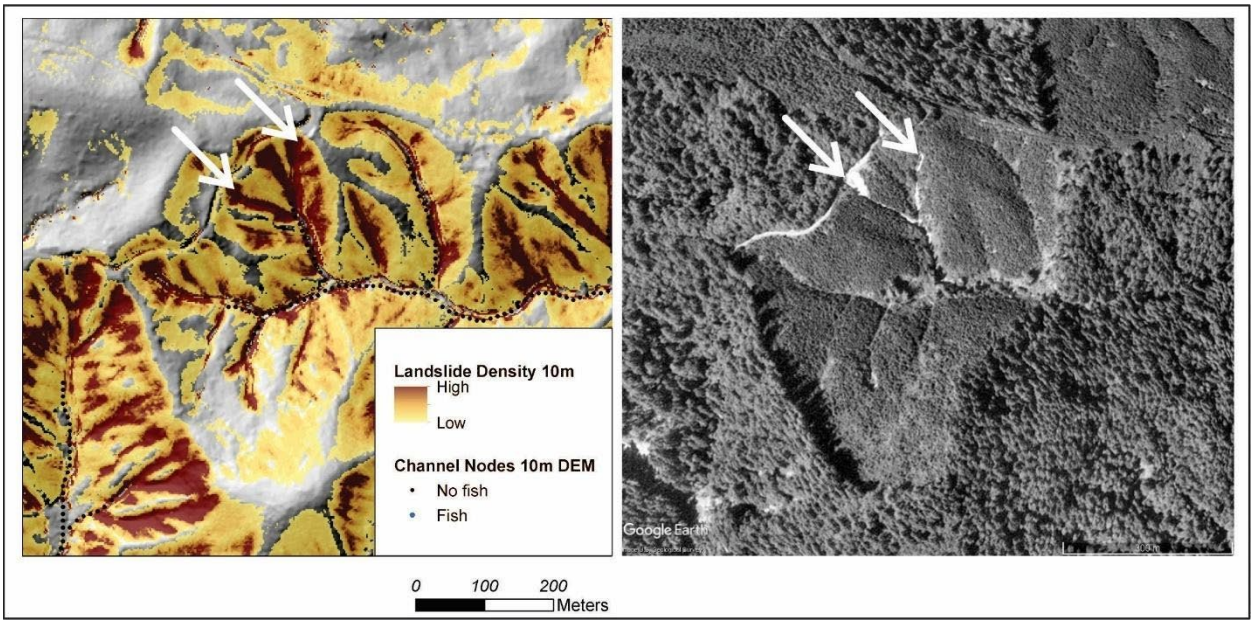


Figure 3. Landslide density (#/km^2) varies with topographic attributes in a coastal Oregon watershed. Topographic locations associated with landslide occurrences have a high density. Example shown is from the central Oregon Coast Range.

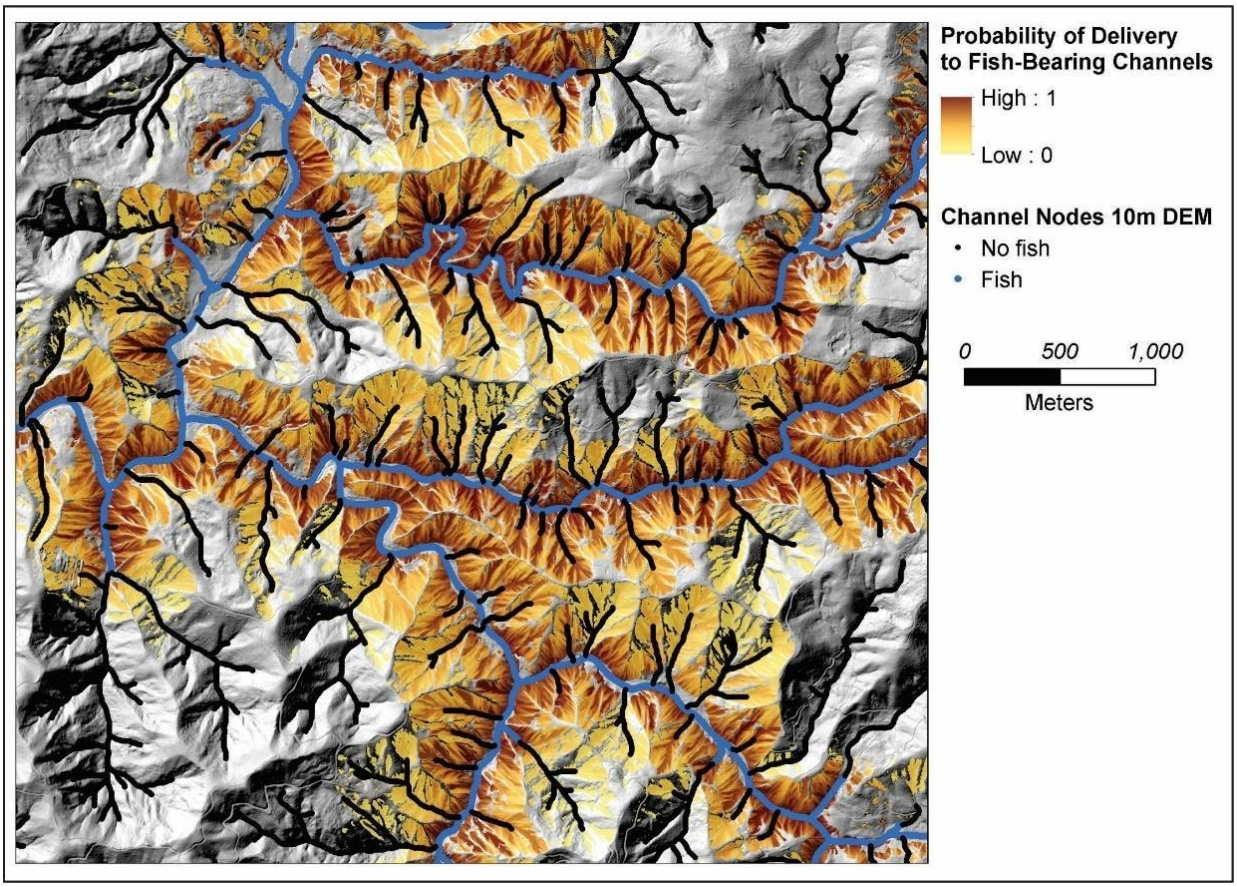


Figure 4. Probability of sediment delivery is calculated for each DEM (2m LiDAR) cell.

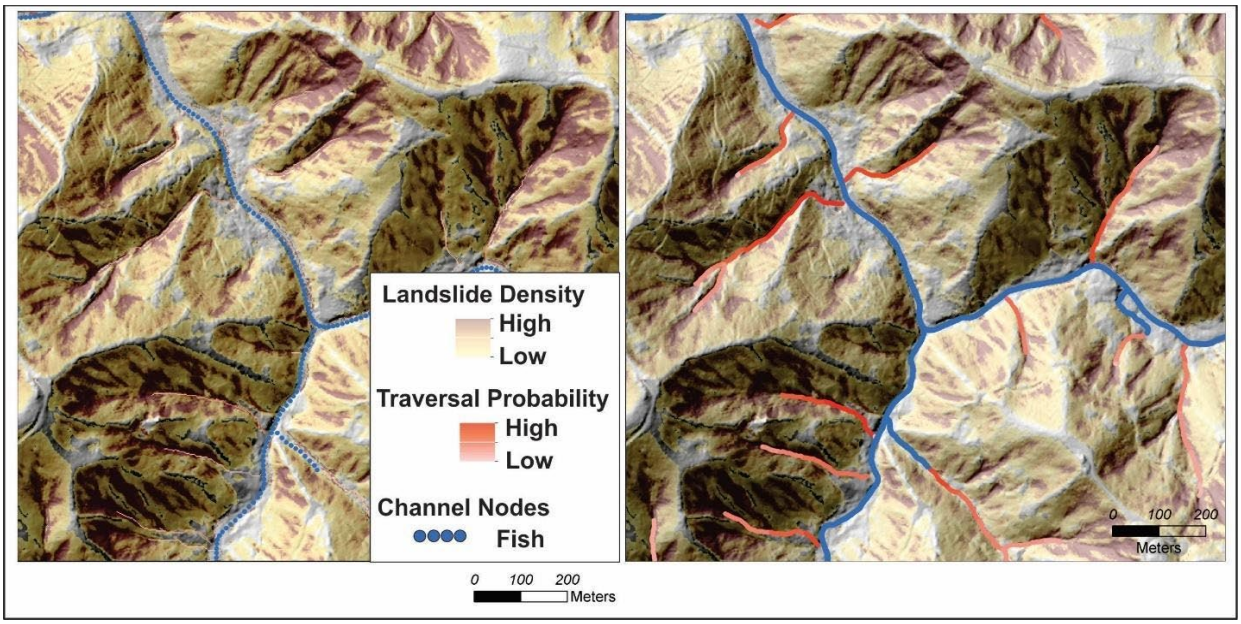


Figure 5. Predicted landslide density (left) and debris flow traversal probability for an area in the Oregon Coast Range using 2m LiDAR DEMs. Flow paths with high probability of being traversed en route to a fish-bearing channel show up as thin red lines. (right) Predictions overlayed onto synthetic stream network; blue lines are fish-bearing channels.

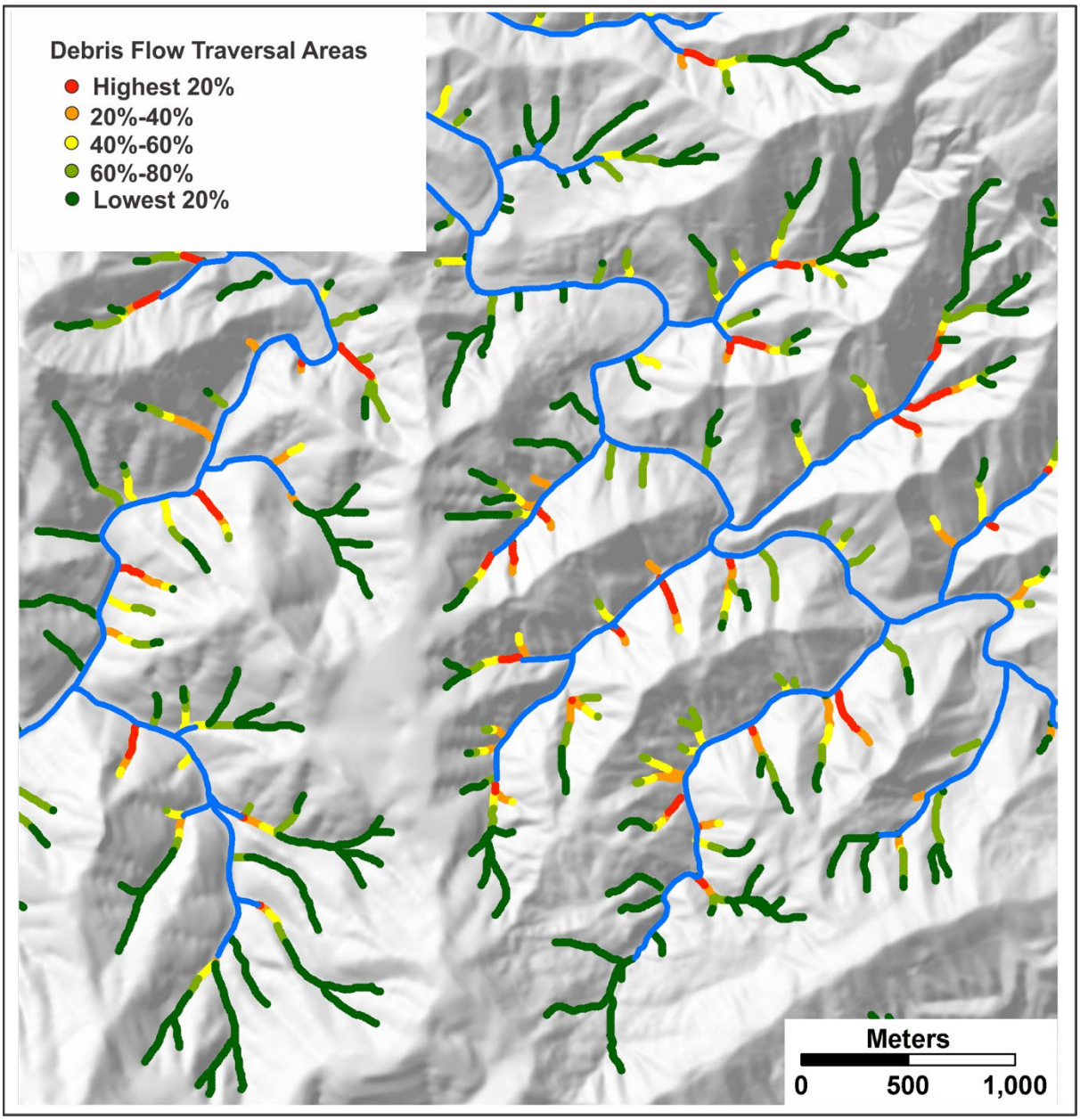


Figure 6. Model predictions of non-fish channels showing proportion of future debris flows that travel to fish streams (*Debris Flow Traversal Areas*). The inset is a cumulative distribution of Debris Flow Traversal Area proportions.

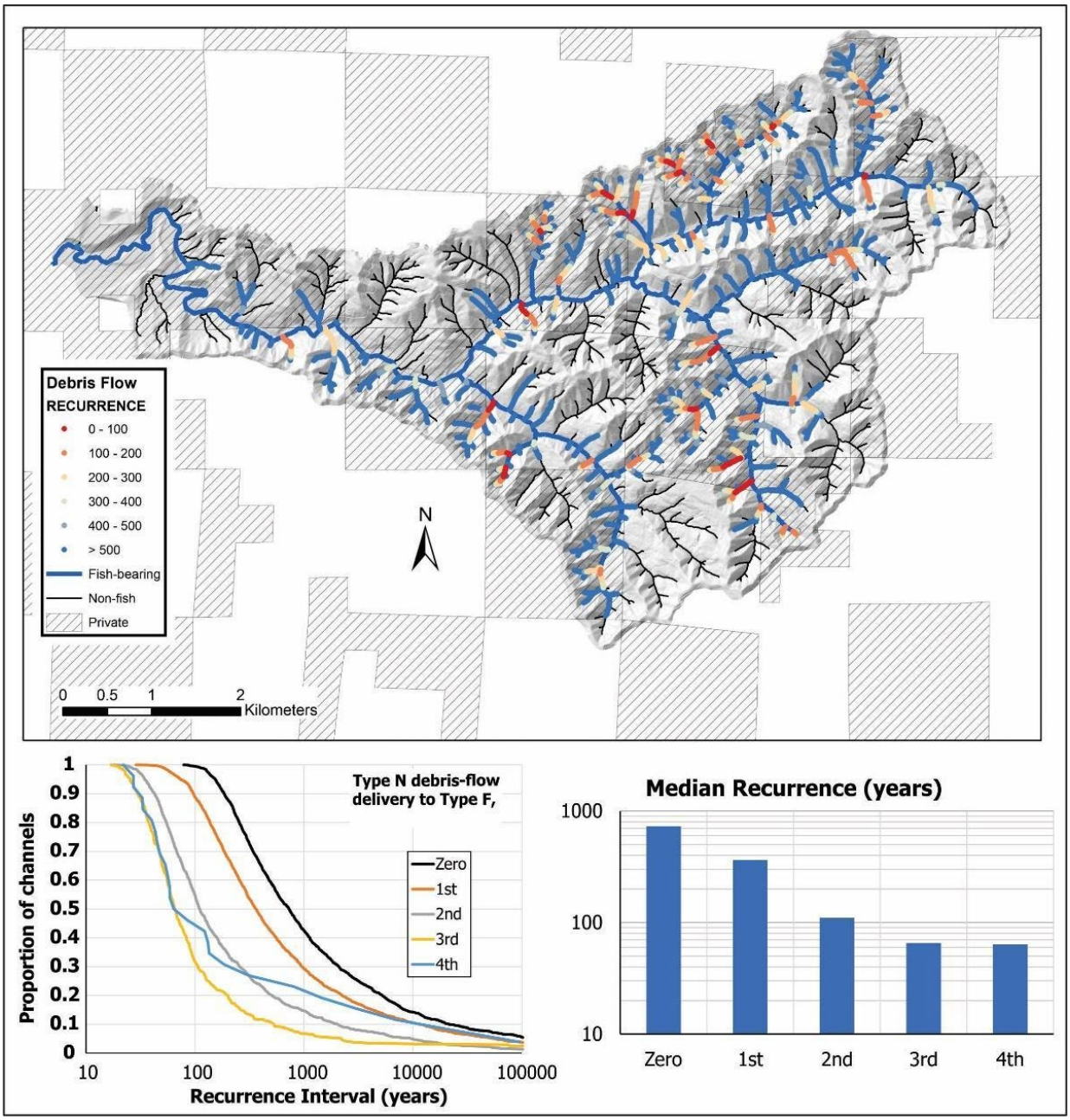


Figure 7. Predicted recurrence intervals of landslides (zero-order) and debris flows in first- through fourth-order channels for a subbasin in the central Oregon Coast Range (Miller, in prep.).

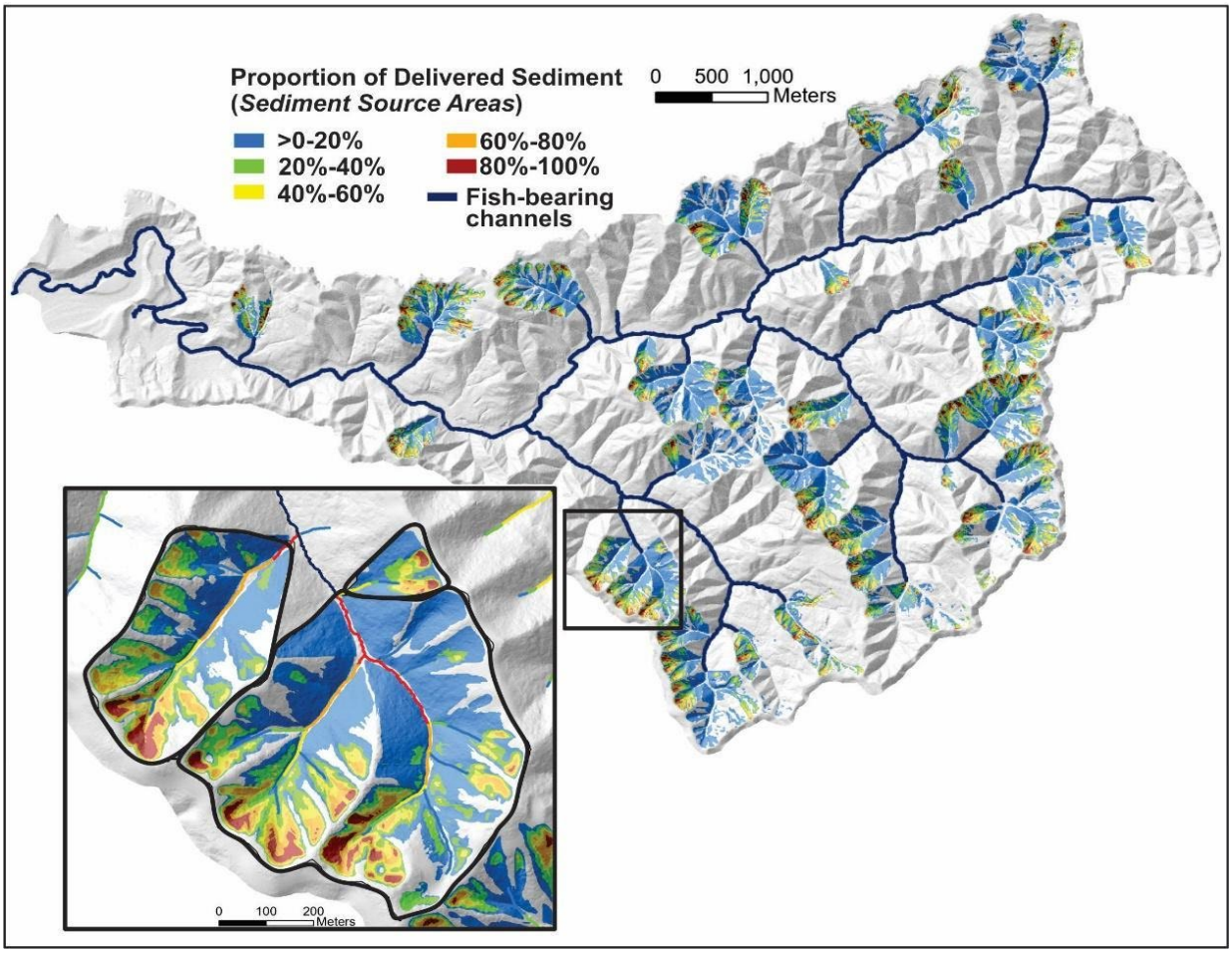


Figure 8. Predicted *Sediment Source Areas* are ranked for debris flow sediment scoured from non-fish channels that deposit into fish-bearing channels specifically for those subbasins that are associated with the highest 20% Debris Flow Traversal Area Subbasins.

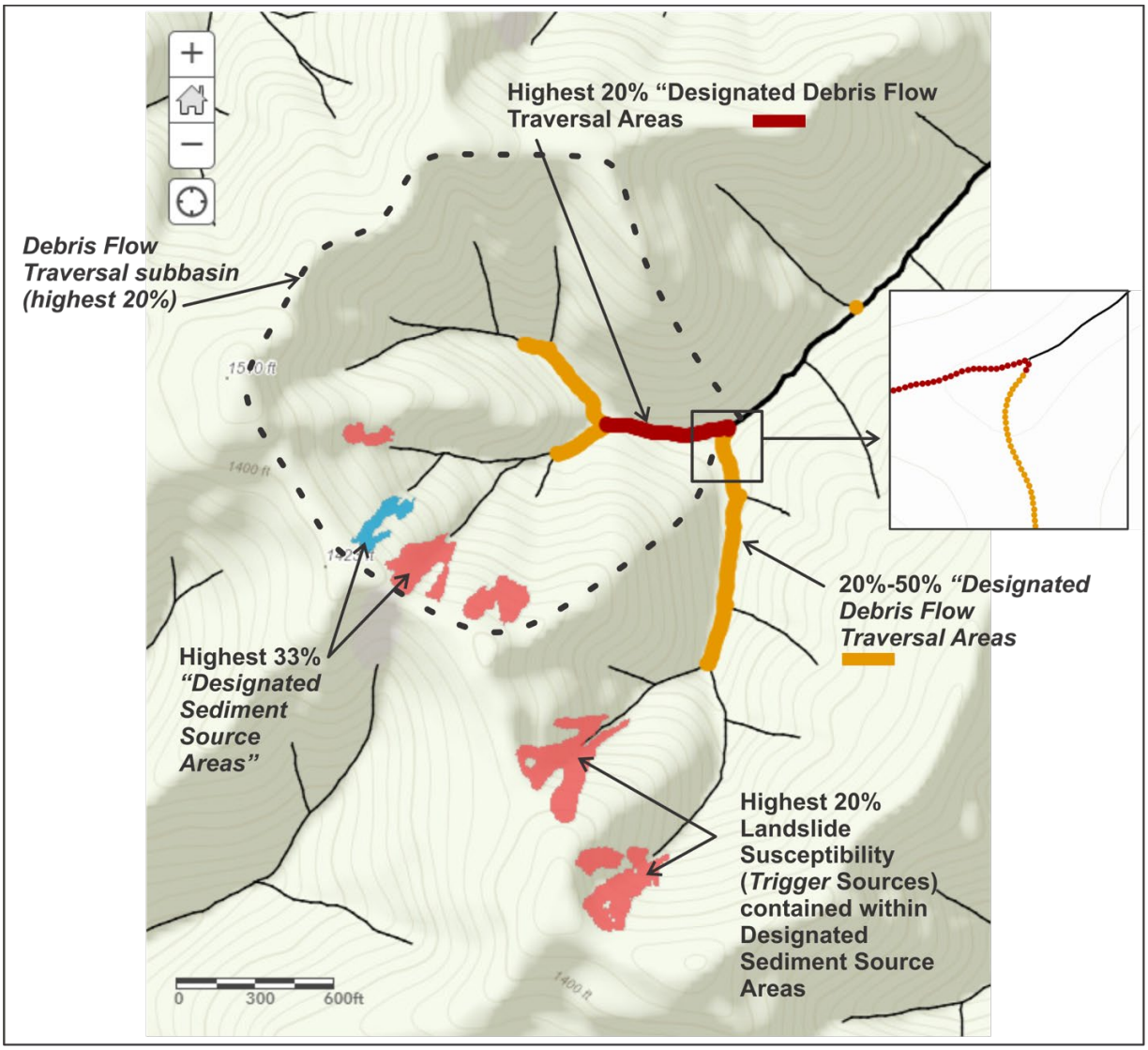


Figure 9. The highest 20% and 20-50% *Debris Flow Traversal Areas* are shown by red and orange channels. The *Debris Flow Traversal Area* *Subbasins* circumscribe the highest 20% *Debris Flow Traversal Areas* (dashed line). Within these specific subbasins, the highest 33% of *Sediment Source Areas* greater than ¼ acre in size are classified as *Designated Sediment Source Areas*. They are indicated as blue and coral polygons. The coral polygons indicate the highest 20% of landslide susceptibility and debris flow volume (*Trigger Sources*). (see Figure 10).

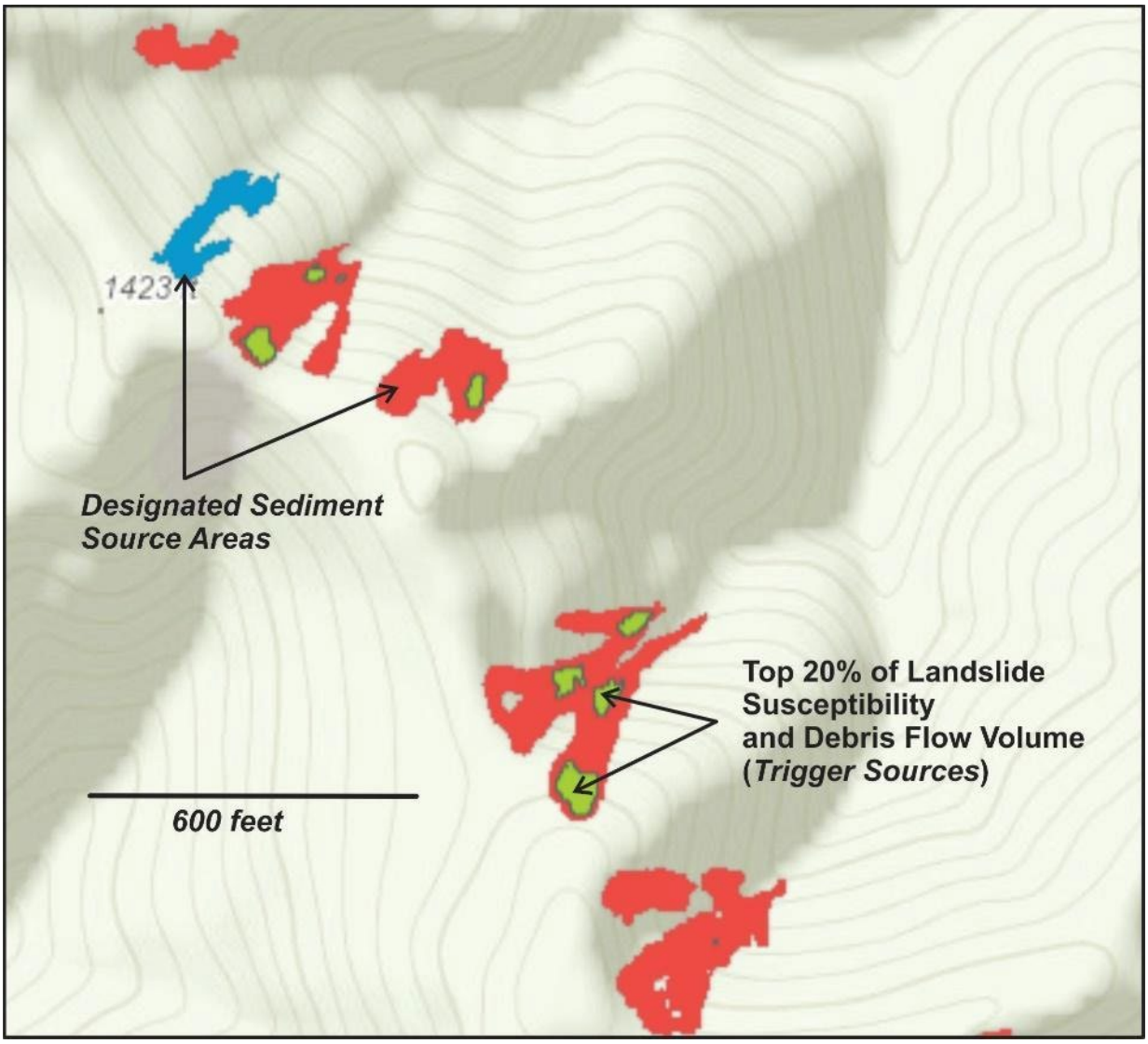


Figure 10. Depiction of designated Sediment Source Areas (blue, coral polygons) showing the highest 20% landslide susceptibility (*Trigger Source*) areas (green).



APPENDIX C: GUIDANCE FOR IDENTIFICATION OF SLOPE RETENTION

Appendix C. Guidance for Identification of Slope Retention Areas from Designated Sediment Source Areas

1.0 Scope

The approach for identifying Slope Retention Areas from model-derived Designated Sediment Source Areas using remote screening tools and field criteria by trained personnel.

1.1 Introduction

The current standard of practice in the Pacific Northwest for identifying landslide hazards and risks associated with proposed forest practices is to couple remote screening and field information. Remote screening traditionally relies on existing air-photo and map-based information to characterize various landforms and other criteria that are correlated with landsliding (e.g., rock type, soil properties, topography, and precipitation). More recently, such information has been

synthesized into empirically calibrated computer models designed to identify potentially unstable slopes. Landforms and other criteria generally serve as proxies for mechanistic parameters (e.g., soil strength, soil depth) and groundwater conditions that control landslide initiation but that cannot be readily observed or evaluated directly over large areas. At the harvest unit scale, field reconnaissance is an important component because some landform boundaries and other relevant features may not be conclusively resolved by a model or remote sensing data. Field protocols typically include observation of topographic, hydrologic, and vegetative indicators of past and potential future slope instability.

For the Private Forest Accord, the Authors agree that outputs of the TerrainWorks model will provide the initial remote screening. The model identifies Designated Sediment Source Areas. From these, 50% will be selected as Slope Retention Areas based on an office screen and a field evaluation. ODF will develop a Technical Note and train (and document the training of) landowner representatives and ODF field personnel to apply the office screen and conduct the field evaluation, including recognizing numeric or narrative geomorphic criteria and field indicators necessary to complete final harvest plans.

This guidance is intended to apply to rules developed in the context of the Private Forest Accord and is not a substitute for regulations, rules, and guidance that apply to the identification of high landslide hazard locations for public safety purposes.

1.1.1 Audience

Landowner representatives, such as foresters, forest engineers, and other field personnel tasked with identifying Slope Retention Areas, where timber harvest is prohibited, from model-identified Designated Sediment Source Areas.

1.1.2 Context

Concern about unstable slopes on private forest lands in Oregon dates to 1982 (Spiesschaert et al., 1982). Forest landowners have been identifying certain landforms for 35+ years in Oregon, Washington, and British Columbia (Chatwin et al., 1994). Over this time, numerous documents have been published that describe unstable landforms specific to the geomorphic history of a given region as well as topographic, hydrologic, and vegetative field indicators of potential or existing slope instability that are common across regions. A partial list is included in section 1.2.1 of this Appendix.

1.1.3 Terminology

Headwalls are clearly identifiable concave-shaped slopes (as seen along the slope contour on the ground surface) that can concentrate water to increase landslide susceptibility. These are steep, unchannelized areas with a strong convergent slope form that are situated at the head of drainages. Headwalls are also referred to as bedrock hollows (in Washington), gullies (in British Columbia), colluvial filled hollows, zero-order basins, and swales. Landslides occurring in these locations are more likely to move as channelized debris flows than landslides that initiate in other areas of the slope (*See* ODF 2019, ODF 2003).

As indicated below, slope gradients consistent with the headwall component of ODF High Landslide Hazard Location Criteria (ODF Technical Notes 2 and 6, *See* ODF 2019 and ODF 2003) will be used.

1.2 Steps for Delineating Slope Retention Areas

Basic steps and field criteria are described below for mapping Slope Retention Areas from Designated Sediment Source Areas. See Chapter 3 of this Report for definitions. Figure 1 provides landform examples.

a. Step 1: Office screen

Use the map of Designated Sediment Source Areas generated by the TerrainWorks model ("Delineating Landslide and Debris Flow Susceptibility in Western Oregon in Support of the Private Forest Accord," TerrainWorks 2022). The mapped Designated Sediment Source Areas represent potential landslide initiation sites that contribute the highest 33% of the proportion of delivered sediment to a designated subset of Type F and Type SSBT streams and are greater than ¼ acre in size. The Designated Sediment Source Areas are further divided into those that contain modeled Trigger Sources, as described (TerrainWorks 2022). Those with Trigger Sources, which are the most susceptible fifth (20%) of sites likely to initiate a high-volume debris flow that delivers to a Type F or Type SSBT stream, are shaded red[16]. Those without Trigger Sources are shaded blue[2].

Within each harvest unit, choose at least half (50%) of the Designated Sediment Source Areas as potential Slope Retention Areas, where timber harvest will be prohibited. Selection should prioritize Trigger Sources (red) over non-Trigger Sources (blue) and larger Designated Sediment Source Areas over smaller ones. These should be distributed throughout the harvest unit consistent with safety, environmental, and operability concerns. Yarding, which may require cutting, but not removal, of trees, is permitted only through Slope Retention Areas that do not contain Trigger Sources, but the number, size, and location of yarding corridors shall be designed to minimize soil and vegetation disruptions that may increase slope instability. Results of this office screen are the Designated Sediment Source Areas to receive a field evaluation and final identification as Slope Retention Areas.

b. Step 2: Field evaluation

In the field, the presence of headwalls **within** a potential Slope Retention Area should be identified. This identification is determined based on narrative (e.g., slope form) and numeric (e.g., slope gradient) geomorphic criteria. Gathering of subsurface information (e.g., soil depth, soil strength, etc.) is not required for determination. Traverse and locate the boundaries of the headwall. These may often be inferred from surface, geomorphic, and vegetative indicators. Headwalls most likely to initiate a shallow, rapid landslide in Western Oregon are steeper than 70 percent, except in the Tyee Core Area, where the headwall is steeper than 65 percent. Measurement should be along the steepest portion of the slope. Clinometers do not give precise slope readings, so when slopes just under the

[16] Colors that appear on final FERNS maps may be different than indicated here.

threshold criteria are measured with a clinometer, these may in fact be areas of concern. Once any headwall is mapped, adjust the boundary of the Slope Retention Area to ensure the headwall is encompassed.

Other field indicators (topographic, hydrologic, and vegetative) as identified in Table 1 can be used to further refine the boundary of a Slope Retention Area to incorporate any other unstable areas. No single field indicator necessarily defines the precise boundary of a Slope Retention Area, but a combination of several can help in delineating a boundary.

Windthrow may be a factor contributing to shallow, rapid landslides. The Operator should consider the wind firmness of trees that are to be left in a Slope Retention Area. Thus, the boundary of a Slope Retention Area may need to be extended to reduce windthrow hazard to retained trees. Crown and bole characteristics, exposure to prevailing storm winds, topographic effects, relative height of trees, and species mix (conifer/hardwood) should be evaluated when determining the boundary of a Slope Retention Area.

Field evaluation may identify safety or ecological impact concerns not present during office screening that may require choosing a different Designated Sediment Source Area as a Slope Retention Area and documenting that decision. Where safety or increased risks to Type F or Type SSBT streams warrant, landowner representatives may select smaller Designated Sediment Source Areas or those Designated Sediment Source Areas without Trigger Sources instead of the standard priorities. Eligible concerns that may warrant selection of non-priority areas to satisfy the minimum 50% Designated Sediment Source Area requirement are that priority areas would: 1) clearly reduce worker safety; or 2) increase ecological impacts resulting from, for example, additional road or landing construction, excessive sidehill yarding, or other yarding practices.

c. Step 3: Apply the appropriate prescription

Once any Slope Retention Area has been thoroughly assessed and the boundaries clearly marked in the field, a written plan must be submitted containing at a minimum:

- Unit map where timber harvesting will occur, including
    - those portion(s) of the operation containing Designated Sediment Source Areas, with Trigger Sources identified, and which of these have been selected as Slope Retention Areas;
    - Identification of those Designated Sediment Source Areas that are eligible for yarding corridors.
- The rationale for selecting specific Slope Retention Areas, including that for choosing non-priority areas to satisfy the requirement of retaining a minimum of 50% of the Designated Sediment Source Areas;

- A map of yarding corridors and documentation that these were designed to minimize impacts;

- Additional information related to the operation, as required or requested by the State Forester.

In summary, the steps for delineating Sediment Retention Areas are as follows:

1. Refer to FERNS map for Designated Sediment Source Area(s)(DSSA) (blue and red polygons) for the proposed harvest unit.

2. Select at least 1/2 of the DSSA (if more than one) for further investigation. Prioritize red (Trigger Areas) over blue polygons, larger over smaller.

3. Identify headwalls ***within*** *the DSSA chosen above, i.e., the potential Slope Retention Areas.*

4. *In the field, identify headwalls and flag final boundaries of Slope Retention Areas.*

5. *Prepare a written plan summarizing application of these steps.*

1.2.1 Field Indicators for Delineating Slope Retention Areas

Topographic indicators

- Steep (>70% gradient) slopes with strong convergence near ridge tops and swales that are unchannelized, commonly spoon-shaped, typically 50-100 feet wide. Usually terminates where distinct channels begin. Convergence should indicate potential for significant concentration of groundwater within the headwall before reaching a defined channel.
- Bare or raw, exposed, non-vegetated soil on steep slopes. This condition may mark the location of a debris flow, or the headwall or sidewall of a slide or evidence of active movement.

Hydrologic indicators

- Seepage lines or spring and groundwater piping. These conditions often mark the contact between high permeability and low permeability soils.

Vegetative indicators

- Split trees and split old growth stumps. These may be associated with tension cracks.
- Hydrophytic (water-loving) vegetation (skunk cabbage, devil's club, salmon berry, etc.) on slopes. These conditions may indicate the presence of groundwater seeps and associated hydrogeologic conditions.
- Patterns of disturbed vegetation such as changes in stand composition (early seral stage or lack of mature trees within a hillslope) or small groupings of alder in a conifer-dominated forest may indicate recent or historic slope failure.

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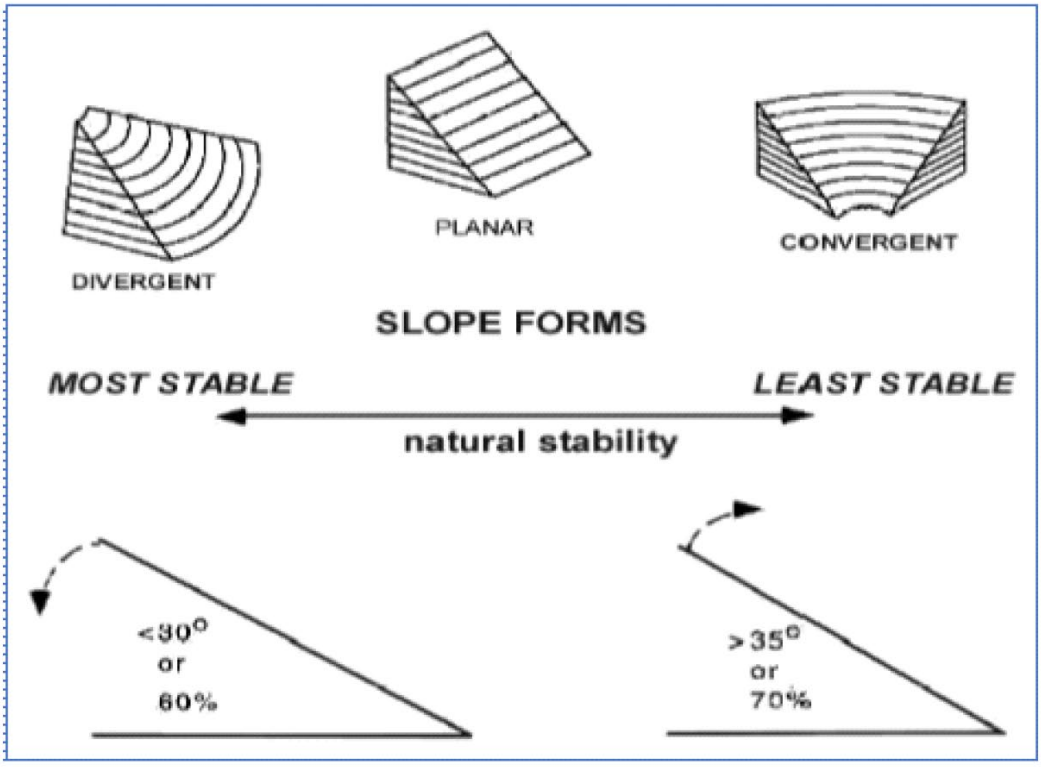
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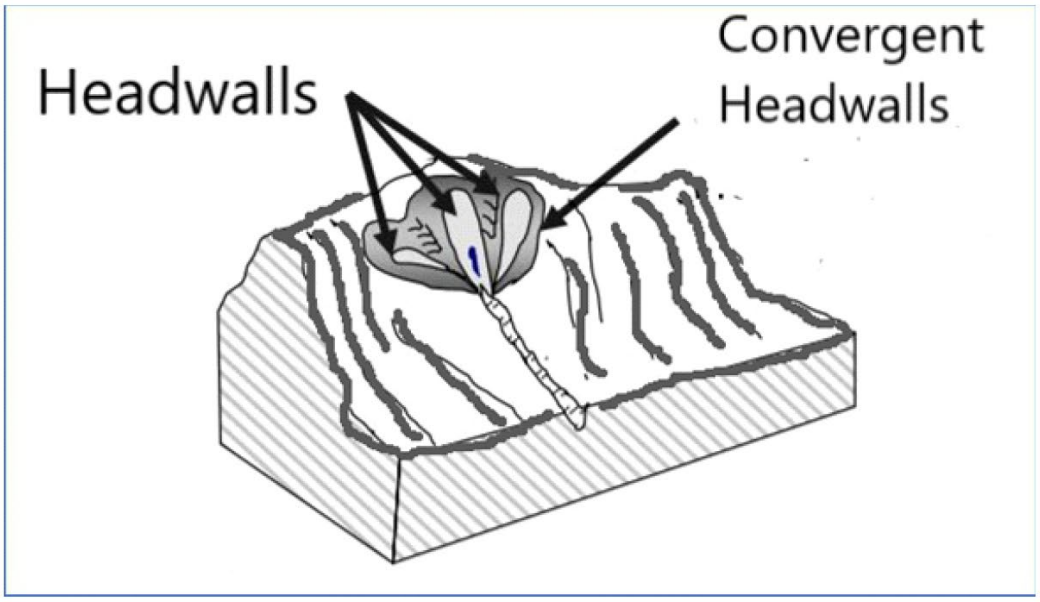
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Headwalls and Convergent Headwalls illustration. Modified from Figure 8, page 16-15, WDNR Forest Practices Board Manual, Section 16, Guidelines for Evaluating Potentially Unstable Slopes

Figure 1.



APPENDIX D: FOREST CONSERVATION CREDIT

Appendix D. Forest Conservation Credit

The Forest Practice Act regulations to be adopted as part of the Private Forest Accord (PFA) include a Standard Practice for large forestland owners and a Small Forestland Owner (SFO) Minimum Option which regulates timber harvests in subject riparian areas. These forest practices will be incorporated into a Habitat Conservation Plan (HCP) which will form the basis of the application for an Incidental Take Permit (ITP), with the goal of providing regulatory stability and assurances to forest landowners.

To incentivize SFOs to implement the Standard Practice, when an SFO adopts the Standard Practice instead of the SFO Minimum Option, the SFO will become eligible to receive a Forest Conservation Credit (Credit) equal to the Stumpage Value (See "Stumpage Value" below) of the additional timber that is retained in the Forest Conservation Area by adopting the Standard Practice. Additionally, a tax credit may be claimed pursuant to Section 5.3.1.3(a)(2).

The process to request and receive a Forest Conservation Credit will be as follows:

1. To become eligible for the Forest Conservation Credit (Credit), an SFO must file a Notification of Operation (Notice) with the Oregon Department of Forestry (ODF) to conduct an eligible Type 1, 2, or 3 timber harvest (as defined under the Forest Practices Act) adjacent to a qualifying riparian area. To be eligible, the harvest area outside the riparian area must be equal in size or larger than the size of the adjacent Forest Conservation Area (as defined in Chapter 5 of this Report). In the Notice, the SFO must include their intent to adopt the Standard Practice for the Forest Conservation Area in lieu of the SFO Minimum Option.

2. An eligible SFO must request the Credit when filing the Notice. The SFO must provide ODF with adequate documentation of the Stumpage Value of the Timber retained in the Forest Conservation Area (Stumpage Value). The Stumpage Value documentation and related costs under this section can be submitted by the SFO to ODF anytime between the date of Notice and three months after the timber harvest has been completed. The effective date of the Stumpage Value is to be the date of the Notice. The SFO is responsible for providing documentation of the Stumpage Value and related costs to ODF in a timely fashion.

3. If the SFO hires a professional forester to determine Stumpage Value, the cost of the appraisal may be submitted by the SFO to ODF to add to the Credit. If the appraisal costs are added to the Credit amount, they may not be deducted for income tax purposes.

4. ODF will timely evaluate and approve the Stumpage Value, add any related landowner costs as provided in this section, issue the resulting Credit to the SFO, and notify the Oregon Department of Revenue of the existence and amount of the Credit issued to the SFO. The effective date of the Credit is to be the date on which the Notice is filed.

5. Once a Credit has been issued for a particular riparian area, the SFO and any future owners must adopt the Standard Practice in that riparian area for a period of 50 years from the date the Notice is filed. Landowners will not be allowed to remove trees from the Forest Conservation Area, except for reasons of public safety or for personal use (e.g., provision of firewood). Landowners should consult with ODF prior to removing trees from the Forest Conservation Area. To avoid the necessity of obtaining surveys of the affected areas, details of the area subject to the management restriction shall be maintained by ODF in the FERNS system and are not required to be included in any deed restriction except to note that there is a restriction on management for the affected property.

6. ODF will provide the SFO a standardized document suitable for filing with the County noting the management restrictions for the riparian area earning the Credit, the amount of the Credit received that creates the restriction, and the expiration date of the restriction. The SFO is responsible for filing this document with the County where the affected areas are located. The fee for recording the deed restriction with the County will be paid by the SFO but may be submitted by the SFO to ODF to add to the Credit amount. If the recording fees are added to the Credit amount, they may not be deducted for income tax purposes. The restriction will remain with the property if and when ownership is transferred to another.

7. Once issued, the Credit will be a permanent multi-year carry forward tax credit until completely used up by the taxpayer or their heirs.

8. If the SFO is taxed as a trust, partnership, or S corporation, the entity can distribute the Credit to its owners or beneficiaries, as appropriate.

9. The Credit may be used by any taxpayer holding the Credit to offset Oregon Income and Estate Taxes. Any unused Credit becomes part of the taxpayer's estate and is transferrable to the taxpayer's heirs.

10. The taxpayer can apply the Credit to their tax liability in the normal way tax credits are used when filing taxes. It is the SFO's obligation to keep a record of the original Credit, the amount of Credit applied in prior tax years, the amount of Credit being applied on the current return, and the amount carried forward to future years. The taxpayer must retain the records as part of their permanent files and provide the records to the Oregon Department of Revenue upon request.

11. The taxpayer is not required to use the Credit against their tax liability in any given year.

12. The Forest Conservation Credit will not be included in the Sunset Clause for other state tax credits. This is to be a permanent tax credit available to SFOs for the duration of the Incidental Take Permit envisioned by the PFA.

13. If a future legislature cancels the Forest Conservation Credit and does not replace it with a similar compensation option for SFOs, all existing Credits held by taxpayers and the related deed restrictions will be retained. All restrictions on SFOs on using the SFO Minimum Option will be removed for riparian areas where a Credit has not been issued. ODF will continue to track use of the SFO Minimum Option without restrictions of its use. A future legislature could reinstate the Forest Conservation Credit and the system would be renewed.

14. If the SFO who originally applied for and received a Credit wishes to use the SFO Minimum Option or remove the restriction on the property deed for the area receiving the Credit, the taxpayer must repay the State any Credit that has been deducted from their tax liability, with interest from the due date of the original return(s) where the Credit was taken and will forfeit any unused Credit. The interest rate shall be the underpayment rate. The repayment amount could be paid directly to the State or be added to the taxpayer's income tax liability. To make repayment to the State, a form specifically for the purpose of repaying the state for the Credit and the appropriate County so that the restriction can be removed will be developed by ODF. Once the repayment has been made, the SFO will inform ODF that the harvest restriction related to the Credit has been removed. ODF will modify the information in FERNS to reflect there is no longer a restriction on that particular riparian area. The SFO will contact the County with the document and the restriction will be removed. SFO will pay recording fees.

15. If a subsequent SFO owner wishes to use the SFO Minimum Option or remove the County restriction from the deed in a riparian area because of a previous owner's actions, the SFO must repay the State for the original amount of the Credit received by the previous owner with

interest from the date of acquisition of the property. The interest rate shall be the underpayment rate. The repayment amount can be paid directly to the State or be added to the taxpayer's income tax liability. To make payment to the State, a form specifically for the purpose of repaying the State and appropriate County that the restriction can be removed will be developed by ODF. Once the repayment has been made, the SFO will inform ODF that the harvest restriction related to the Credit has been removed. ODF will modify the information in FERNS to reflect there is no longer a restriction on that particular riparian area. ODF will provide the SFO with a document to be presented to the appropriate County to remove the restriction. The SFO will contact the County with the document and the restriction will be removed. SFO will pay recording fees.

16. Should an SFO intentionally harvest in a riparian area where a Credit has been issued and a deed restriction prohibits such harvest, the SFO will be in violation of the Forest Practices Act (FPA) and vulnerable to penalties for such FPA violation. If the SFO originally requested and received the Credits and some Credits have already been used, the SFO must repay the State any Credit that has been deducted from their tax liability from the due date of the original return(s) where the Credit was taken and will forfeit any unused Credit. The interest rate shall be the underpayment rate. If the SFO acquired the property with the deed restriction identifying the Credit value and restricting harvest in the relevant riparian area, the SFO must repay the State for the original amount of Credit received by previous owner from the date of acquisition of the property. The interest rate shall be the underpayment rate. To make payment to the State, a form specifically for the purpose of repaying the State and appropriate County that the restriction can be removed will be developed by ODF. Once the repayment has been made and the SFO has paid any penalties for violating the FPA, the SFO will inform ODF that the harvest restriction related to the Credit has been removed. ODF will modify the information in FERNS to reflect there is no longer a restriction on that particular riparian area. ODF will provide the SFO with a document to be presented to the appropriate County to remove the restriction. The SFO will contact the County with the document and the restriction will be removed. The SFO will pay recording fees.

Special Assessment Determinations – A forest conservation area for which a credit is allowed under this section may not be disqualified from eligibility for the special assessment as forestland solely due to the use of the credit allowed under this section and shall remain eligible for any deferral that they would otherwise be eligible for. Additionally, these lands shall be classified as land class FX.

Determining Stumpage Value – Stumpage Value is the value of standing timber based on the value that would be received if those trees were harvested and delivered to mills minus the costs of delivering those logs to those mills. The SFO will determine the Stumpage Value of timber not harvested when using the Standard Practice instead of the SFO Minimum Option. First, the SFO will determine the volume, by species and log grade for the timber to be credited for the Forest Conservation Credit using standard methods used by professional foresters. Professional forester is defined in ORS 674.100 (2)(f). Once the volume of timber by species and log grades is determined, the SFO will determine the Stumpage Value using methods used by professional foresters, such as

the Conversion Return Stumpage Value Method, the Actual Comparative Stumpage Value Method, or Cash Flow Model Method.

Conversion Return Stumpage Value Method – Conversion Return Stumpage Value Method begins with the volume of timber to be retained, which is determined by species and log grades using standard measuring techniques and procedures used by professional foresters. Then, to determine Stumpage Value, take the delivered log value by species and log grades from current log price information for the area in which the timber is ordinarily sold and deducting the total costs of marketing and delivering the logs to the mills. This will determine the Stumpage Value of the standing timber to be retained.

Actual Comparison Stumpage Value Method – The Actual Comparison Stumpage Value Method can be used when the timber being retained is similar to the timber being harvested in the timber harvest associated with the Retention Tax Credit request. It begins with determining the volume of timber to be retained by species and log grades using standard measuring techniques and procedures used by professional foresters. The Stumpage Value is then calculated using the actual average revenues minus costs of logs sold by species and grade from the adjacent harvest area.

Cash Flow Modeling Method – Determining the Value of standing timber by measuring the projected volume of the stand over a harvest rotation based on species and site class, determining the Stumpage Value of the stand at harvest age then discounted that value to the present with an appropriate interest rate.

DIVISION 600
DEFINITIONS

DEFINITIONS
629-600-0100

As used in OAR Chapter 629, Divisions 605 through 669 and Divisions 680 through 699, unless otherwise required by context:

(1) "Abandoned resource site" means a resource site that the State Forester determines is not active.

(2) "Active resource site" means a resource site that the State Forester determines has been used in the recent past by a listed species. 'Recent past' shall be identified for each species in administrative rule. Resource sites that are lost or rendered not viable by natural causes are not considered active.

(3) "Active roads" are roads currently being used or maintained for the purpose of removing commercial forest products.

(4) "Aquatic area" means the wetted area of streams, lakes and wetlands up to the high water level. Oxbows and side channels are included if they are part of the flow channel or contain fresh water ponds.

(5) "Artificial reforestation" means restocking a site by planting trees or through the manual or mechanical distribution of seeds.

(6) "Basal area" means the area of the cross-section of a tree stem derived from DBH.

(7) "Basal area credit" means the credit given towards meeting the live tree requirements within riparian management areas for placing material such as logs, rocks or rootwads in a stream, or conducting other enhancement activities such as side channel creation or grazing exclosures.

(8) "Bog" means a wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and dominated by ground mosses, especially sphagnum. A bog may be forested or non-forested and is distinguished from a swamp and a marsh by the dominance of mosses and the presence of extensive peat deposits.

(9) "Bull Trout" means fish species Salvelinus confluentus.

(10) "Channel" is a distinct bed or banks scoured by water which serves to confine water and that periodically or continually contains flowing water.

(11) "Chemicals" means and includes all classes of pesticides, such as herbicides, insecticides, rodenticides, fungicides, plant defoliants, plant desiccants, and plant regulators, as defined in ORS 634.006 (8); fertilizers, as defined in ORS 633.311; petroleum products used as carriers; and chemical application adjuvants, such as surfactants, drift control additives,

anti-foam agents, wetting agents, and spreading agents.

GUIDANCE:
Chemicals - The definition of "chemicals" includes animal repellents and insect pheromones. Adjuvants are ingredients added to a pesticide formulation to make it more effective. **Note:** *ORS 634.006(8) "Pesticide" includes: (h) Any substance, or mixture of substances intended to be used for defoliating plants or for preventing, destroying, repelling or mitigating all insects, plant fungi, weeds, rodents, predatory animals or any other form of plant or animal life which is, or which the department declares to be a pest, which may infest or be detrimental to vegetation, humans, animals, or be present in any environment thereof.* See also division 620.

(12) "Commercial" means of or pertaining to the exchange or buying and selling of commodities or services. This includes any activity undertaken with the intent of generating income or profit; any activity in which a landowner, operator or timber owner receives payment from a purchaser of forest products; any activity in which an operator or timber owner receives payment or barter from a landowner for services that require notification under OAR 629-605-0140; or any activity in which the landowner, operator, or timber owner barters or exchanges forest products for goods or services. This does not include firewood cutting or timber milling for personal use.

GUIDANCE:
Commercial - Note the discussion of this term in guidance for the definition of an "operation".

(13) "Completion of the operation" means harvest activities have been completed to the extent that the operation area will not be further disturbed by those activities.

GUIDANCE:
Completion of the operation - Generally, an operation is considered complete when yarding is complete. The "completion of the operation" date designates the start of the 24-month reforestation clock for compliance with Division 610. **Note:** there is a different requirement date for compliance with the 120 harvest unit limitation, as described in ORS 527.740(2)(c). The SF must determine the date the unit was planted to determine when the "stand was created."

(14) "Conflict" means resource site abandonment or reduced resource site productivity that the State Forester determines is a result of forest practices.

(15) "Debris torrent-prone streams" are designated by the State Forester to include channels and confining slopes that drain watersheds containing high landslide hazard locations that are of sufficient confinement and channel gradient to allow shallow, rapid landslide movement.

(16) "Department" means the Oregon Department of Forestry.

(17) "Diameter breast height" (DBH) means the diameter of a tree inclusive of the bark measured four and one-half feet above the ground on the uphill side of the tree.

(18) "Domestic water use" means the use of water for human consumption and other household human use.

GUIDANCE:
Domestic water use - Irrigation and livestock watering are not considered domestic water use.

(19) "Dying or recently dead tree" means a tree with less than ten percent live crown or a standing tree which is dead, but has a sound root system and has not lost its small limbs. Needles or leaves may still be attached to the tree.

(20) "Estuary" means a body of water semi-enclosed by land and connected with the open ocean within which saltwater is usually diluted by freshwater derived from the land. "Estuary" includes all estuarine waters, tidelands, tidal marshes, and submerged lands extending upstream to the head of tidewater. However, the Columbia River Estuary extends to the western edge of Puget Island.

(21) "Exposure categories" are used to designate the likelihood of persons being present in structures or on public roads during periods when shallow, rapidly moving landslides may occur.

(22) "Filling" means the deposit by artificial means of any materials, organic or inorganic.

(23) "Fish use" means inhabited at any time of the year by anadromous or game fish species or fish that are listed as threatened or endangered species under the federal or state endangered species acts.

(24) "Fledging tree" means a tree or trees close to the nest which the State Forester determines are regularly used by young birds to develop flying skills.

(25) "Forage" means the plant species or other source of food that will be provided to substantially contribute, either directly or indirectly to nutrition of the target wildlife species or guild.

(26) "Forestland" means land which is used for the growing and harvesting of forest tree species, regardless of how the land is zoned or taxed or how any state or local statutes, ordinances, rules or regulations are applied.

GUIDANCE:
Forage - See also OAR 629-610-0100 Wildlife Food Plots.
Forestland - Note the discussion of this term in guidance for the definition of an "operation."

(27) "Forest practice" means any operation conducted on or pertaining to forestland, including but not limited to:
- ***(a) Reforestation of forestland;***
- ***(b) Road construction and maintenance;***
- ***(c) Harvesting of forest tree species;***
- ***(d) Application of chemicals;***
- ***(e) Disposal of slash; and***

(f) Removal of woody biomass.

(28) "Forest tree species" means any tree species capable of producing logs, fiber or other wood materials suitable for the production of lumber, sheeting, pulp, firewood or other commercial forest products except trees grown to be Christmas trees as defined in ORS 571.505 on land used solely for the production of Christmas trees.

GUIDANCE

Forest tree species - is a key element of determining if an activity is an "operation" subject to the FPA, but it is not to be used for enforcement action. The Oregon Forest Practices Act (FPA) has authority only when forest tree species are being established, managed, or harvested. The reforestation rules define species that are acceptable for reforestation.

A conifer or hardwood species that has any commercial value as a forest product will meet the requirements of this section. This includes products such as commercial firewood and Pacific yew bark. The fact that such products may not be the most profitable for a given site is not relevant.

This 2001 definition retains the exclusion of trees grown solely for Christmas trees from "forest tree species." SB 315 (2001) established a clearer delineation between the FPA regulated activities and activities that are better suited to agricultural or other non-forest regulation. The change clarifies when the FPA regulations are not applicable in an agricultural, urban, or rural-residential setting. The definition of "forest tree species" was modified to specifically identify Christmas tree growing as exempt from forest practice regulations.

(29) "Free to grow" means the State Forester's determination that a tree or a stand of well distributed trees, of acceptable species and good form, has a high probability of remaining or becoming vigorous, healthy, and dominant over undesired competing vegetation. For the purpose of this definition, trees are considered well distributed if 80 percent or more of the portion of the operation area subject to the reforestation requirements of the rules contains at least the minimum per acre tree stocking required by the rules for the site and not more than ten percent contains less than one-half of the minimum per acre tree stocking required by the rules for the site.

GUIDANCE:

Free to grow - The definition of "well distributed" trees says it is acceptable if ten percent of the area subject to reforestation is at less than one-half the minimum per acre stocking. That does not mean landowners need not attempt reforestation on ten percent of the operation area that is below the reforestation threshold. An operator must have made an effort to reforest the entire area suitable for reforestation before being able to qualify for the "well-distributed" and "close enough" standards in the definition.

(30) "Further review area" means an area of land that may be subject to rapidly moving landslides as mapped by the State Department of Geology and Mineral Industries or as otherwise determined by the State Forester.

(31) "Geographic region" means large areas where similar combinations of climate, geomorphology, and potential natural vegetation occur, established for the purposes of implementing the water protection rules.

GUIDANCE:
Geographic region – is not the same as "Forest Practices Regions", OAR 629-605-0160.

(32) "Harvest type 1" means an operation that requires reforestation but does not require wildlife leave trees. A harvest type 1 is an operation that leaves a combined stocking level of free to grow seedlings, saplings, poles and larger trees that is less than the stocking level established by rule of the board that represents adequate utilization of the productivity of the site.

(33) "Harvest type 2" means an operation that requires wildlife leave trees but does not require reforestation. A harvest type 2 does not require reforestation because it has an adequate combined stocking of free to grow seedlings, saplings, poles and larger trees, but leaves:

(a) On Cubic Foot Site Class I, II or III, fewer than 50 11-inch DBH trees or less than an equivalent basal area in larger trees, per acre;

(b) On Cubic Foot Site Class IV or V, fewer than 30 11-inch DBH trees or less than an equivalent basal area in larger trees, per acre; or

(c) On Cubic Foot Site Class VI, fewer than 15 11-inch DBH trees or less than an equivalent basal area in larger trees, per acre.

(34) "Harvest type 3" means an operation that requires reforestation and requires wildlife leave trees. This represents a level of stocking below which the size of operations is limited under ORS 527.740 and 527.750.

GUIDANCE:
Harvest type 1, 2 and 3 - Definitions are not subject to enforcement action, but are used to apply the rules and statutes. See also guidance in ORS 527.620 for harvest types 1, 2, and 3.

Harvest type 1 is typically a shelterwood cut or a very heavy commercial thinning. In either case, at the completion of the harvest, the amount of understory regeneration (in combination with the retained overstory trees) would be inadequate to meet the reforestation requirements, but the retained trees and snags greater than 11 inches DBH exceed the wildlife tree basal area requirements. A common scenario for this type of harvest unit is the insect damage salvage in eastern Oregon that requires reforestation but often retains a significant number of live trees and/or snags. The harvest unit size is not limited.

Harvest type 2 is typically a "green clearcut." This is the type of operation where the overstory is removed, but the advanced (understory) regeneration is adequate to meet the free to grow reforestation standards without additional planting or time. The harvest unit size is not limited.

Harvest type 3 units are traditionally "clearcuts" that are routinely conducted in even-aged management in western Oregon and less commonly in eastern Oregon. The harvest unit size is limited to 120 acres, but may exceed 120 acres up to 240 acres through an approved plan for an alternate practice (PFAP).

For harvest type 2 or 3 units, the landowner is expected to maintain the identity and location of the required wildlife trees. For future reference, the Stewardship Forester (SF) should document in the FERNS notification the location of the retained wildlife leave trees when known. Landowners are not required to mark wildlife leave trees.

Note: While dead trees can be counted as wildlife trees, they cannot be included in tree stocking and basal area measurements when determining harvest type 1, 2, or 3.

Determining Harvest Type by Post-Harvest Requirements and Site Class

6/2020

1. Does the post-operation unit meet the minimum reforestation stocking requirements by Site Class?

- If yes, then the unit is either Harvest type 2 or Undesignated harvest type
- If no, then the unit is either Harvest type 1 or Harvest type 3

High (Site Class I, II, III)	Medium (Site Class IV and V)	Low (Site Class VI)
Plant or Retain: 200 seedlings (< 1" DBH)/acre; **Retain:** 120 saplings & poles (1" to 10" DBH)/acre; **or** **Retain:** 80 sq. ft. basal area/acre in 11"+ DBH trees or equivalent combinations of seedlings, saplings or poles	**Plant or Retain**: 125 seedlings (< 1" DBH)/acre; **Retain:** 75 saplings & poles (1" to 10" DBH) /acre; **or** **Retain:** 50 sq. ft. basal area / acre in 11"+ DBH trees or equivalent combinations of seedlings, saplings or poles	**Plant or Retain**: 100 seedlings (< 1" DBH)/acre; **Retain:** 60 saplings & poles (1" to 10" DBH)/acre; **or** **Retain:** 40 sq. ft. basal area/acre in 11" DBH trees or equivalent combinations of seedlings, saplings or poles

2. Does the post-operation unit meet the minimum wildlife trees retention requirements by Site Class?

- If yes, then the unit is either Harvest type 1 or Undesignated harvest type
- If no, then the unit is either Harvest type 2 or Harvest type 3

High (Site Class I, II, III)	Medium (Site Class IV and V)	Low (Site Class VI)
Retain trees ≥ 30 feet tall, ≥ 11 inches DBH, and ≥ 50% conifer: 50 trees/acre or 33 sq. ft. basal area/acre;	**Retain trees ≥ 30 feet tall, ≥ 11 inches DBH, and ≥ 50% conifer:** 30 trees/acre or 20 sq. ft. basal area/acre	**Retain trees ≥ 30 feet tall, ≥ 11 inches DBH, and ≥ 50% conifer:** 15 trees/acre or 10 sq. ft. basal area/acre

Summary by harvest type and post-harvest requirements based on answers to questions 1 and 2:

- **Harvest type 1,** Reforest any unit size; Not required to retain wildlife trees & downed logs.
- **Harvest type 2,** Not required to reforest any unit size; Retain wildlife trees and downed logs if unit is > 25 acres.
- **Harvest type 3,** Reforest any unit size; Retain wildlife trees and downed logs if unit is > 25 acres; and Limit harvest size to 120 acres, unless exempted by an approved plan for an alternate practice.
- **Undesignated harvest type,** No post-harvest requirements for reforestation, wildlife trees and downed logs retention, or harvest size limitation.

(35) "High landslide hazard location" means a specific site that is subject to initiation of a shallow, rapidly moving landslide. The following criteria shall be used to identify high landslide hazard locations:

- ***(a) The presence, as measured on site, of any slope in western Oregon (excluding competent rock outcrops) steeper than 80 percent, except in the Tyee Core Area, where it is any slope steeper than 75 percent; or***
- ***(b) The presence, as measured on site, of any headwall or draw in western Oregon steeper than 70 percent, except in the Tyee Core Area, where it is any headwall or draw steeper than 65 percent.***
- ***(c) Notwithstanding the slopes specified in (a) or (b) above, field identification of atypical conditions by a geotechnical specialist may be used to develop site specific slope steepness thresholds for any part of the state where the hazard is equivalent to (a) or (b) above. The final determination of equivalent hazard shall be made by the State Forester.***

(36) "High water level" means the stage reached during the average annual high flow. The "high water level" often corresponds with the edge of streamside terraces, a change in vegetation, or a change in soil or litter characteristics.

(37) "Hydrologic function" means soil, stream, wetland and riparian area properties related to the storage, timing, distribution, and circulation of water.

(38) "Important springs" are springs in arid parts of Eastern Oregon that have established wetland vegetation, flow year round in most years, are used by a concentration of diverse animal species, and by reason of sparse occurrence have a major influence on the distribution and abundance of upland species.

(39) "Inactive roads" are roads used for forest management purposes exclusive of removing commercial forest products.

(40) "Key components" means the attributes which are essential to maintain the use and productivity of a resource site over time. The key components vary by species and resource site. Examples include fledgling trees or perching trees.

(40) "Lake" means a body of year-round standing open water.

- ***(a) For the purposes of the forest practice rules, lakes include:***
  - ***(A) The water itself, including any vegetation, aquatic life, or habitats therein; and***
  - ***(B) Beds, banks or wetlands below the high water level which may contain water, whether or not water is actually present.***
- ***(b) "Lakes" do not include water developments as defined in section (90) of this rule.***

GUIDANCE:
Lake - A reservoir on a stream channel meets the definition of a lake, i.e., a body of year-round standing open water. Lake is further defined by size in division 650.

(42) "Landslide mitigation" means actions taken to reduce potential landslide velocity or re-direct shallow, rapidly moving landslides near structures and roads so risk to persons is reduced.

(43) "Landowner" means any individual, combination of individuals, partnership, corporation or association of whatever nature that holds an ownership interest in forestland, including the state and any political subdivision thereof.

(44) "Large lake" means a lake greater than eight acres in size.

(45) "Large wood key piece" means a portion of a bole of a tree, with or without the rootwad attached, that is wholly or partially within the stream, that meets the length and diameter standards appropriate to stream size and high water volumes established in the "Guide to Placement of Wood, Boulders and Gravel for Habitat Restoration," developed by the Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Oregon Department of State Lands, and Oregon Watershed Enhancement Board, January 2010.

(46) "Live tree" means a tree that has 10 percent or greater live crown.

(47) "Local population" means the number of birds that live within a geographical area that is identified by the State Forester. For example: the area may be defined by physical boundaries, such as a drainage or subbasin.

(48) "Main channel" means a channel that has flowing water when average flows occur.

GUIDANCE:
Main channel - Channels scoured down to river rock or bedrock, or with any significant soil scour are considered main channels. Usually there is little perennial vegetation in main channels, although it is sometimes present in smaller main channels. See the definition of "side channel" in this rule. Oxbows or beaver pond complexes that are connected to main channels are considered part of main channels.

(49) "Natural barrier to fish use" is a natural feature such as a waterfall, increase in stream gradient, channel constriction, or other natural channel blockage that prevents upstream fish passage.

(50) "Natural reforestation" means restocking a site with self-grown trees resulting from self-seeding or vegetative means.

(51) "Nest tree" means the tree, snag, or other structure that contains a bird nest.

(52) "Nesting territory" means an area identified by the State Forester that contains, or historically contained, one or more nests of a mated pair of birds.

(53) "Operation" means any commercial activity relating to the establishment, management or harvest of forest tree species except as provided by the following:

- ***(a) The establishment, management or harvest of Christmas trees, as defined in ORS 571.505, on land used solely for the production of Christmas trees.***
- ***(b) The establishment, management or harvest of hardwood timber, including but not limited to hybrid cottonwood that is:***
  - ***(A) Grown on land that has been prepared by intensive cultivation methods and that is cleared of competing vegetation for at least three years after tree planting;***
  - ***(B) Of a species marketable as fiber for inclusion in the furnish for manufacturing paper products;***
  - ***(C) Harvested on a rotation cycle that is 12 or fewer years after planting; and***
  - ***(D) Subject to intensive agricultural practices such as fertilization, cultivation, irrigation, insect control and disease control.***
- ***(c) The establishment, management or harvest of trees actively farmed or cultured for the production of agricultural tree crops, including nuts, fruits, seeds and nursery stock.***
- ***(d) The establishment, management or harvest of ornamental, street or park trees within an urbanized area, as that term is defined in ORS 221.010.***
- ***(e) The management or harvest of juniper species conducted in a unit of less than 120 contiguous acres within a single ownership.***
- ***(f) The establishment or management of trees intended to mitigate the effects of agricultural practices on the environment or fish and wildlife resources, such as trees that are established or managed for windbreaks, riparian filters or shade strips immediately adjacent to actively farmed lands.***
- ***(g) The development of an approved land use change after timber harvest activities have been completed and land use conversion activities have commenced.***

GUIDANCE:

Operation - This definition is not used directly for enforcement action. However, in combination with other definitions in law and rule, it is a key factor in determining whether an activity is within the jurisdiction of the forest practice regulations and whether notification is required.

The "operation" definition is relevant in evaluating any commercial activity (also defined in this section) associated with establishing, managing, or harvesting forest tree species (also defined in this section) with designated exceptions. These exceptions are discussed individually below.

The FPA does not have jurisdiction for the following herbicide applications, where the clear purpose of the activities is not to establish, manage, or harvest forest trees:

- "The establishment or management of trees intended to mitigate the effects of agricultural practices…" as defined under operation, ORS 527.620 and OAR 629-600-0100. For example, establishment and management of streamside forested buffers projects under the Conservation Reserve Enhancement Program (CREP), Natural Resources Conservation Service (NRCS) or Soil and Water Conservation District (SWCD).

- Herbicide applications solely for agricultural purposes on mixed agricultural-forestlands. For example, a herbicide application to maintain or improve livestock forage on open, grazed ponderosa pine lands in areas of eastern Oregon.
- Noxious weed control programs administered by an agency, nongovernmental group, or landowner consortium, and take place across multiple ownerships. For example, herbicide applications to control streamside infestations of knotweed species.
- Herbicide applications to control streamside infestations of knotweed species.

This guidance uses the definitions of **"forestland," "forest practice"(as found in ORS 527.620), "forest tree species"(as found in ORS 527.620), "commercial",** and **"operation." (in ORS 527.620)** These definitions are key in **determining if forest practice regulations apply to a specific activity.** These definitions also provide the criteria needed for determining FPA jurisdiction using the following checklist.

(1) Is the activity one of those exempted from being an operation under FPA jurisdiction? If so, the activity is, by definition, excluded from forest practice's authority.

(2) Is the activity on "forestland"? If not, there is no forest practice's jurisdiction.

(3) Does the activity relate to the "establishment, management, or harvesting" of forest tree species? If not, there is no forest practice's jurisdiction.

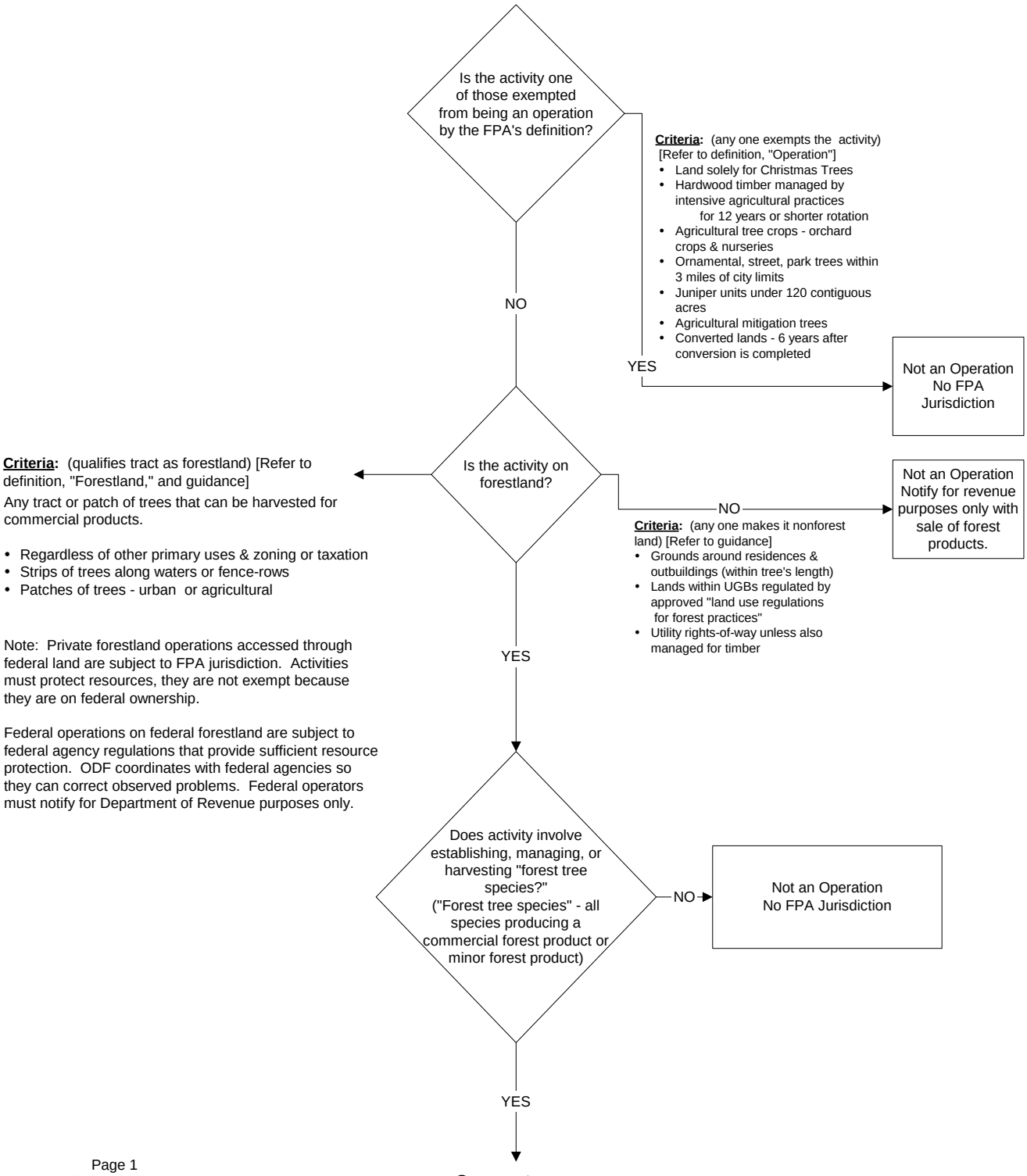
(4) Is the activity "commercial"? If not, there is no forest practice's jurisdiction.

(5) Is the activity an "operation"? If not, there is no forest practice's jurisdiction.

The following flowchart, "Identifying Commercial Forest Operations," illustrates these decision checkpoints for determining whether an activity is an operation within the jurisdiction of the FPA.

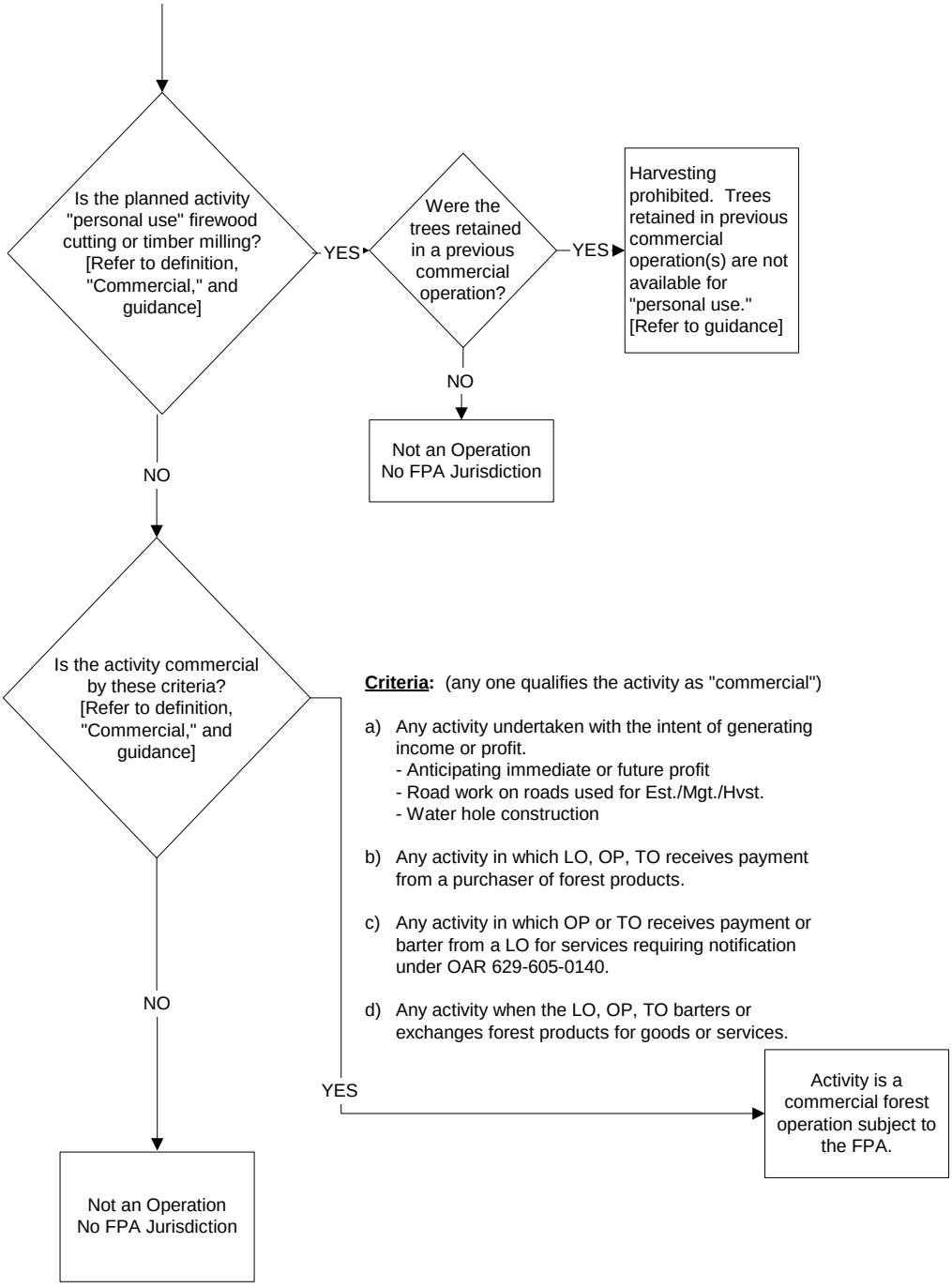
Identifying Commercial Forest Operations

(This is how the definitions of "operation," "forestland," "forest tree species," and "commercial" go together with ODF policy guidance in determining Forest Practices Act jurisdiction over an activity.)



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Identifying Commercial Forest Operations



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1. Is the activity one of those exempted from being an operation under FPA jurisdiction?

The statute and rule defining an "operation" lists seven exemptions, which generally, but not always, are excluded from forest practice's authority.

Example: ODF approves a land use change, but monitors FPA compliance until the land use change complies with the completion and maintenance requirements.

OAR 629-605-0140(2) "Notification to the State Forester - Types of Operations" lists activities that are "operations" but do not require notification. OAR 629-600-0100(52) takes some of those same activities which do **NOT** require notification and exempts them from being considered as "operations", and therefore explicitly exempt from FPA jurisdiction.

(a) Land devoted solely to Christmas tree growing.

"Operation" means any commercial activity . . . except. . . :

Subsection (a). "The establishment, management or harvest of Christmas trees, as defined in ORS 571.505, on land used solely for the production of Christmas trees."

Christmas tree management on lands devoted solely to that use is outside FPA jurisdiction.

However, an intermixed plantation strategy where a portion of the trees are for Christmas trees and a portion are to be managed for timber is within FPA jurisdiction. Regulated activities would include forest management activities such as vegetation control using herbicides or pre-commercial thinning. In addition, harvesting of forest products would come under FPA regulation.

One way to distinguish Christmas tree growing from timber growing is to determine if the landowner is licensed with the Oregon Department of Agriculture (ODA) as a Christmas tree grower under ORS 571.525.

Paragraph (a) adds the ORS 571.505 reference to define Christmas trees. ORS 571.505 defines Christmas trees as follows.

> (2) "Christmas tree" means a cut evergreen tree:
> (a) Of a marketable species;
> (b) Managed to produce trees meeting U.S. No. 2 or better standards for Christmas trees as specified by the Agricultural Marketing Service of the United States Department of Agriculture; and
> (c) Evidencing periodic maintenance practices of shearing or culturing, or both, for all Christmas tree species; weed and bush control and one or more of the following practices: Basal pruning, fertilization, insect and disease control, stump culture, soil cultivation and irrigation.

(b) Hardwoods intensively managed for fiber.

"Operation" means any commercial activity . . . except. . . :

Subsection (b.)" The establishment, management or harvest of hardwood timber, including but not limited to hybrid cottonwood, that is:

(A) Grown on land that has been prepared by intensive cultivation methods and that is cleared of competing vegetation for at least three years after tree planting;
(B) Of a species marketable as fiber for inclusion in the furnish for manufacturing paper products;
(C) Harvested on a rotation cycle that is 12 or fewer years after planting; and
(D) Subject to intensive agricultural practices such as fertilization, cultivation, irrigation, insect control and disease control."

The distinguishing characteristics of this tree growing activity are the intensive cultural methods that relate more to agricultural practices than to forest practices. These same hardwood species, when grown under normal silvicultural practices that depart from the specifics in this definition, would be considered within FPA jurisdiction.

When timber is harvested on a rotation cycle greater than 12 years and less than 20 years after planting, ODF **may modify or waive** the limitations and requirement for: wildlife leave trees, ORS 527.676; harvest type 3 limitations, ORS 527.740 and 750; and scenic highways, ORS 527.755, as authorized in ORS 527.736(5). Contact Salem staff when the rotation cycle is 20 years or greater.

ODF will not consider hardwood fiber plantations left to grow past 12 years to be automatically subject to forest practice harvesting regulations. Determine what the hardwoods are to be used for and contact Salem staff for further coordination with the ODA. Notification for harvesting would be required by the Oregon Department of Revenue (DOR) if timber were the product harvested. Clarification with the DOR will be necessary.

(c) Agricultural tree crops.

"Operation" means any commercial activity . . . except. . . :

Subsection (c). "The establishment, management or harvest of trees actively farmed or cultured for the production of agricultural tree crops, including nuts, fruits, seeds and nursery stock."

Agricultural trees include fruit and nut trees in actively managed orchards (apple, pear, cherry, walnut, filbert, etc.) and all ornamental trees grown in nurseries. Agricultural trees also include trees such as yew or Douglas-fir that are managed in nurseries or seed orchards for the continuous production of seed or other "crops" such as taxol.

Old orchard trees growing on sites that have not been maintained for agricultural production should also be treated as agricultural trees. However, if old orchard sites have grown back into native tree cover that includes some remnant fruit trees, harvesting them for timber or commercial firewood would be considered a part of the overall "operation."

(d) Ornamental, street, or park trees.

"Operation" means any commercial activity . . . except. . . :
Subsection (d). "The establishment, management or harvest of ornamental, street or park trees within an urbanized area, as that term is defined in ORS 221.010."

This exception applies to "urbanized areas". The reference, ORS 221.010 states:

> "(4) "Urbanized area" means territory within three miles of a city.
> *Furthermore, "city" is defined also:*
> (2) "City," except in the term "incorporated city" in ORS 221.020, means a city incorporated under ORS 221.020 to 221.100 or proposed to be incorporated. "

The first category of trees exempted from "operations" in urbanized areas is "ornamental trees." Ornamental trees are interpreted by ODF to be those in the "yard" immediately surrounding a house and its associated outbuildings. Harvesting in this area is often done because of windthrow threats to the buildings. ODF will not dispute these homeowner concerns.

Note: ODF does not consider the area within the "yard" to be forestland. The "yard" is the area within the extent of 1.5 times the height of on-site trees currently growing in the vicinity, per guidance for hazard trees from Oregon Occupational Safety and Health Division. “Yards" as nonforest land are discussed in detail under the topic, "Is the activity on "forestland?"

However, outside of the "landscaped and maintained yard," such as on large lots with a house or undeveloped lots, harvesting groups of trees for sale as a commercial forest product is an operation. ***Note:*** *Other agencies may have jurisdiction for land ODF considers to be already converted to non-forest uses.*

The second category of trees exempted from "operations" in urbanized areas is "street trees." ODF interprets street trees to be those lining city and urban streets and those located in parking lot and urban highway medians.

The third category of trees exempted from "operations" in urbanized areas is "park trees." Park trees are interpreted to be those located within state, county, and city parks that are in urbanized areas. Forest management activities should not be considered an operation when they occur in designated parks in or within three miles of city limits. A "park-like" forest stand should not be confused with a park, owned and maintained by a public entity.

Technical questions or conflicts about the culturing or harvesting of ornamental trees should be handled by the city government or directed to the department's urban foresters.

This provision of the ORS 527.620 and OAR 629-600-0100 definition of an "operation" relieves ODF of administering resource protection rules for only ornamental street or park tree harvesting in and around cities. Harvesting of remnant stands of forest within urbanized areas remains subject to ODF regulation unless: a) the city has adopted "land use regulations for forest practices" under ORS 527.722(5); or b) the activity is otherwise exempted by the definition of an "operation" as discussed in this section.

ODF may inform local government or DEQ of the activity planned within three miles so that they may consider administering their resource protection or water quality regulations as

appropriate. Priority of such reporting should be locally determined by ODF. The SF should inform the landowner of these additional regulations and of the value of tree retention to the stream and all the associated resources including water quality, fish and wildlife habitat, and the like.

Notification is still required when any urban trees are going to be sold on sites that are not on "forestland". Such notification will often be solely for the purposes of the DOR as stated in ORS 321.550. "Notice of intent to harvest; rules; effect of failure to file notice." as follows:

> "(1) No person shall harvest or cause to be harvested any timber from land in Oregon without first having notified the State Forester in writing with a copy to the DOR on forms prepared by the State Forester and the department of intent to harvest pursuant to ORS 321.005 to 321.185, 321.560 to 321.600, and 321.700 to 321.754."

Prior to 2003's legislative changes to the forest tax law, ORS 321, operators had to have a notification number to supply to mills and other log buyers before the logs could be received. The DOR no longer can require a notification number for each transaction. The DOR encourages mills to maintain a record of notification numbers, but it is not mandatory. This reduces the usefulness of the one "sort yard" notification specifically for operators who make a business of collecting small batches of logs from numerous landowners and selling them as a batch. ODF will no longer accept open-ended "sort yard" notifications.

FPA statutes require an operator to have a notification for each site that qualifies as an "operation" to determine if there are resource protection concerns with the source logs. Residential trees within 1.5 times the height of on-site trees currently growing in the vicinity of a house and its associated outbuildings are already considered non-forestland, meaning the FPA doesn't have jurisdiction (see definition of forestland).

Exception: The 2020 catastrophic fire event allowed one notification for multiple landowners for very small fire salvage operations, provided the Operator was listed as the Timber Owner and the digitized operation area includes all landowners conducting the salvage operation.

(e) Juniper species management or harvest under 120 acres.

"Operation" means any commercial activity . . . except. . . :

Subsection (e). "The management or harvest of juniper species conducted in a unit of less than 120 contiguous acres within a single ownership."

Senate Bill 1151 (1999), directed ODF to review the department's management of western juniper (*Juniperus occidentalis*) and recommended changes to benefit landowners and improve watershed health. The ODF 2000 Ad Hoc Juniper Issues Group, concluded that western juniper management was needed, but that rangeland owners might see FPA regulatory procedures as a disincentive. The group recommended that western juniper harvests be regulated only by Agricultural Water Quality Management Plans (administered by the ODA), not by the FPA. The 120-acre threshold figure was introduced during legislative negotiations in 2001. ODF may inform other agencies if there are natural resource concerns with juniper management.

Landowners may separate juniper harvest units by breaks of any width. Harvesting mixed stands of juniper and acceptable species is subject to the FPA regardless of harvest unit size, e.g., pine

site with juniper encroachment, not a juniper site with few pine on microsites. The purpose of juniper-only projects is typically to maintain or improve rangelands and/or natural resources.

Though other juniper tree species were not identified in the 2000 Ad Hoc SB 1151 Juniper Issues Group or ORS 321, apply ODF regulations to all juniper tree species as if they were western juniper.

Determine between Tables 1, 2, or 3 which represents the stand type by reviewing ground observations, aerial photos and land management history.

Table 1: Western juniper-only stand, few to no pine or other acceptable tree species, Unit <120 acre	
Scenario	**FPA Implications**
• Any juniper management activity	• None – FPA does not apply, 629-600-0100(52)(e)

Table 2: Western juniper-only stand, few to no pine or other acceptable tree species, Unit >120 acres	
Scenario	**FPA Implications**
• Juniper management, no commercial harvest	• None – FPA does not apply, 629-600-0100(12)
• Juniper management, otherwise commercial harvest (e.g., firewood or specialty products) or incidental commercial harvest (e.g., a friend takes a few firewood cords or special wood piece)	• FPA applies except[1] reforestation, leave trees, down wood, and harvest type 3 size limitation • Water Protection rules apply • Specified Resource Sites rules apply • Plan for Alternate Practice may apply

Table 3: Mixed Stand of western juniper and "Acceptable Species", pine, etc.; Unit + any Acreage	
Scenario	**FPA Implications**
• Any **juniper-only** management activity, harvest or no harvest (always a commercial "operation" because it is management of the acceptable species, e.g., pine, etc.)	• FPA applies except[2] reforestation, leave trees, down wood, and harvest type 3 size • Water Protection Rules apply • Specified Resource Sites rules apply • Plan for Alternate Practice may apply

[1]Juniper isn't an "acceptable reforestation species," so juniper-only removal doesn't require reforestation.
[2] For cubic foot site class at least VI, when a mixed stand has a juniper-only Type 2 harvest that exceeds 25 acres, the leave trees and down wood requirement applies.

The FPA applies to western juniper harvest units 120 acres or larger. However, because juniper tends to grow on low-productivity sites, some of the FPA requirements may not apply.

Table 4. Regulatory Standards for Commercial Western Juniper Harvests Unit > 120 acres

Statute or Rule Standard	Standard applies to western juniper harvest?
Notification OAR 629-605-0140(2)(j)	**Yes.** The activity is an operation exceeding 120 acres, and is not exempted from notification.
Written plans OAR 629-605-0170	**Yes,** if a statute or rule requires a written plan for the specific activity and location, e.g., operations within 100 feet of a Type F stream.
Retain trees along scenic highways ORS 527.755(1)	**Yes,** but the landowner may file a plan for alternate practices to remove the trees and convert to grazing land.
120-acre size limitation on harvest type 3 units ORS 527.740, 527.750	**No,** if below cubic foot site class VI. Also, there is not a Type 3 harvest for a juniper-only stand, because juniper is not considered an acceptable species to require reforestation. **Yes,** if site class VI or above **and** harvesting a mixed stand of juniper and acceptable species, e.g., pine stand with juniper encroachment, not a juniper stand with few pine on microsites.
Retain green trees, snags, and down wood in harvest type 2 or type 3 units exceeding 25 acres ORS 527.676	
Reforestation OAR 629-610	**No.** Reforestation is not required after juniper-only harvesting. Juniper is not an acceptable reforestation tree species.
Protection of waters and specified resource sites OAR 629-635 through OAR 629-665 during • slash treatment, OAR 629-615; • chemical application, OAR 629-620; • harvesting, OAR 629-630; and • road construction/maintenance, OAR 629-625	**Yes.** The activity is an "operation" exceeding 120 acres, OAR 629-600-0100(52)(e), conducted on "forestland", OAR 629-600-0100(25), for managing "forest tree species", OAR 629-600-0100(27).
Plan for an alternate practice for site specific vegetation retention for streams and RMA OAR 629-642-0700	**Yes,** if the approved plan provides incentive for restoring or enhancing RMAs, while protecting waters of the state during felling and stream crossings. **Review** with ODFW proposals to fell juniper trees within 20 feet of RMAs -- prior to plan approval.
Western Juniper harvest and privilege taxes ORS 321.005(6) and 321.805(7)	**No.** Exemption from taxes means notification to DOR is not required for commercial harvest of any juniper product on any amount of western juniper acreage.

A PDM, permit to use fire or power-driven machinery, is required for any sized operation where juniper management activities is in, or within 1/8 mile of a fire protection district, ORS 477.625.

Though the Rocky Mountain juniper (Juniperus scopulorum) was not identified in the 2000 Ad Hoc SB 1151 Juniper Issues Group or ORS 321, apply ODF regulations as if it were western juniper.

(f) Trees mitigating agricultural practices.

"Operation" means any commercial activity . . . except. . . :
Subsection (f). "The establishment or management of trees intended to mitigate the effects of agricultural practices on the environment or fish and wildlife resources, such as trees that are established or managed for windbreaks, riparian filters or shade strips immediately adjacent to actively farmed lands."

Forest practices regulation does not apply to establishing and managing trees to mitigate agricultural practices. Site preparation, planting, chemical vegetation control, and non-commercial thinning are exempt from forest practice regulations. However, "harvesting" is not included in the exemption wording. This was intentional and means that any commercial harvesting among such trees is an operation subject to the forest practice rules. Non-commercial removal of such trees would be subject to the ODA's Water Quality Management Area Plans for the basin. ODF will contact and inform ODA when learning of such activities. DEQ would also likely be interested in being notified of the activity, per the 2006 MOA, Conversion of Forestland. For example, establishment and management of streamside forested buffers projects under CREP, NRCS or SWCD.

(g) Approved land use change.

"Operation" means any commercial activity . . . except. . . :
Subsection (g). "The development of an approved land use change after timber harvest activities have been completed and land use conversion activities have commenced."

This provision establishes a point in approved land use change operations when FPA resource protection jurisdiction ends, except for completion and maintenance of the land use change. The phrase "after timber harvest activities have been completed" should usually be interpreted as the completion of yarding. The commencement of "land use conversion activities" occurs with the beginning of any activity that is not a forest practice. The definition reads **"and"** so both conditions must be present before the site is no longer an operation subject to forest practice rules. Note: There is a more complete discussion of land use changes in the guidance for OAR 629-610-0090 Exemption from Reforestation for Land Uses Not Compatible with Forest Tree Cover. Administer the processes for a plan for alternate practice (PFAP) in alignment with the interagency Memorandum of Agreement for Conversion of Forestland.

Note: Two other types of activities are exempt from forest practice regulations:

A. Emergency insect eradication projects sponsored or conducted by the ODA are not regulated by the FPA.

Examples: Applications of Btk, an organic biopesticide, for gypsy moth eradication, even if portions of the application take place on forestland. This conclusion is based on the finding that these types of projects are not commercial activities directly related to growing and harvesting forest tree species.

Insecticide applications that are conducted by forest landowners and that are clearly related to growing and harvesting forest tree species remain subject to the FPA.

Example: A pesticide application on forestland for control of Douglas-fir tussock moths.

B. Invasive weed control projects are not subject to the FPA if the projects meet the following conditions:

- They are sponsored or conducted by the ODA, a cooperative weed management area, or similar entity other than a forest landowner; and
- The purpose is clearly to control invasive and/or noxious weeds, not to control vegetation for the purpose of growing and harvesting forest tree species.

Example: A knotweed control projects in coastal streamside areas, is coordinated by local weed control organizations in cooperation with the ODA.

- Vegetation control activities that are done or directed by the landowner and that are clearly connected to the purpose of growing and harvesting forest trees species are subject to the FPA, even though control of invasive weeds might be involved.

Example: Control of overtopping Scotch broom in a conifer plantation.

The distinctions in A and B above may not always be clear, especially when landowners are directly involved in the projects. Contact Salem staff to determine the appropriate policy.

2. Is the activity on "forestland?"

Forestland defined for Forest Practices Administration.
"Forestland" is defined broadly in ORS 527.620 "Definitions" and includes any land being used to grow and harvest forest tree species, even if that is not the **primary** use of the land. The zoning, tax status, other state or local statutes, ordinances, rules or regulations that may apply to the parcel are not considered when making the forestland determination. If forest tree species are growing on the land and activities for managing or harvesting trees for commercial purposes have been or are being conducted, it is forestland.

Forestland: Any size tract or patch of trees that can be harvested for a commercial forest product regardless of the surrounding land use or zoning of the land, including:

- Strips of timber along streams on farm or range land. There is an exemption for the *establishment* and *management* of forested patches intended to mitigate the effects of agricultural practices on the environment or fish and wildlife resources, such as trees that are established or managed for windbreaks, riparian filters, or shade strips immediately adjacent to actively farmed lands. This exemption does not apply to the *harvest* of such forested patches.
- Patches of timber that remain inside urbanized areas that are not exempted by the FPA definition of "operation."
- Patches of timber within the urban growth boundary of local governments that have not adopted land use regulations that supplant the FPA.
- Natural or unmaintained areas of public parks and campgrounds (Not including areas of publicly-accessible parks and campgrounds maintained for public use, as these are considered to be already converted to non-forest land).
- The forested portions of rights-of-ways are considered “forestland” for purposes of FPA administration.

Non-forestland, considered to be already converted to a non-forest use, includes:

- "Yard" or grounds around maintained residential structures and outbuildings to the extent of 1.5 times the height of on-site trees currently growing in the vicinity, per guidance for hazard trees from Oregon Occupational Safety and Health Division.
  - The portions of parks, campgrounds, and day-use areas that are maintained/landscaped, or developed with maintained buildings or other structures, and where people are normally present.
    - Includes publicly- and privately-owned parks, campgrounds, and day-use areas, with the condition that the public is invited to use the facilities.
    - "Developed with building or other structures" does not include:
      - Hiking trails outside publicly-accessible parks, campgrounds and day-use areas.
      - Privately-owned facilities not generally open for public use.
  - Developed and maintained public campgrounds and park areas that are not managed for the growing and harvesting of tree species, rather are managed exclusively for recreation. Incidental tree harvests in public campgrounds or parks that are non-forestland would not be reforested with the intent of future commercial tree harvest.
  - Tree nurseries and seed orchards.
    - Statute excludes from the definition of "operation" those activities relating to tree nurseries and seed orchards (ORS 527.620).
    - The 1995 Memorandum of Agreement on pesticide regulation between the Board of Forestry and ODA states that the definition of forestland does not include tree nurseries or seed orchards.
  - "Utility rights-of-way" such as power line or gas pipeline corridors, where commercial trees have already been harvested. However, within the non-forestland portion of the ROW, notifications are required for incidental commercial forest harvest for DOR and PDM purposes only. There is typically a federal/state/regional/local process for such conversions. ODF's policy is that it wants to be included in the planning stages, but that most of its resource protection concerns would be addressed in the existing formal process. **Note:** Notifications are needed for stream crossings, road building and harvesting. Where written plans are needed, they would usually be in the form of existing planning documents. Other concerns, such as landslides and public safety should be considered in the planning process.

Because the definition of an "operation" reads ". . . activity relating to the establishment, management or harvest of forest tree species . . .," forest practice's jurisdiction extends to adjacent land crossed in order to access forestland. Examples: A road, used however occasionally in forest operations, that crosses residential or agricultural land to reach forestland. ODF will regulate the resource-affecting activities on a road crossing federal land to access an operation on private forestland.

Note: Other agencies may have jurisdiction for land ODF considers to be already converted to non-forest uses. Example: DEQ would be the regulatory authority over any delivery of sediment to waters of the state originating from activities on non-forestland campgrounds.

Local Government Regulation.
Note that ORS 527.722 relieves the State Forester of the responsibility to administer the FPA on those forestlands within urban growth boundaries (UGBs) where a local government has adopted "land use regulations for forest practices." Salem staff maintains a list of qualifying local government regulations on the program website. Districts should periodically review the status of local government regulation within UGBs and inform Salem staff of any changes. Since the law directs local governments to develop such regulations in coordination with ODF, districts and Salem staff should be aware of and involved in development and revision of such land use regulations. ODF will foster a cooperative relationship with local governments developing or revising land use regulations for forest practices inside their UGBs. Until this cooperative process is complete, ODF will continue to administer forest practices within the local government's UGB.
Forestland Conversions.
If a landowner is converting forestland to an approved use not compatible with forestry, the land is forestland until timber harvest activities have been completed and land use conversion activities have commenced (see subparagraph (g), defining "operation" above). Harvest completion means yarding and all forestry-related disturbance is complete on the site. The commencement of land use conversion is marked by initiation of any activity, not a forest practice, which contributes to the non-forest use.

Landowners who intend land use conversions must first obtain approval of a PFAP for the exemption from reforestation requirements. This requires written approval from ODF and other agencies as appropriate. See also guidance for OAR 629-610-0090.

Afforestation.
Where a landowner is converting non-forest land to forestland, the forestland designation applies when the afforestation activity begins. Examples: Clearing, piling, and spraying, activities which require notification and observance of the relevant rule requirements, such as water quality protection practices.

ODF should investigate to determine whether the rules apply in cases where the landowner's intent to convert to forest tree species is not clear. Example: A landowner may intend to convert forestland to only grow Christmas trees.

Federal or other Jurisdiction.
The FPA does not have jurisdiction for forest practices within the National Floodplain Insurance Program (NFIP), per a Department of Justice review, May 20, 2014. The county administration of the NFIP, through a land use permit, provides more regulatory certainty than the FPA.

The FPA does not have jurisdiction when forest practices take place within the right of way boundary of the existing railroad line, per the federal railway regulations (primarily the Interstate Commerce Commission Termination Act).

However, other communications through the ODF's E-Notification system is required for:

- Any activity that is on or within 1/8-mile of a forest protection district and that qualifies as an "operation" under ORS 477.001 (17) would be subject to the requirement to obtain a permit to use fire or operate power driven machinery (via ODF's E-Notification system), and would be subject to the other requirements in ORS 477; and

- If harvesting will be involved, the timber owner must notify DOR (via ODF's E-Notification system).

FPA Authority and Federal Forestland.
Though federal forestlands fit under the FPA's definition of forestland, the State Forester does not administer the FPA on federal lands. Federal lands is not addressed directly by ORS 527.620. Nothing in the FPA indicates there is any intent for the FPA to not apply to federal lands. Under the federal Clean Water Act (CWA), federal agencies are required to comply with the measures of Oregon designed to implement the CWA. The FPA is one of these measures.

The Forest Service and BLM lands have signed agreements with the state to be the designated management agencies to implement the state's water quality program, specifically temperature (OAR 340-041-0028(12)(g) and other water quality criteria (OAR 340-041-0061(13)). These agreements require that the Forest Service and BLM have a program in place that will meet or exceed the standards of the FPA. Contact Salem staff to review FPA jurisdiction for operations on other federal lands, including Bonneville Power Administration, Army Corps of Engineers, U.S. military agencies, Bureau of Reclamation, and national wildlife refuges.

An operator, harvesting on federal forestlands, must file a notification with ODF for DOR purposes. An operator conducting forest activities on BLM land in western Oregon must file a Permit to Use Fire or Power Driven Machinery (PDM) to allow ODF to administer industrial fire prevention regulations, including forest operations inspections, per the BLM Western Oregon Suppression Agreement.

Violations of the standards of the FPA observed by ODF on federal lands, and unrelated to operations on private land, should be reported to the local BLM, Forest Service, or other federal agency office. Both the USFS and BLM are DEQ designated management agencies for compliance with the state water quality standards and unsatisfactory conditions on their lands can be referred to DEQ.

Operations on Private Land that Cross Federal Land.
Private operations that use federally-controlled haul roads are responsible to maintain state water quality standards. This is analogous to compliance with state game laws on federal land. It is a fine point, legally, that the FPA will be applied to federally-controlled lands and roads, but ODF will only inform federal agencies of unsatisfactory conditions on federally-owned lands and roads. ODF will require operators to address unsatisfactory conditions on federally-controlled lands and roads they are using, even if the conditions are due to inadequate road design, materials, or road maintenance by the federal agency.

Example: A private operator is hauling on a federally-controlled road and causes or contributes to a turbidity standard violation, they will be required by ODF to stop the damage by adequate road maintenance practices or by ceasing use of the road. Failure to comply will result in enforcement action by ODF against the operator.

To correct the problems, the private operator may attempt to apply the terms of the road use agreement with the federal agency or otherwise negotiate with them to correct the unsatisfactory condition.

When the landowner is the USFS or BLM, ODF will first report the violation to them for correction. ODF will not take direct enforcement action against the federal landowner. ODF may report the violation to the Department of Environmental Quality (DEQ) if the federal agency continues to contribute to the unsatisfactory condition whether by inaction or inadequate repair. The federal agencies are required by the federal Clean Water Act to comply with the state Water Quality Standards and are subject to enforcement action by DEQ.

Operations on Private Land that are conducted by federal agencies.
Activities conducted by the BLM, Forest Service, or other federal agencies on private lands are directly subject to all requirements of the FPA as administered by the State Forester.

Example: Road construction to access federal lands through a private lands easement.

FPA Authority Where Tribes Exert Sovereign Rights.

- **Caution should be used when confronted with a forest resource issue pertaining to tribal trust or tribal fee lands or operations on non-Indian lands within tribal reservation boundaries.**
- **Consult with Salem staff, who will discuss with the tribe, Department of Justice and Bureau of Indian Affairs.** These issues are very sensitive and complex and generalization cannot be made between reservations or land classifications on the same reservation.
- "Tribal lands" means land owned and managed by the tribe but held in federal trust.
- "Fee lands" means land, originally tribal reservation land, which is owned by a tribe, Indian or non-Indian and is not held in federal trust, The state and local governments have jurisdiction on fee lands but sometimes a tribe may exert jurisdiction when fee lands are inside a tribal reservation boundary.
- "Closed reservation" means the tribe has sole regulatory authority over all lands within the reservation boundary.
- "Open reservation" means the tribe has limited regulatory authority on non-Indian land within the reservation boundary.

FPA jurisdiction on tribal trust and tribal fee lands:

- The Department acknowledges **each** of Oregon's nine federally recognized tribes have sovereign rights unique to other Oregonians.
- Though tribal forestlands held in federal trust fit under the FPA's definition of forestland, the FPA does not directly address federal trust lands, therefore, the FPA has no jurisdiction on tribal trust lands or on tribal lands in the process of being converted to federal trust status.
- Tribes may benefit by notifying the State Forester of forest operations, who will provide a resource review, such as, landslide and public safety concerns.

FPA jurisdiction on non-Indian lands within **each** tribal reservation:

- Private lands within the Confederated Tribes of Warm Springs Reservation must comply with tribal regulations and notify the State Forester for the Oregon Department of Revenue processing of harvest income, otherwise, the FPA has no jurisdiction.

- Non-Indian landowners within other tribal reservation boundaries very likely must comply with the FPA and may also be required to comply with the tribe's regulations. Consult Salem.

FPA jurisdiction, yet to be determined by Salem staff for **each tribe**:

- Tribal lands which remain independent of federal trust status (fee lands),
- Lands owned by individual tribal members located inside or outside the tribal reservation boundaries,
- Enforcement action when resources are damaged on tribal lands not under federal trust
- Enforcement action on lands owned by individual tribal members, and
- Enforcement action when resources are damaged on non-Indian lands within a tribal reservation boundary.

Table 5. Forest Practice Act Authority Where Tribes Exert Sovereign Rights

Land	Federal trust	FPA	Department of Revenue
Tribal trust land, within or outside reservation	Yes	No	No
New tribal lands seeking federal trust status	Yes	No	No
New tribal lands outside a reservation, not seeking federal trust	No	Consult Salem	Consult Salem
Tribal fee land within a reservation	No	Consult Salem	Consult Salem
Individual tribal member land outside reservation	No	Maybe, consult Salem	Maybe, consult Salem
Non-Indian land within a "closed" reservation. Example: Confederated Tribes of Warms Springs Reservation of Oregon.	No	No	Yes
Non-Indian land within an "open" reservation. Example: Confederated Tribes of Umatilla Indian Reservation.	No	Likely, consult Salem. Umatilla IR requires private lands to comply with tribal regulations	Yes

Department of Justice, October, 27, 2011

3. Does the activity establish, manage, or harvest "forest tree species?"

Establishing, managing, or harvesting forest trees includes, but is not limited to: reforestation; road construction and maintenance; harvesting of forest tree species; application of chemicals; disposal of slash; site preparation; pre-commercial thinning; pruning; development of rock pits for forest road use; collecting cones and seeds; tree protection such as bud capping; and harvesting of minor forest products.

"Forest tree species" includes all tree species that can produce a commercial forest product, including minor forest products. Forest trees grown as Christmas trees on land dedicated wholly

to growing Christmas trees are excluded from this definition. However, "forest tree species" does include those planted as Christmas trees that are allowed to outgrow their initial purpose and are instead managed for timber or other forest products.

4. Is the activity a "commercial" "operation?"

"Operation" means any "commercial" activity relating to the establishment, management, or harvesting of forest tree species. "Commercial" is a key characteristic in determining whether an activity is an "operation." Until 2002, it was defined only in guidance, but it is now defined in rule OAR 629-600-0100 Definitions.

By this rule, **"commercial" means of, or pertaining to, the exchange or buying and selling of commodities or services. This includes . . .**

(a) Any activity undertaken with the intent of generating income or profit;

- Operations are commercial when they include activities that are being conducted because of the anticipation of either immediate or future profit. Therefore, precommercial thinning, fire prevention, chemical release, fertilizing, and site preparation are commercial operations.
- Construction or reconstruction of any road on or accessing forestland that was built for or has been used as part of a commercial forest operation is a commercial operation.

  Example: Industrial forest landowners are in the "business" of growing trees, thus any road on their ownership is part of their commercial operation. This also includes any roads used by non-industrial landowners that are or have been used for harvesting trees and managing timber, notwithstanding other additional uses such as agriculture.

- Excavating water holes for fire protection "pump chances" or for chemical mixing water sources is a commercial activity. It's an aspect of forest management, ultimately for income or profit. ODF may determine that a PFAP is required for machine work in the stream in order to minimize the activity as required in OAR 629-625-0430(2), Stream Protection.

(b) Any activity in which a landowner, operator or timber owner receives payment from a purchaser of forest products;

- Harvesting forest products for sale is the most common commercial operation.

(c) Any activity in which an operator or timber owner receives payment or barter from a landowner for services that require notification under OAR 629-605-0140; or

Except when firewood cutting or timber milling for personal use is involved, there is a commercial operation any time an activity occurs on forestland and someone is paid or in some way compensated for conducting forest practices requiring notification under OAR 629-605-0140. **Note**: If the activity occurs on land already converted to non-forest use, such as a residential yard or a utility right-of-way, the activity will not be considered an "operation" because it is not on forestland; therefore, notification will not be required by OAR 629-605-0140. However, the notifier must check the E-Notification box to inform ODF and the DOR when there is saleable or personal use, timber or firewood produced.

Examples:

- It is a commercial activity when an operator is hired to rebuild a road for access to a woodlot for planting and further forest management.
- It is not a commercial activity if a landowner pays a logger to cut trees from their woodlot solely for the landowner's personal use as firewood or milled timber, but a notification for DOR use is required.
- It is a commercial activity if a landowner pays a logger to cut trees from their woodlot to be sold or traded.
- It is not a commercial activity when a disgruntled landowner pays someone to cut, with the intent to leave trees lie unused on the landowner's forestland.
- It is commercial if a landowner pays to have danger trees cut from within reach of the structures around his house. However, this is not an operation because the land is considered non-forest land by ODF. The landowner may need a notification for DOR purposes because they sell the logs, but forest practices regulations do not apply.
- It is a commercial operation to cut and clear trees from existing forestland in order to clear the land for conversion to a non-forest use, **If** the activity meets the definitions of "operations" and "commercial" (OAR 629-605-0140(e)).

Reference:

OAR 150-321-0020 and 150-321-0640, Timber subject to taxation.

(d) Any activity in which the landowner, operator, or timber owner barters or exchanges forest products for goods or services.

- It is a commercial operation if a landowner exchanges some of his logs with the mill for cash and some in exchange for milling of lumber that he uses for construction on his own land.
- If the timber owner at the time of harvest is the State of Oregon, USFS, BLM or other exempt entity, and the timber is being donated, that timber would be exempt from tax.

(e) This does not include firewood cutting or timber milling for personal use.

- If all criteria are met, this exclusion overrides any of the above conditions in this definition that might be present. It is intended to allow individual landowners to cut their own trees for firewood or lumber they process, or to pay someone to do so, solely to obtain these products for their personal use. ODF interprets "personal use" to mean that the landowner makes use of the firewood or lumber from their land for its primary purpose. That is, the landowner burns the firewood in their structures or builds on their own land with the lumber. A key criterion is that they use the firewood or lumber themselves and do not sell it or barter it for any other purpose than to obtain the products for their personal use. This means they do not give these products away, even as a charitable donation, e.g. for large wood stream enhancement projects with ODFW. Any use outside this meaning of "personal use" is "commercial," and if all other criteria for an "operation" are met, the activity is an "operation" that must comply with appropriate forest practice regulations. Although this may seem strict, it is necessary to prevent attempts by some landowners to evade protecting forest resources by claiming personal use, exempt from regulation.

  In summary this exemption from regulation as a commercial forest operation applies when:

  I. The only forest products of the activity are firewood or lumber, and

II. The landowner cuts and processes the products himself or pays someone to do so in currency or barter, but solely for the purpose of obtaining firewood or lumber; and
III. The firewood or lumber are used only on the landowner's property for their primary and normal purposes, except that product bartered in return for its production; and
IV. The landowner receives no monetary return from the product bartered to someone else in return for product production.

Technically, firewood and lumber harvested and processed for personal use must be declared as income in reporting to the DOR. Therefore, notification only for DOR purposes is appropriate for such activities even though they are not considered commercial. ODF will inform the operator of this should the occasion present itself.

Note: Trees retained as required in a commercial operation, such as in-unit wildlife leave trees or riparian trees, remain part of that commercial operation until they would otherwise become available for harvest under rule (usually this is when replacement trees have grown in the stand). **If the land use is changed to non-forest use, the removal must be approved by the appropriate agency with regulatory jurisdiction over the non-forest use. Such trees are not available for personal use harvesting for firewood or lumber.** This is because leave tree requirements would be meaningless if the trees can be harvested for some non-commercial purpose. Interpretations of legal requirements that result in a meaningless outcome are generally not supported by courts during legal actions.

Non-commercial activities include the following.

(1) The cutting of firewood or milling of lumber by the landowner personally or by someone they pay or trade some of the wood or lumber only for the service, solely for the landowner's personal use.

(2) Utility companies' rights-of-way are usually considered by ODF to be land converted to non-forest use, with no trees being intentionally grown for commercial forest products. Therefore, vegetation management on rights-of-way is not a commercial operation requiring notification. A PDM may be required however.

In contrast, utility companies cutting and selling trees alongside their rights-of-way to protect the power lines are conducting a commercial operation under clause c) of the "commercial" guidance above. When this is the situation, the utility company must notify ODF of the operation.

If, however, the utility company leaves the merchantable trees for the landowners alongside the right-of-way to sell, then, not the utility company, but those landowners must notify, primarily for DOR purposes. If the landowner cuts up the trees for firewood or mills them for personal use as lumber, there is no commercial operation.

When outside their rights-of-way, utility companies may cut normally-retained trees that may be in an RMA to protect their installation, under the rule modifications allowed by OAR 629-605-0500, Modification of Requirements for Forest Health and Public Safety. If such trees are outside the utility right-of-way, the utility company must notify and submit written plans (when required by rule or statute) and a PFAP for approval when the trees are on forestland.

Examples to determine if an activity is a commercial operation.

(1) Situation: A landowner annually harvests a year's worth of firewood from his woodlot for heating his house. Trees required to be retained as part of a previous commercial operation are not involved. The landowner does all the work.

Analysis:

(a) *Is the activity exempt from being a forest operation?*
The activity is not exempt in the definition of "operations".

(b) *Is the activity on "forestland"?*
The activity occurs on forestland, used for growing and harvesting forest trees.

(c) *Does the activity relate to the "establishment, management or harvesting" of "forest tree species"?*
The activity is related to harvesting forest trees.

(d) *Is the activity "commercial"?*

(A) The wood is not harvested to generate income, nor is it bartered for services or products.

(B) The landowner receives no payment for the firewood.

(C) No money or bartered product or service is exchanged, although harvesting usually requires a notification under OAR 629-605-0140.

(D) The landowner cut the firewood for personal use.

(E) The trees harvested were not retained as obligations under a previous commercial operation.

Conclusion: The activity is not commercial because of factor (d)(D). Cutting firewood solely for personal use is not considered commercial activity. Notification for forest practices purposes is not required, but technically notification to DOR is required.

Variations on this scenario are common and can change the conclusion. ODF must consider the relative weight of each factor to make the determination. If the landowner plans to exchange money or barter for services in harvesting, hauling, or processing the wood, but will only supply his personal use, the activity would not be considered commercial. If the landowner plans to sell or barter some or all of the wood, the activity would be commercial.

(2) Situation: A landowner plans to hire a faller to cut down five large trees which the landowner will process into lumber on site with his own portable sawmill. The lumber will be used to build a barn on the property. The landowner will do all the yarding and processing work. The trees are within 100 feet of a large Type F stream, but there has never been a commercial operation along this riparian area.

Analysis:

(a) *Is the activity exempt from being a forest operation?*
The activity is not exempt in the definition of "operations".

(b) *Is the activity on "forestland"?*
The activity occurs on forestland, used (at least in part) for growing and harvesting forest trees.

(c) *Does the activity relate to the "establishment, management or harvesting" of "forest tree species"?*
The activity is related to harvesting forest trees.

(d) *Is the activity "commercial"?*
(A) The DOR rules require reporting the value of the lumber as income.
(B) The landowner would receive no payment for the lumber.
(C) Money or barter would change hands for services, and harvesting requires a notification under OAR 629-605-0140.
(D) The landowner plans to mill the wood for personal use.
(E) The trees planned for harvest were not retained as obligations under a previous commercial operation.

Conclusion: **This activity is not commercial because of factor (d)(D).** (Note: The landowner is required by DOR rules to report the value of the lumber as income.)

(3) Situation: In a commercial harvesting activity a landowner reluctantly leaves the required vegetative components in the 1,000 foot long RMA on one side of a small Type F stream. However, the landowner advises ODF he will remove most of those trees himself for personal use firewood.

Analysis (applies to the firewood cutting):

(a) *Is the activity exempt from being a forest operation?*
The activity is not exempt in the definition of operations.

(b) *Is the activity on "forestland"?*
The activity would occur on forestland, used for growing and harvesting forest trees.

(c) *Does the activity relate to the "establishment, management or harvesting" of "forest tree species"?*
The activity would be harvesting forest trees.

(d) *Is the activity "commercial"?*
(A) The wood would not be harvested to generate income.
(B) The landowner would receive no payment for the firewood.
(C) Money or barter will not change hands for services, but harvesting usually requires a notification under OAR 629-605-0140.
(D) The landowner plans to cut the firewood for personal use.
(E) The trees to be cut for firewood are being retained as a requirement under a previous commercial operation.

Conclusion: **The activity is not commercial, because of factor (d)(E). It's not commercial in itself, but the RMA trees must be maintained as part of the preceding commercial operation under the applicable forest practice requirements.** While the woodcutting is separated in time from a specific harvest activity, it would take trees that are being maintained as part of a commercial operation; this cannot be overridden by claiming non-commercial status for this activity.

(4) Situation: A residential landowner (or group of landowners) wishes to hire a contractor to clear excess and ladder fuels from around their houses and outbuildings to reduce fire

danger. Some merchantable trees will be removed by the contractor who is working in the area and will combine logs from many homeowners and sell them, paying the homeowners for their net value.

Analysis:

(a) *Is the activity exempt from being a forest operation?*
The activity is not exempt in the definition of "operations".

(b) *Is the activity on "forestland"?*
The activity will not occur on forestland, used for growing and harvesting forest trees. ODF views this area around the house and outbuildings as converted to non-forest use.

Conclusion: **No operation or FPA jurisdiction is involved because the land is not forestland.** However, the operator who is selling the logs must notify the DOR.

The analysis checklist should be applied for each unique set of conditions to consistently determine the applicability of the FP rules in each case. Consult local supervisors or Salem staff in situations where application of the test criteria is uncertain.

(54) "Operator" means any person, including a landowner or timber owner, who conducts an operation.

GUIDANCE:
"Operator" This definition is not subject to enforcement action, but is used to apply the rules and statutes.

The term "operator" refers to any person conducting a forest operation and may include the operator, landowner or timberowner. Unless the responsible party is specified by rule (such as reforestation being the sole responsibility of the landowner), use of this generic term provides flexibility to determine on an operation-by-operation basis who is responsible for rule requirements.

As a technical legal matter, each landowner is ultimately responsible for what happens on his/her land so long as the person taking the action is acting with the owner's permission and on the owner's behalf. However, as a matter of policy, if noncompliance occurs, SFs should apply discretion in taking enforcement action toward the party or parties most accountable for the problem and who will benefit from the educational aspects of the enforcement action. This can include the operator listed on the notification; an employee or subcontractor of the operator; the landowner; the timber owner; an agent (such as a consulting forester); any combination or all of the above, provided a responsibility for the actions resulting in noncompliance exists. The enforcement directive should be consulted for additional information with regard to enforcement actions and responsibility.

(55) "Other wetland" means a wetland that is not a significant wetland or stream-associated

wetland.

(56) "Perch tree" means a tree identified by the State Forester which is used by a bird for resting, marking its territory, or as an approach to its nest.

(57) "Plan for an Alternate Practice" means a document prepared by the landowner, operator or timber owner, submitted to the State Forester for written approval describing practices different than those prescribed in statute or administrative rule.

(58) "Relief culvert" means a structure to relieve surface runoff from roadside ditches to prevent excessive buildup in volume and velocity.

(59) "Removal" means the taking or movement of any amount of rock, gravel, sand, silt, or other inorganic substances.

(60) "Replacement tree" means a tree or snag within the nesting territory of a bird that is identified by the State Forester as being suitable to replace the nest tree or perch tree when these trees become unusable.

(61) "Resource site" is defined for the purposes of protection and for the purposes of requesting a hearing:

- ***(a) For the purposes of protection:***
  - ***(A) For threatened and endangered bird species, "resource site" is the nest tree, roost trees, or foraging perch and all identified key components;***
  - ***(B) For sensitive bird nesting, roosting and watering sites, "resource site" is the nest tree, roost tree or mineral watering place, and all identified key components;***
  - ***(C) For significant wetlands "resource site" is the wetland and the riparian management area as identified by the State Forester.***
- ***(b) For the purposes of requesting a hearing under ORS 527.670(4) and ORS 527.700(3), "resource site" is defined in OAR 629-680-020.***

GUIDANCE:

Resource site - is defined here for protection, with the area subject to protection described in (A), (B), or (C). When a person requests a hearing, the definition in OAR 629-680-0020 is applied. That definition limits the area that is subject to appeal.

For those sites that have not gone through technical analysis and rulemaking, such as mineral watering places, we have only the inventory of sites in the 1984 Cooperative Agreement between the Board of Forestry and the Fish and Wildlife Commission and the interim process in OAR 629-605-0180 to go on in identifying sites and key components.

(62) "Riparian area" means the ground along a water of the state where the vegetation and microclimate are influenced by year-round or seasonal water, associated high water tables, and soils which exhibit some wetness characteristics.

(63) "Riparian management area" means an area along each side of specified waters of the state within which vegetation retention and special management practices are required for the protection of water quality, hydrologic functions, and fish and wildlife habitat.

GUIDANCE:

Riparian management area - The following waters have riparian management areas: Type F, SSBT, and D streams; large and medium size Type N streams; significant wetlands; large lakes; lakes that have fish (regardless of size); and lakes larger than one-half acre. Small Type N streams, lakes less than one-half acre with no fish, other wetlands (less than eight acres and not stream-associated), seeps and springs do not have riparian management areas. OAR 629-642-0400(6), and the associated Table 7, specify vegetation retention along perennial small Type N streams in selected geographic regions.

(64) "Salmon" means any of the five salmon species that exist in Oregon. These species are:
(a) Chinook salmon (Oncorhynchus tshawwytscha);
(b) Coho salmon (Oncorhynchus kisutch);
(c) Chum salmon (Oncorhynchus keta);
(d) Sockeye salmon (Oncorhynchus nerka); and
(e) Pink salmon (Oncorhynchus gorbuscha).

(65) "Saplings and poles" means live trees of acceptable species, of good form and vigor, with a DBH of one to 10 inches.

(66) "Seedlings" means live trees of acceptable species of good form and vigor less than one inch in DBH.

(67) "Shallow, rapidly moving landslide" means any detached mass of soil, rock, or debris that begins as a relatively small landslide on steep slopes and grows to a sufficient size to cause damage as it moves down a slope or a stream channel at a velocity difficult for people to outrun or escape.

(68) "Side channel" means a channel other than a main channel of a stream that only has flowing water when high water level occurs.

GUIDANCE:

Side channel - This definition describes channels with infrequent flows, perhaps during only a few events each year. Perennial vegetation is often growing in side channels. Minor soil scour is usually evident. Channels with scour down to river rock or bedrock, or with any significant soil scour are considered main channels. See the definition of “main channel" in section (47) of this rule. Oxbows or beaver pond complexes connected only to side channels are considered part of side channels.

(69) "SSBT use" means a stream with salmon, steelhead or bull trout present or otherwise used by salmon, steelhead, or bull trout at any time of the year as determined by the State Forester.

(70) "Significant wetlands" means those wetland types listed in OAR 629-680-0310, that require site specific protection, as follows:
(a) Wetlands that are larger than eight acres;
(b) Estuaries;
(c) Bogs; and
(d) Important springs in eastern Oregon.

GUIDANCE:
Significant wetlands are further defined in OAR 629-645-0000.

(71) "Small forestland" for the purpose of implementing a wildlife food plot means forestland as defined in ORS 527.620 that:
(a) Has an owner that owns or holds common ownership interest in at least 10 acres of Oregon forestland but less than 5,000 acres of Oregon forestland; and
(b) Constitutes all forestland within a single tax lot and all forestland within contiguous parcels owned or held in common ownership by the owner.

GUIDANCE:
Small forestland - See also OAR 629-610-0100 Wildlife Food Plots.

(72) "Snag" means a tree which is dead but still standing, and that has lost its leaves or needles and its small limbs.

(73) "Sound snag" means a snag that retains some intact bark or limb stubs.

(74) "State Forester" means the State Forester or the duly authorized representative of the State Forester.

(75) "Steelhead" means the anadromous life history variant of Oncorhynchus mykiss.

(76) "Stream" means a channel, such as a river or creek, that carries flowing surface water during some portion of the year.
(a) For the purposes of the forest practice rules, streams include:
(A) The water itself, including any vegetation, aquatic life, or habitats therein;
(B) Beds and banks below the high water level which may contain water, whether or not water is actually present;
(C) The area between the high water level of connected side channels;
(D) Beaver ponds, oxbows, and side channels if they are connected by surface flow to the stream during a portion of the year; and
(E) Stream-associated wetlands.
(b) "Streams" do not include:
(A) Ephemeral overland flow (such flow does not have a channel); or
(B) Road drainage systems or water developments as defined in section (81) of this rule.

(77) "Stream-associated wetland" means a wetland that is not classified as significant and that is next to a stream.

GUIDANCE:
Stream-associated wetlands are further defined in OAR 629-635-0200(16)(b).

(78) "Structural exception" means the State Forester determines that no actions are required to protect the resource site. The entire resource site may be eliminated.

(79) "Structural protection" means the State Forester determines that actions are required to protect the resource site. Examples include retaining the nest tree or perch tree.

(80) "Target wildlife" means a wildlife species or wildlife guild expected to benefit from the installation of a wildlife food plot.

GUIDANCE:
Target wildlife - See also OAR 629-610-0100 Wildlife Food Plots.

(81) "Temporal exception" means the State Forester determines that no actions are required to prevent disturbance to birds during the critical period of use.

(82) "Temporal protection" means the State Forester determines that actions are required to prevent disturbance to birds during the critical period of use.

(83) "Timber owner" means any individual, combination of individuals, partnership, corporation or association of whatever nature, other than a landowner, that holds an ownership interest in any forest tree species on forestland.

(84) "Tree leaning over the channel" means a tree within a riparian management area if a portion of its bole crosses the vertical projection of the high water level of a stream.

(85) "Tyee Core Area" means a location with geologic conditions including thick sandstone beds with few fractures. These sandstones weather rapidly and concentrate water in shallow soils creating a higher shallow, rapidly moving landslide hazard. The Tyee Core area is located within coastal watersheds from the Siuslaw watershed south to and including the Coquille watershed, and that portion of the Umpqua watershed north of Highway 42 and west of Interstate 5. Within these boundaries, locations where bedrock is highly fractured or not of sedimentary origin as determined in the field by a geotechnical specialist are not subject to the Tyee Core area slope steepness thresholds.

(86) "Type D stream" means a stream that has domestic water use, but no fish use.

(87) "Type F stream" means a stream with fish use, or both fish use and domestic water use.

(88) "Type N stream" means a stream with neither fish use nor domestic water use.

(89) "Type SSBT stream" means a small or medium stream that is classified as a Type F stream and that has SSBT use. Stream sizes are determined by the State Forester as described in OAR 629-635-0200(15).

(90) "Unit" means an operation area submitted on a notification of operation that is identified on a map and that has a single continuous boundary. Unit is used to determine compliance with ORS 527.676 (down log, snag and green live tree retention), ORS 527.740 and ORS 527.550 (harvest type 3 size limitation), and other forest practice rules.

(91) "Vacated roads" are roads that have been made impassable and are no longer to be used for forest management purposes or commercial forest harvesting activities.

(92) "Water bar" means a diversion ditch and/or hump in a trail or road for the purpose of carrying surface water runoff into the vegetation and duff so that it does not gain the volume and velocity which causes soil movement or erosion.

(93) "Water development" means water bodies developed for human purposes that are not part of a stream such as waste treatment lagoons, reservoirs for industrial use, drainage ditches, irrigation ditches, farm ponds, stock ponds, settling ponds, gravel ponds, cooling ponds, log ponds, pump chances, or heli-ponds that are maintained for the intended use by human activity.

GUIDANCE:

Water developments – are water bodies like those specifically mentioned in this definition that are not constructed in a stream. "Not part of a stream" means the man-made water bodies are not installed in any part of a stream nor in an area that was part of a stream before development (sloughs, flood channels, oxbows and the like). A heli-pond, excavated and maintained for that purpose where it collects runoff from a small swale, is a water development. In contrast, a pump chance built by excavating in a streambed above a road crossing culvert is part of the stream, and is part of the stream, not a separate "water development."

A manmade, and maintained water body is a water development even though it receives water from or delivers water to a stream, such as drainage or irrigation ditches or canals that branch off of, but do not overlay or follow a natural stream channel. A raised channel with distinct banks is a water development. "Maintained for the intended use" means that actions required to maintain the intended use are undertaken when needed. By definition, water developments are not lakes, streams, or wetlands. However, some water developments are waters of the state, and protection practices described in rule for waters of the state would apply.

See also definitions of "waters of the state" for a discussion on the relationship of "waters of the state," "lakes," "streams," "wetlands," and "water developments."

(94) "Waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with

natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

GUIDANCE:
Waters of the state- This is a standard definition used by state agencies. As shown in the following, this definition is related to the definitions for "lakes," "streams," "wetlands," and "water developments."

"Waters of the state" defines a broad category of waters, including all natural or artificial waters that form junctions with natural surface or underground waters. The definition exempts from this category any private waters that are isolated from natural surface or underground waters. Road drainage ditches are not waters of the state, provided that the ditches do not intercept water from or discharge water directly into lakes, streams, or wetlands. In addition, puddles on landings or roads are not waters of the state.

"Waters of the state" is used in many of the forest practice rule divisions requiring specific practices for resource protection. The rules typically (1) identify waters of the state as an umbrella category to generally describe waters that must be protected, and then (2) identify specific protection practices that are applied only to defined **subsets** of the "waters of the state" category, i.e., lakes, streams, and wetlands. The Water Protection Rules (OAR 629-635 and 629-642) are an example of this method. In contrast, some rules require specific practices for protection of waters of the state **in general**; these rules usually involve keeping sediment or chemicals out of those waters.

Example: Operators are required to keep road construction debris, sidecast, or waste from entering waters of the state, OAR 629-625-0400.

(95) "Wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, bogs, and similar areas. Wetlands do not include water developments as defined in section (90) of this rule.

GUIDANCE:
Wetland - In some cases, wetlands may appear seasonally dry on the surface. Some wetlands may not show surface water at any time of the year. Surface water may be an indicator of wetland status, but the key factors are the presence of wetland vegetation and wetland soils at the time of the operation. The exception would be if the wetland met the definition of a "water development", in which case it would not meet the FPA definition of "wetland", but would likely still be a "water of the state".

ODF designates wetlands using procedures in the *1987 U.S. Army Corps of Engineers Wetland Delineation Manual and Regional Supplements* along with any supporting technical or guidance documents issued by the department and other state or federal agencies for making wetland determinations for the area in which the wetlands are located. The *Manual* describes certain biologic and physical features, namely plants, soils, and signs of hydrology to establish criteria for verifying the presence or absence of wetland.

(96) "Wildlife food plot" means a small forestland area that, instead of being used for growing and harvesting of a forest tree species, is planted in vegetation or has vegetation capable of substantially contributing to wildlife nutrition.

(97) "Wildlife guild" means a grouping of wildlife that has similar characteristics and fulfills similar ecological roles in the environment.

GUIDANCE:

Wildlife food plot and wildlife guild – See also OAR 629-610-0100 Wildlife Food Plots.

(98) "Wildlife leave trees" means trees or snags required to be retained as described in ORS 527.676(1).

(99) "Written plan" means a document prepared by an operator, timber owner or landowner that describes how the operation is planned to be conducted

GUIDANCE:

Written plan - A written plan requires certain information to be included in the document in order for it to be considered a complete written plan. The purpose of a written plan is found in OAR 629-605-0170(12) and states that the written plan must contain enough information to allow the Forester to evaluate the likelihood that the operation or practice described in the plan would comply with the FPA.

The required elements of a written plan are identified in OAR 629-605-0170(13). This rule outlines the basic information required in the written plan to make such an assessment. If a document is submitted that does not contain this information, it is not considered a complete written plan and therefore does not satisfy the requirement to submit a written plan.

REFERENCES:

- Other Agencies' Program Guidance, 2000
- 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and Regional Supplements

OREGON
Department of Land Conservation & Development

OREGON FARM & FOREST LAND USE REPORT

2018 –2019

EXHIBIT H.3
PC-2021-14207



November 15, 2020:

OREGON
Department of
Land Conservation
& Development

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Introduction



For nearly half a century, Oregon has maintained strong policies to protect our farm and forest lands. The state legislature adopted governance in the early 70's calling for the preservation of a maximum amount of the limited supply of agricultural land in order to sustain the agricultural economy and ensuring forest resources remain available for timber harvest, wildlife habitat, natural resource values and recreation.

The main tool for carrying out these policies is the statewide land use planning program. Oregon's Land Conservation and Development Commission (LCDC) sets standards and criteria for protecting these resource lands. Counties then apply these state requirements through local comprehensive plans and land-use ordinances. Under this system, all 36 counties in Oregon have adopted planning and zoning measures to protect agricultural and forest lands.

Vibrant farm and timber economies require critical masses of resource land be maintained. When residential development or other non-resource uses encroach into these areas, a downward cycle of conversion leads to increased conflicts between farm and forest practices and rural residents, as well as increased risk for wildfire and pressures on diverse wildlife.

Oregon provides persuasive evidence that zoning has been able to protect large areas of land from conversion to other uses, particularly sprawling residential subdivisions. The comparison to other parts of the country is stark, especially at the edges of urban areas, where in most states low-density residential development continues to leap-frog across the landscape, forcing the premature conversion of farms and forestlands to other uses and encroaching into the wildland-urban interface.

In the past, conversations around working lands preservation have primarily focused on constraining urban sprawl. There is a growing concern within working lands preservation communities about trends in increasing low-density rural residential development. A report published this summer by the American Farmland Trust (AFT) recognizes that increased low-density residential development in agricultural areas results in actual conversion of farmland to other uses. AFT estimates that roughly half of the farmland conversion in Oregon between 2001 and 2016 was due to low-density residential development. This happens even while land remains under exclusive farm use zoning. This report contains detailed data on those non-farm and non-forest uses that have been permitted on lands designated as working resource lands.

This report provides information on the background and structure of the Goal 3 (Agricultural Lands), and Goal 4 (Forest Lands), components of the land use program; reports data on applications approved and denied for certain land uses in exclusive farm use (EFU) and forest zones; and highlights challenges and emerging issues pertaining to the protection of agricultural or forest land. Careful consideration of this information can provide insight into:

- How well our program is working relative to the original goals established for it,
- How new data and information could be used to enhance the program,
- How we can respond to challenges facing the program, and
- How the program might be adapted to respond to emerging issues like climate change adaptation and mitigation.

Reporting of County Land Use Decisions

Oregon Revised Statutes (ORS) 197.065 requires the Oregon Land Conservation and Development Commission (LCDC) to submit a report every two years to the Legislature "analyzing applications approved and denied" for certain land uses in exclusive farm use (EFU) and forest zones and "such other matters pertaining to protection of agricultural or forest land as the commission deems appropriate."

The Department of Land Conservation and Development (DLCD or department) receives county land use decisions in EFU, forest and mixed farm-forest zones. This report summarizes the information provided by the counties for the two-year period from January 1, 2018 through December 31, 2019. For each of the two years, tables and graphs include information on dwelling and land division approvals as well as other approved uses on farm and forest land. Detailed, county-level data tables are included here in the appendix and statewide summaries are included in the body of the report. In addition, the report provides information on the acreage rezoned out of farm and forest zones to urban and rural zones in this same time period. Additional graphs, tables, and maps provide historic data on development trends and land conversion of farm and forest land to other uses. Finally, this report also includes data on county land use decisions in farm and forest zones that are based on waivers to state and local land use regulations under Ballot Measures 37 and 49.

Use of this Report

The department uses the collected information to evaluate the extent and location of development, partitions, and zone changes on farm and forest lands. This information is used to continually assess the effectiveness of farm and forest programs in implementing Statewide Planning Goal 3 (Agricultural Lands) and Goal 4 (Forest Lands). The data may also be used by LCDC and the Legislature to shape statutory and rule changes to enhance or clarify protections for farm and forest lands.

I. Oregon's Agricultural Land Protection Program: Planning for the agricultural economy

As expressed in the statutory Agricultural Land Use Policy, the preservation of agricultural land is one of the primary objectives of Oregon's statewide planning program. Oregon has determined that it is in the state's interest to protect the finite land resource that is the foundation of one of its leading industries – agriculture. Agriculture is the second largest sector of Oregon's economy contributing directly and indirectly $12.12 billion in taxes, $29.71 billion in wages and over 680,000 jobs (ODA 2020).

2017 USDA NASS Highlights for Oregon

- 37,616 Farms in Oregon
- 1,664,921 acres of irrigated land
- $5 billion market value of products sold

Oregon's agricultural lands protection program is based on statute and administrative rules as interpreted by the Land Use Board of Appeals (LUBA) and the courts. Statewide Planning Goal 3 (Agricultural Lands) requires counties to identify and inventory agricultural land, apply statutory EFU zones (ORS Chapter 215) to those lands, and review applications for farm and non-farm uses according to statute and administrative rule (OAR chapter 660, division 33). These provisions also incorporate statutory minimum lot sizes and standards for all land divisions.

Oregon's Agricultural Land Use Policy

ORS 215.243 Agricultural Land Use Policy

(1) Open land used for agricultural use is an efficient means of conserving natural resources that constitute an important physical, social, aesthetic and economic asset to all of the people of this state, whether living in rural, urban or metropolitan areas of the state.

(2) The preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources and the preservation of such land in large blocks is necessary in maintaining the agricultural economy of the state and for the assurance of adequate, healthful and nutritious food for the people of this state and nation.

(3) Expansion of urban development into rural areas is a matter of public concern because of the unnecessary increases in costs of community services, conflicts between farm and urban activities and the loss of open space and natural beauty around urban centers occurring as the result of such expansion.

(4) Exclusive farm use zoning as provided by law, substantially limits alternatives to the use of rural land and, with the importance of rural lands to the public, justifies incentives and privileges offered to encourage owners of rural lands to hold such lands in exclusive farm use zones.

Oregon's Agricultural Land Use Policy was first established by the Oregon Legislature in 1973 with the enactment of SB 101, the partner bill to the Land Conservation and Development Act (SB 100), and is codified at ORS 215.243. It pre-dates the adoption of Goal 3 and is included therein by reference.

There are four basic elements to the policy. This first two parts of the policy recognize the benefit of farmland preservation to the agricultural economy and also its physical, social and aesthetic contributions to all people of the state in both urban and rural communities. It acknowledges agricultural land as a limited natural resource and as an asset to the public. In other words, the policy acknowledges that ***private farm land has significant public value beyond the economic contribution of the agricultural sector and the security of food supply.***

Some of those public values are less tangible, such as the imaginal contribution of the farm-scape to our sense of landscape identity - or the 'open air' and 'room to breathe' that attract recreationists to our countryside. Other public values are more concrete and have been the subject of growing public discourse such as the potential for carbon sequestration - particularly on managed rangeland.

While the first two policy statements clearly set forth the state's interest in the preservation of agricultural lands, the later statements establish that:

- Imposing limitations on uses allowed on agricultural lands are justified in order to prevent the conflicts and negative outcomes which are the typical topics of many of our land use reviews, and
- Certain incentives and privileges (i.e. special tax assessment) are justified because of those limitations placed upon the use of the land.

Farmland Taxation in Oregon



In Oregon, all land zoned EFU automatically receives special tax assessment at its farm use value rather than at its true cash or "highest and best use" value, unless it is explicitly disqualified. The tax laws enabling this special assessment, laws establishing areas of eligibility and the criteria for eligibility pre-date the Land Conservation and Development Act by over a decade. Between 1961 and 1973 the special farm assessment program evolved from a voluntary, incentive-based program available in a few areas of the state to a consistent, statewide program that requires the protection of agricultural land through zoning restrictions with reciprocal tax benefits. EFU landowners receive financial compensation in the form of reduced property tax in exchange for the restrictive land use limitations imposed by the EFU zone. The structure that has been in place since 1973 is a compensatory tax program linked to the land use program.

Over the years there have been efforts to quantify the tax benefit owners of EFU land have received. A 2015 report by the American Land Institute estimates the program has resulted in a total $5.75 billion of compensation in the form of reduced property taxes in the forty-year period from 1974 to 2014. As discussed further below, when the program was established, only six nonfarm uses were allowed in the EFU zone. Since the inception of the program, the legislature has added additional allowed uses on farmland almost every legislative session. There are now over 60 nonfarm uses allowed in the exclusive farm zone. As we consider how the program has evolved over the past 47 years and how successful we have been in achieving the farm land policy goals set by the legislature, it is also important to keep in mind the incentives and privileges the state has afforded owners of rural lands to hold such lands in restrictive exclusive farm use zones.

What and where are our Agricultural Lands?

Oregon boasts a diverse landscape supporting a variety of agricultural activities. As reported in the 2017 Census of Agriculture, over 220 high-quality agricultural products are produced in the state. The top commodities produced reflect that diversity ranging from cattle and calves, hay, grass seed, milk, wheat, wine grapes, blueberries, hazelnuts, nursery products and Christmas trees. Important agri-clusters are located in all areas of our state.

Agricultural Lands Definition

1) Lands classified by the U.S. Natural Resources Conservation Service (NRCS) as predominantly Class I-IV soils in Western Oregon and I-VI soils in Eastern Oregon;

2) Land in other soil classes that is suitable for farm use as defined in ORS 215.203(2)(a), taking into consideration soil fertility; suitability for grazing; climatic conditions; existing and future availability of water for farm irrigation purposes; existing land use patterns; technological and energy inputs required; and accepted farming practices; and

3) Land that is necessary to permit farm practices to be undertaken on adjacent or nearby agricultural lands.

Land in capability classes other than I-IV/I-VI that is adjacent to or intermingled with lands in capability classes I-IV/I-VI within a farm unit, shall be inventoried as agricultural lands even though this land may not be cropped or grazed.

For land use purposes, the definition of “Agricultural Lands” subject to statewide planning Goal 3 is primarily based on Natural Resource Conservation Service (NRCS) soil capability ratings. Our program relies on objective, scientific field data in determining what is inventoried as agricultural lands rather than subjective and changeable trends in the agricultural economy or metrics of profitability which are dependent on the particular skills of individual operators and market conditions. Basing our definition of agricultural lands on soils classifications acknowledges that long term resource decisions should not be based on short-term conditions, or to put it other words, individual circumstances such as profitability should not be the basis for long-term resource preservation decisions.

In recognition of the difference in our regional landscapes and unique needs of the variety of farm industries, the definition also encompasses other soil classes as needed based on fertility, climatic conditions, availability of water, land use patterns and farming practices. This allows for a broader definition of agricultural lands subject to Goal 3 in keeping with the individual characteristics, vision and needs of local communities.

Lastly, consistent with the Agricultural Land Use Policy's focus on preserving fully functioning agricultural landscapes, the definition of Agricultural Lands is also meant to include lower capability lands that are interspersed within a cohesive working landscape.

By 1985, all 36 counties had completed their agricultural land inventories based on this definition and the procedures set forth in rule. Counties applied Exclusive Farm Use (EFU) zoning to all inventoried agricultural lands. At that time approximately 16.1 million acres were protected under the EFU zoning designation. Today, 99% of that land remains under the EFU zoning designation. The section on land conversion below addresses other metrics that might be used to evaluate trends in farmland conversion in the state.

> "Man – despite his artistic pretensions, his sophistication, and his many accomplishments – owes his existence to a six inch layer of topsoil and the fact that it rains."
>
> — Paul Harvey

Classification of Agricultural Lands: Over the life of the land use program, the State Legislature has added several definitions to statute and rule influencing how agricultural lands are prioritized relative to other development opportunities. Newer definitions for priority – or "high-value" farmland are more inclusive and rely on more current data. As noted above, the foundation for farm land inventories was based on scientific data. Our evolving understanding of the importance of agricultural soils should be informed by technical experts and current data.

Further classification of designated agricultural lands is required to address criteria under certain land use reviews. Certain land use reviews may require evaluation of the land relative to one of several different definitions for high-value farmland[1], or to definitions for arable land, land suitable for the production of farm crops and livestock, or non-arable land. Land categorized under certain definitions may not be eligible for certain uses or may require additional standards be met. All of these exercises depend fundamentally on soil capability classifications published by NRCS, though the definition may refer to the dataset as it existed at a certain date in time.

The Oregon Legislature originally created the definition of high-value farmland at ORS 195.300(10) for use in review of Measure 49 claims and it was later referenced in a few other review types. The definition at 195.300(10) goes beyond the more basic soils capability definition in rule to include things like suitability for viticulture use; evaluation of access to irrigation water or drainage infrastructure and other metrics in determining if the land should be considered particularly important for agriculture. This is an example of how the Goal 3 program has been updated, albeit in a limited way, to account for advances in data availability; external or environmental constraints on irrigation potential; and evolving social perceptions

[1] ORS 215.710, ORS 195.300, OAR 660-033-0020(8)

of value. ***The way in which we prioritize our agricultural lands for better protection is a topic that merits regular consideration*.**

Exclusive Farm Use Zones



Agricultural lands in Oregon are meant to be protected from conversion to rural or urban uses and other conflicting non-farm uses through the application of EFU zoning. At present, about 16 million acres in Oregon are protected under EFU zoning. The Legislature first developed the EFU zone in 1961 and the statutory zoning provisions are codified in ORS Chapter 215 as interpreted and refined by LCDC rulemaking. State law protects and encourages farm use within the EFU zone. In addition to farm use, the statutes allow for a variety of accessory farm uses and nonfarm uses provided they are compatible with agriculture. Large minimum lot sizes and dwelling approval standards limit the outright conversion of farmland to other uses.

Local jurisdictions do have some discretion in how state statute and rule are reflected in local zoning ordinance provisions and local jurisdictions craft many of the standards and criteria associated with specific uses to recognize regional differences.

- Counties may not impose more restrictive standards on those uses allowed outright in statute, like farming itself or farm stands, and they cannot regulate farm or forest practices[2], such as herbicide application, on resource lands. However, for discretionary uses like campgrounds that require a demonstration of compatibility with surrounding farm and forest practices, counties may adopt more restrictive standards than those in statute,
- Some uses and standards are mandatory and some are optional, meaning that a county wanting to implement those optional use provisions must adopt them into its local ordinance,
- Certain uses, like guest ranches, are allowed in some areas of the state and not in others,
- Other uses (e.g. nonfarm dwellings) apply different standards and criteria depending on where in the state they will be located.

This flexibility recognizes that municipal and county governments are in the best position to assess local conditions and needs within the regulatory framework established by the state. As a result, county farm use zoning ordinances vary widely across the state.

[2] *ORS 215.253, "Restrictive local ordinances affecting farm use zones prohibited; exception. (1) No state agency, city, county or political subdivision of this state may exercise any of its powers to enact local laws or ordinances or impose restrictions or regulations affecting any farm use land situated within an exclusive farm use zone established under ORS 215.203 or within an area designated as marginal land under ORS 197.247 (1991 Edition) in a manner that would restrict or regulate farm structures or that would restrict or regulate farming practices if conditions from such practices do not extend into an adopted urban growth boundary in such manner as to interfere with the lands within the urban growth boundary. "Farming practice" as used in this subsection shall have the meaning set out in ORS 30.930."*

Farm Ownership and Operations

Although the land use program does not directly bear on certain factors which influence the agricultural economy and who owns and manages agricultural lands (succession planning, economic viability, access to capital), the topic of ownership is important as owners decide whether to maintain land in commercial farm use or press to develop the property for non-farm uses. As ownership of farmland evolves over generations, we can anticipate that pressures on the land use program will also evolve.

White only	93.99%
Hispanic, Latino, or Spanish Origin	2.88%
More than one race reported	1.12%
American Indian or Alaska Native	0.91%
Asian	0.90%
Native Hawaiian or Other Pacific Islander	0.13%
Black or African American	0.07%
USDA NASS. Selected Farm Characteristics by Race of Principal Producers: 2017	

Approximately 84 percent of Oregon's farms are family owned and operated (USDA, 2017). This may be changing. A Portland State University study found that less than half of all buyers of farmland between 2010 and 2016 had a clear connection to agriculture with many buyers focused on estate/property development, investment (such as national and international investors), or manufacturing (requiring eventual conversion away from working farmland) (Horst, 2018). Farmland is particularly vulnerable to conversion to other uses when an experienced operator retires and may be looking for ways to realize the equity he or she has accrued in the land. The average age of Oregon farmers is 57.9 years old and has been increasing over the past decade Sixty-four percent of Oregon's farm operators are over the age of 55 (USDA, 2017). This presents challenges in conveying land to the next generation of farmers and highlights the need for farm succession planning Retirements over the next several decades will require the conveyance of over 10 million acres (64 percent) of Oregon's agricultural land (Brekken et al, 2016). Given the trend towards buyers without a connection to agriculture, this changing of hands presents a challenge for continuity of operations.

Average Age of Oregon Farm Producers 2007 -2017 (USDA 2017)	
2007	55.3
2012	57.4
2017	57.9

Climate impacts, adaptation and carbon sequestration

Oregon's farms and ranches will experience significant adverse impacts from climate change.			
Increased average temperature	Shifting growing season & climatic zones	Drought	New pests and invasive pressure
Changes in precipitation and snowpack (amount and timing)	Increased CO2 concentrations (fertilization effect)	Changes in irrigation needs and water supplies	New pathogens
Decrease in chilling days	Wildfire	Increased heat stress	Flooding
(Oregon Climate Change Adaptation Framework 2010)			

Climate-related changes in temperatures and precipitation patterns compound and alter pest pressures, crop maturation, and livestock productivity. Oregon's agriculturalists are already experiencing increased disturbances from pest-related losses, prolonged drought, and changing growing seasons (Oregon Climate Change Adaptation Framework 2010). Of particular concern are the projected impacts to availability of irrigation water. Oregon's limited water supplies are already being stressed by climate and population

changes (Mucken, 2017). Reduced availability of water will affect irrigators without first priority water rights, change water supply planning in many basins, and proposals for surface water storage may increase (Oregon Climate Change Adaptation Framework 2010). Irrigated agriculture is a primary economic driver in Oregon, so without careful planning strategies to mitigate water-related impacts, the economy may suffer.



Productive agricultural lands can also serve as a sink for the absorption and sequestration of greenhouse gasses back into both plants and soils in the form of carbon. Practices contributing to the maintenance of soil health are key to this aspect of agriculture's contribution to climate solutions. However, adoption of land use regulations limiting farm practices are prohibited by statutes (ORS 215.253). The responsibility for regulation of farm practices falls to other state agencies. Oregon State University is currently engaged in collaborations to develop a set of nationally adopted soil health metrics, process samples, and develop a database that can establish a baseline of soil health for the state[3]. The Oregon Department of Agriculture, NRCS and Oregon State University all engage in efforts to provide support and resources for soil health including voluntary incentives for practices related to climate mitigation. As mentioned above, Oregon's land use program relies heavily on NRCS soil capability classifications in defining agricultural lands and high-value farmlands. DLCD remains interested in evolutions in soil health metrics as they relate to definitions and valuations of farmland for the state.

One also cannot overlook the role other aspects of our land use planning program play in ensuring sufficient lands are designated for rural commercial and rural industrial uses and are available for critical food infrastructure like co-packing plants and livestock processing facilities which will help reduce transportation miles, create jobs through localized economic networks in our rural communities, and help keep agricultural land in agricultural production – all of which contribute positively to the climate mitigation strategies.

[3] Oregon State University College of Agricultural Sciences Central Analytical Laboratory Soil Heath Initiative.

II. Land Use Approvals on Agricultural Land

Dwellings

ORS 215.243 Resource Land Dwelling Policy

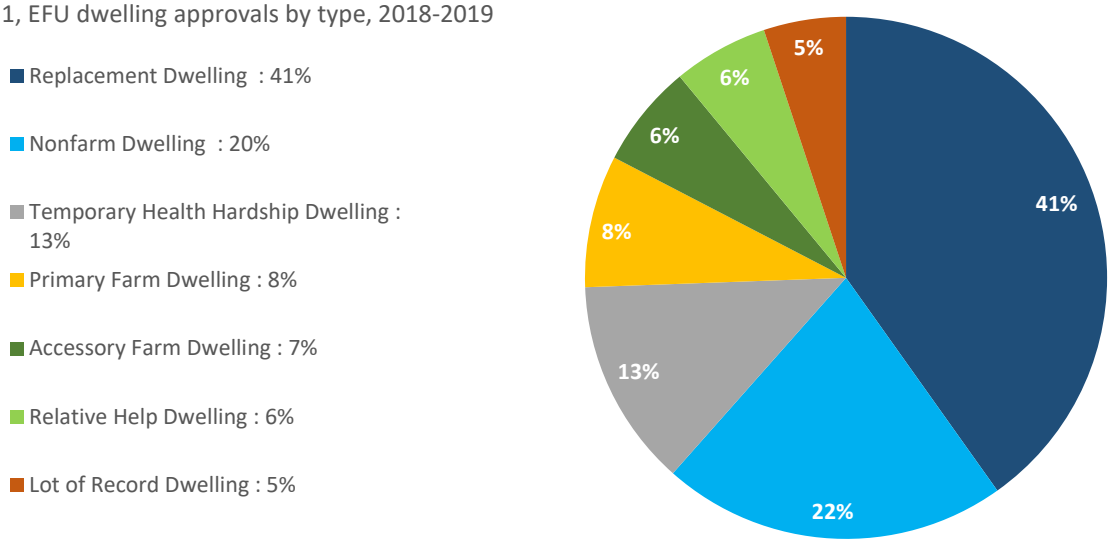
The Legislative Assembly declares that land use regulations limit residential development on some less productive resource land acquired before the owners could reasonably be expected to know of the regulations. In order to assist these owners while protecting the state's more productive resource land from the detrimental effects of uses not related to agriculture and forestry, it is necessary to:

(1) Provide certain owners of less productive land an opportunity to build a dwelling on their land; and

(2) Limit the future division of and the siting of dwellings upon the state's more productive resource land.

The EFU zone allows for the development of a variety of dwelling types on agricultural land. These dwelling types generally fall into two broad categories – those permitted for farm owners (and relatives helping in farming) and farm workers (including relatives assisting in the farm operation), and those that are not associated with an active farm use on the property. The statutory policies related to housing on resource land included in ORS 215.262, 215.277 and 215.700 indicate that it was the intention of the legislature that a limited number of dwellings be permitted on less productive resource land and that farmworker housing be allowed as long as it is consistent with the State's agricultural land use policy discussed above.

Fig. 1, EFU dwelling approvals by type, 2018-2019



Primary Farm Dwellings

Primary farm dwellings are dwellings that are permitted in conjunction with a working farm operation. There are several ways in which a farm operator may apply to place a primary farm dwelling on agricultural land. All of these tests require that the dwelling only be occupied by the farm operator and the operator's immediate family, and all of these tests require documentation that a commercial farm use is being conducted on the property. Farming of marijuana cannot be considered as a qualifying farm use for the purpose of establishing primary or accessory farm dwellings. The income standards applicable to most of the farm dwelling tests were established in 1992 as clear and objective standards that would be easy for citizens to understand and for local jurisdictions to apply. These gross income requirements were not tied to any inflationary index and have not been revised since.

Table 1, Primary farm dwelling approvals, statewide summary, 2018 - 2019

Primary Farm Dwelling Tests	Summary of Test*	2018	2019
Large Tract Dwelling	On parcel 160-320 acres in size	25	10
Farm Income (High Value)	At least $80,000 in gross annual income from the sale of farm products in each of the last two years or three of the last five years, or in an average of three of the last five years.	13	18
Farm Income (Non-High Value)	At least $40,000 in gross annual income from the sale of farm products in each of the last two years or three of the last five years, or in an average of three of the last five years or the median amount of gross income earned by commercial farm operations in the 1992 census.	7	6
Farm Capability	At least as large as the median size of commercial farm tracts capable of generating at least $10,000 in annual gross sales that are located within a study area. Must be reviewed by DLCD.	2	1
Commercial Dairy**	Owns a sufficient number of producing dairy animals capable of earning the gross annual income required from the high value or non-high value income test - whichever is applicable, from the sale of fluid milk.		
Relocated Farm Operations**	An experienced farm operator who ran a qualifying operation at a different location may relocate to a parcel or tract that previously met the applicable requirements for the farm income test.		

**The basic essence of the test is described here. All referenced tests have additional, nuanced criteria.*
*** Reported under the high-value or non-high value tests above.*

Although not required by rule or statute, some counties require covenants be recorded on the property limiting occupancy of the primary farm dwelling to a primary farm operator and the operator's immediate family in order to increase the likelihood of continued compliance with that requirement.

The total number of primary farm dwelling approvals statewide have declined since 1995 though over the past decade the annual number of approvals have remained fairly consistent between 35 – 50 dwelling approvals a year. Table 1 above shows what option was used to approve primary farm dwellings during the 2018-2019 biennium. Forty-two percent of approvals in 2018-2019 were based on the large parcel size test and were approved in southern or eastern Oregon. Thirty-eight percent of approvals in 2018-2019 were based on the high-value income test and over 75% of those approvals occurred in the Willamette Valley. Appendix Tables 2 and 3 contain detailed information on primary farm dwelling approvals.

Accessory farm dwellings

ORS 215.277 Farmworker housing; compliance with agricultural land use policy required

It is the intent of the Legislative Assembly that the provision of farmworker housing, as defined in ORS 215.278, not allow other types of dwellings not otherwise permitted in exclusive farm use zones and that farmworker housing be consistent with the intent and purposes set forth in the agricultural land use policy.

Accessory farm dwellings must be sited on a farm operation that earns the same gross income required for a primary farm dwelling ($80,000 or $40,000). These approvals occasionally involve more than one dwelling unit. In order to increase the likelihood of continued compliance with the occupancy requirement, some counties require covenants be recorded on the property limiting occupancy of the dwelling to a person who is principally engaged in farm use and whose assistance is required by the farm operator and their immediate family.

Table 2, Accessory farm dwelling approvals, statewide summary, 2018 - 2019

Accessory Farm Dwelling Tests	Summary of Test*	2018	2019
Accessory Farm Dwelling	Occupied by a person employed as a farm worker on the operation. Sited on a farm operation that earns the same gross income required for a primary farm dwelling ($80,000 or $40,000)	30	34
Relative Help	Occupied by a relative of the farm operator who whose assistance is required in the management of farm operations.	31	28

**The basic essence of the test is described here. All referenced tests have additional, more specific criteria.*

Relative Farm Help Dwellings

The number of dwellings approved for relatives whose assistance is needed on the farm has been fairly consistent over the past six years averaging 30 dwelling approvals a year. A concern with this dwelling type is that, once built, there is no requirement that it continue to be occupied by a relative or even that it will continue to be used in conjunction with farm use. Although not required by rule or statute, some

counties require covenants be recorded on the property limiting occupancy of the dwelling to a relative of the primary farm operator whose assistance is needed in the day-to-day operation of the farm in order to increase the likelihood of continued compliance with that requirement.

Dwellings Not in Conjunction with Farm Use

Table 3, Dwellings not in conjunction with farm use, statewide summary, 2018-2019

Dwellings Not in Conjunction with Farm Use	Summary of Opportunity*	2018	2019
Nonfarm Dwelling	Located on a parcel or portion of a parcel not suitable for resource use and when the dwelling will not materially alter the surrounding land use pattern or negatively impact surrounding farm and forest practices.	115	92
Lot of Record Dwelling	Located on a parcel owned continuously since 1985 or inherited from someone who owned the parcel continuously since 1985.	29	22
Temporary Health Hardship Dwelling	Located on a parcel with an existing dwelling for a caregiver or person suffering a medical hardship.	65	64
Replacement Dwelling	Allows the replacement of a legally established dwelling.	213	189
**The basic essence of the test is described here. All referenced tests have additional, more specific criteria.*			

Nonfarm Dwellings

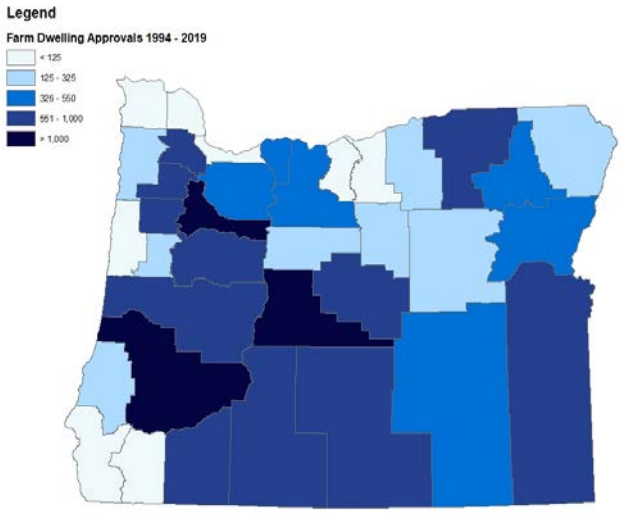
Nonfarm dwellings may be approved on parcels or portions of parcels that are determined to be unsuitable for farm use. They have engendered much debate due to the subjectivity and complexity of the test. The Oregon Court of Appeals observed in *Cherry Lane v. Jackson County*[4] that these types of nonfarm dwelling approvals should "be the exception and that approval for them be difficult to obtain."

Except in the two "marginal lands" counties (Washington and Lane),[5] nonfarm dwelling reviews are quite involved, requiring a county to consider resource practices, prior development approvals, development and parcelization trends, and the cumulative impact of all possible new nonfarm dwellings and parcels in a 1,000 to 2,000-acre study area in order to determine if the proposed nonfarm dwelling may alter the stability of the prevailing land use pattern. A county must deny an application if the county determines that the potential dwellings will make it more difficult for the types of farms in the area to continue

[4] 84 Or. App. 196, 733 P.2d 488 (1987).
[5] "Marginal lands" are lands that Oregon Law authorized under previous versions of Oregon Revised Statutes as an optional regulatory method. The Legislature repealed the statutes authorizing marginal lands in 1993, but allowed two counties that had chosen this regulatory method, Lane and Washington, to continue with its use.

operation due to diminished opportunities to expand, purchase or lease farmland, acquire water rights or diminish the number of tracts or acreage in farm use in a manner that will destabilize the overall character of the study area. A particular challenge with this review is determining when the jurisdiction has encountered the proverbial "tipping point" for a given area – particularly when evaluating something as dynamic as the agricultural landscape.

Fig. 2, Dwelling approvals on EFU, all types, by county, 1994-2019



As shown in Figure 4, the number of nonfarm dwelling approvals declined following 2008 and began to increase in 2011. Over the past five years the number of nonfarm dwelling approvals has been fairly consistent – averaging 105 dwelling approvals a year. That is roughly equivalent to the combined average of primary farm dwelling and accessory farm dwelling approvals over the same five-year period (45 primary farm dwelling approvals/year and 65 accessory farm dwelling approvals/year). Appendix tables 4, 11 and 12 contain additional detailed information on nonfarm dwelling approvals over the past biennium and historically.

In 2010, the Legislature passed House Bill 3647, which required DLCD review of soil assessments, or soils challenges, prepared by a private soil consultant. Soil assessments prepared by private consultants may be used to provide more detailed information than is shown on the USDA Natural Resources Conservation Service's soil mapping and are often used to support a nonfarm dwelling approval by re-classifying a portion of a property to a lower soils capability class. On average, DLCD receives 14 soils reports for review in a given year. One third of the requests received have been for properties in Douglas County, which is consistent with the higher number of nonfarm dwelling reviews in that county.

Lot of record dwellings

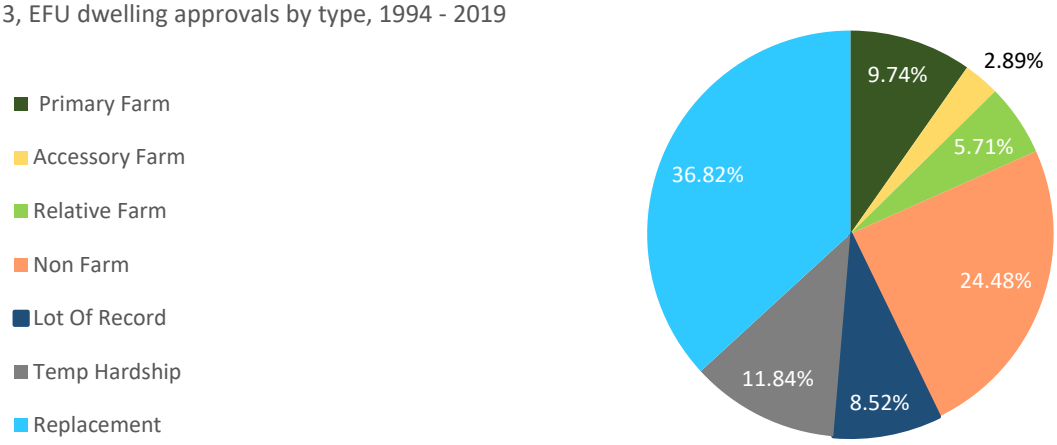
Counties may approve lot of record dwellings on parcels that have been in the same ownership since 1985 and, with some exceptions, are not on high-value farmland. It is anticipated that lot of record approvals will decline over time as existing parcels are built out or conveyed to separate ownership. In 2018-2019, 51 lot of record dwellings were approved. This is consistent with the 10-year average of 25 dwelling approvals per year. Appendix tables 1, 11 and 12 contain additional detailed information on lot of record dwelling approvals over the past biennium and historically.

Health hardship dwellings

These are temporary dwelling approvals for relatives with a medical hardship and must be removed at the end of the hardship. A health hardship dwelling must be sited in conjunction with an existing dwelling and tied into an existing sanitation system. DLCD does not track the removal of these dwellings when they are no longer needed.

During the two-year 2018-2019 reporting period, 129 health hardship dwellings were approved which is consistent with the 5-year average of 67 health hardship dwelling permits/year. Appendix tables 1, 11 and 12 contain additional detailed information on health hardship dwelling approvals over the past biennium and historically.

Fig. 3, EFU dwelling approvals by type, 1994 - 2019

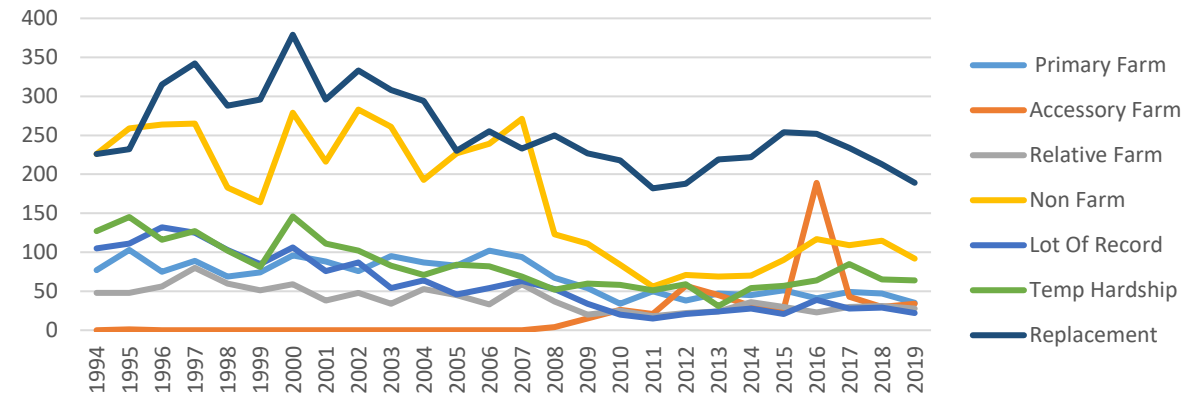


Replacement dwellings

A replacement dwelling is a new home that replaces any older, legally established dwelling on a parcel. These dwellings do not need to be associated with a farm operation. The legislature added new provisions to statute in 2013 and in 2019 which allow owners to obtain a replacement dwelling when the original dwelling no longer exists or is no longer assessed as a dwelling. This category accounts by far for the most number of dwelling approvals in the farm zone. The historical average for replacement dwelling approvals has remained fairly consistent over time at roughly 220 – 250 replacement dwelling approvals per year. Thirty-eight percent of dwellings approved for replacement were removed, 42 percent were demolished, and 10 percent were converted to non-residential use with 11 percent not specified. Appendix tables 11 and 12 contain detailed information on the number of replacement dwelling approvals over time.

Cumulative Dwelling Approvals

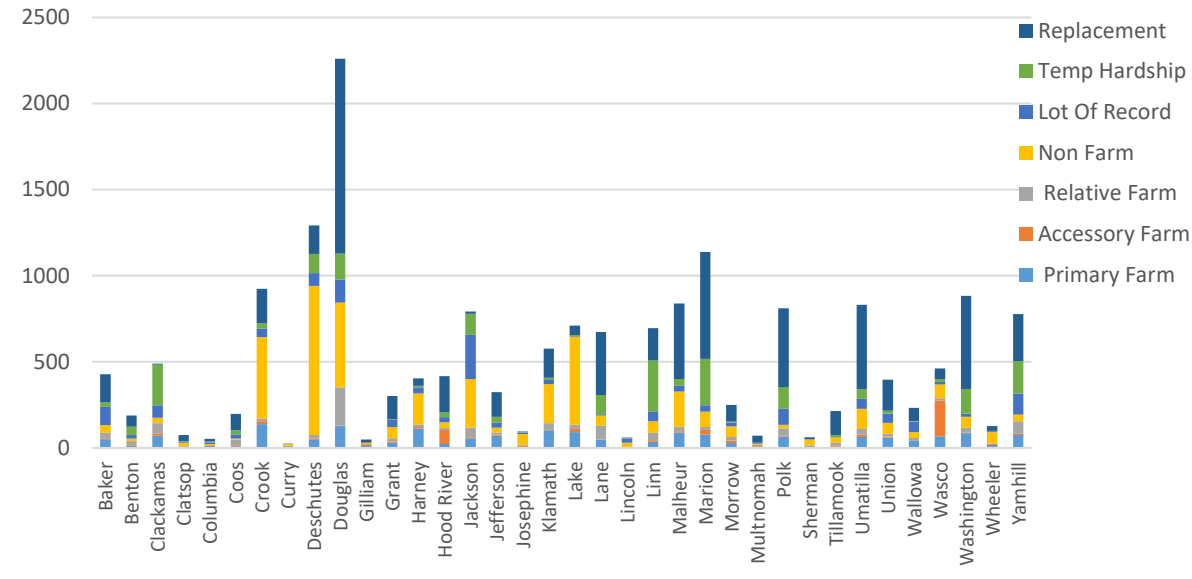
Fig. 4, Dwelling approvals on Farmland by type, 1994-2019



Between 1994 and 2019, over 18,000 dwellings of all types were approved on farmland across the state.

Figures 4 and 5 illustrate the number of dwelling approvals each year since 1994 for the different dwelling types. Detailed information on EFU dwelling approvals over this timeframe are provided in Appendix tables 11 and 12. Since 1994, only 18 percent of dwelling approvals on land zoned EFU have been approved in conjunction with farm use. Thirty-three percent have been nonfarm or Lot of Record dwelling approvals, 37 percent have been replacement dwellings - which may or may not be associated with a farm - and 12 percent have been temporary health hardship dwellings. **Since 1994, fewer dwellings associated with an operating farm have been approved on agricultural lands than other types of dwellings.**

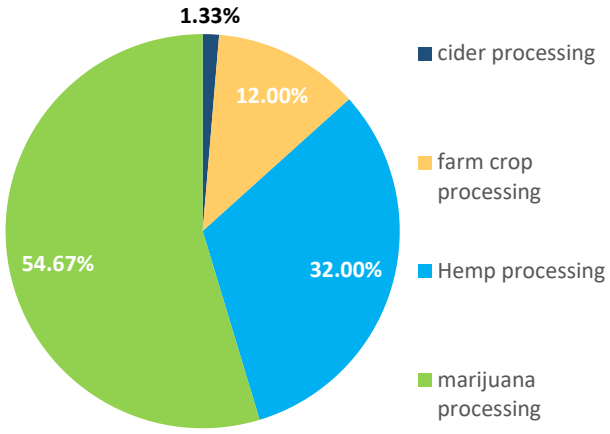
Fig. 5, Total dwelling approvals on Farmland, all counties, 1994-2019



Nonresidential uses

The Legislature has recognized that some farm-related and non-farm uses are appropriate in EFU and mixed farm-forest zones. The legislature has added additional uses almost every session since the inception of the program. In 1963, the first statutory EFU zone included just six nonfarm uses. Today over 60 uses other than farm use are allowed in an EFU zone. Nonfarm uses are subject to local land use approval and must demonstrate that they will not force a significant change in or significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest uses (ORS 215.296). Allowing some nonfarm uses and dwellings assumes that farm zones can accommodate a certain number of nonfarm uses or dwellings without affecting the overall agricultural stability of an area.

Fig. 6, Farm processing facility approval by crop type, 2018-2019



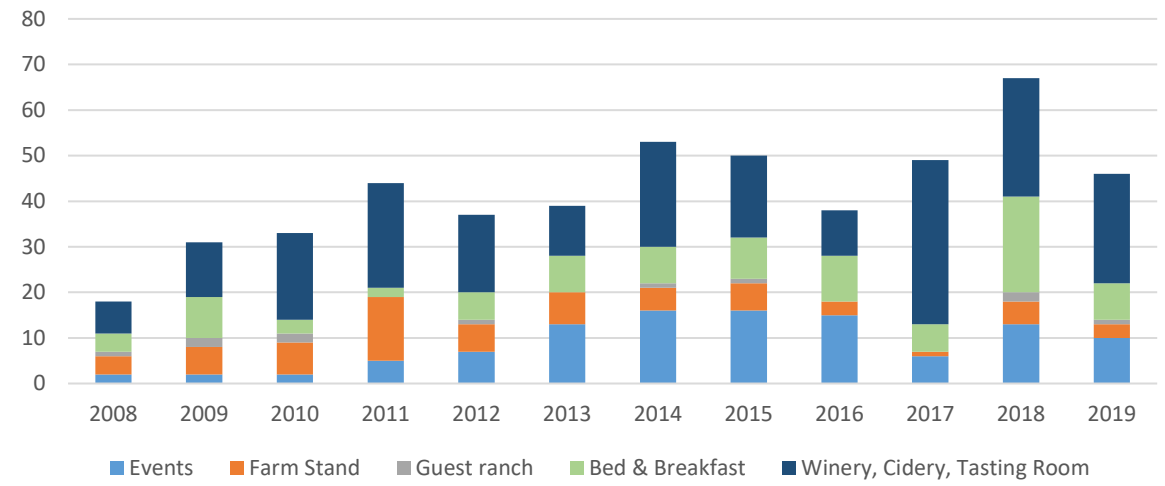
1,000 Friends of Oregon released a report over the summer of 2020, "Death by 1000 Cuts: A 10-Point Plan to Protect Oregon's Farmland," that contains a detailed analysis of conflicts and impacts to agriculture from the accumulation of nonfarm uses within working agricultural areas. Potential impacts to the agricultural economy can occur in a variety of ways: from lost time resolving conflicts with residential neighbors due to issues like noise, odors, spraying and trespass and traffic, to more landscape-level impacts that occur when the number of farms decline beyond a certain point. A certain critical mass of farm operations is required in a given area to maintain social networks that provide mentorship, provide opportunities for knowledge sharing, and maintain an informal economy (borrowing equipment or veterinary supplies). That critical mass of farmers is also required to support critical local service providers like diesel mechanics, feed stores and nearby facilities such as co-packing plants and meat processors.

As shown in Appendix table 5, the most commonly approved nonresidential uses in 2018-2019 were solar power generation facilities (59 approvals), home occupations (77 approvals), commercial activity in conjunction w farm use (51 approvals) and farm processing facilities (72 approvals). Renewable energy and agri-tourism related uses are discussed further below.

In 2014-2015, only nine farm processing facilities were approved statewide. The increase from 2016 through 2019 is largely related to marijuana and hemp processing facilities. In 2018-2019, thirty-one percent of commercial activities in conjunction with farm use and eighty percent of processing facility permits were reported as associated with marijuana or hemp processing.

Agri-tourism

Fig. 7, Agri-tourism related approvals, by year, 2008-2019



Agri-tourism allows visitors to experience and learn about Oregon agriculture while providing additional income for farmers, and has been growing in popularity over the past decade. USDA reports $16M in 2017 revenue earned from Oregon agri-tourism and recreational services (hunting, fishing, farm or wine tours, hay rides, etc.) (USDA NASS 2017). This represents an increase of 51% over 2012 revenues ($10.6M). However the burgeoning industry has its share of controversy as operators and neighboring farmers negotiate a series of challenging conflicts, such as noise, litter, trespass, traffic, parking and spraying.

In addition to the potential for conflict with neighboring agricultural operations, there have been some concerns about the effect of events and the cumulative impact of multiple agri-tourism operations on farm practices. Many agri-tourism uses, like farm stands and farm-to-table dinner events, are allowed outright and are not required to address changes to farm practices or cost increases as part of the land use approval process.

There is no definition for agri-tourism in statute or rule and applications can encompass a wide variety of potential options including: u-picks, farm stands, wineries, cideries, breweries, guest ranches, farm-to-table dinners, corn mazes, commercial activities in conjunction with farm use, home occupations, bed and breakfasts, camping, classes, tastings, tours, concerts, festivals, etc. Many of the provisions related to agri-tourism opportunities are optional for counties to adopt into their ordinances, resulting in uneven application across the state.

Agri-tourism can provide an alternate stream of income that helps farmers and can promote awareness of locally produced food. However siting should occur under defined circumstances that address impacts to the neighboring agricultural area and ensure that the primary use of the property remains farm use rather than entertainment and tourism.

Figure 7 shows approvals of agri-tourism related uses from 2008 to 2019. Each of the categories summarized below might be permitted in a variety of ways. Approvals of "commercial activities in conjunction with farm use" can vary from agricultural trucking and processing operations to wine tasting rooms. Figure 7 only includes "commercial activities in conjunction with farm use" that are tourism oriented, such as tasting rooms. Agri-tourism events were added to the list of uses allowed on farmland following the passage of Senate Bill 960 in 2011. Event venues are also sometimes permitted as outdoor mass gatherings, at farm stands, wineries and cider businesses and occasionally as home occupations.

Overnight accommodation options on farmland can be permitted as room and board arrangements, home occupations and bed and breakfasts at wineries, breweries and cider businesses. Activities like product tastings can be permitted as agri-tourism events, home occupations, commercial activities in conjunction with farm use, and at farm stands, wineries, cider businesses and breweries.

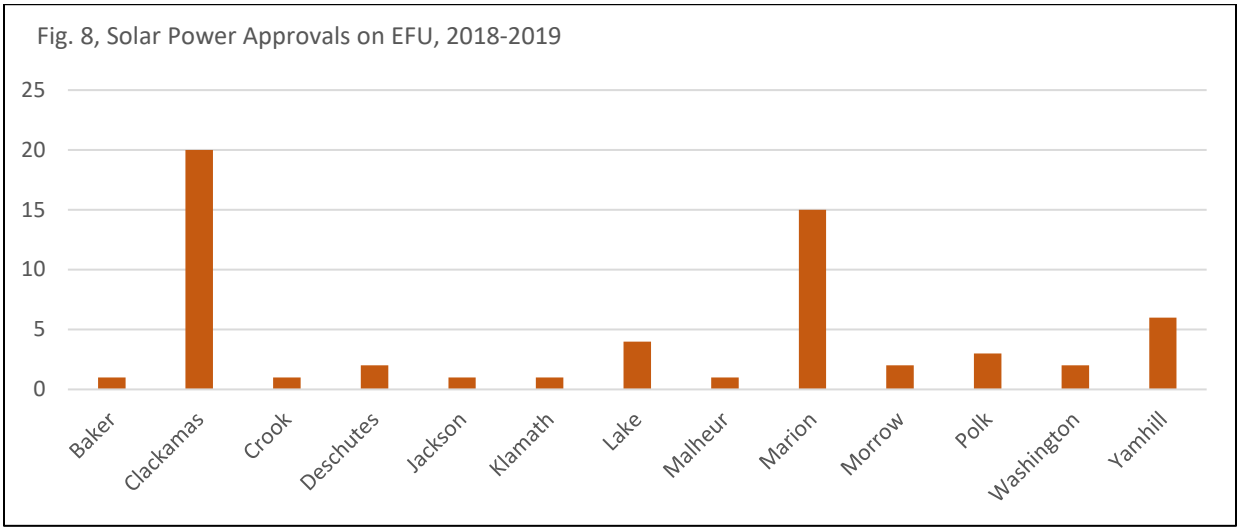
Of the 77 home occupation approvals issued in 2018-2019, 44 percent were related to lodging or events venues. Thirty-three percent of approvals for commercial activities in conjunction with farm use in 2018-2019 were for alcohol production and tasting facilities. That is in addition to the thirty-one approvals issued in 2018-2019 for wineries with tasting rooms under ORS 215.452 and 215.453. **The use permits for agri-tourism related activities captured in Figure 7 above represent a quarter of the total non-residential use permits issued on agricultural lands in 2018-2019.**

Renewable Energy

Oregon has more than 3,400 megawatts (MW) of wind energy generation capacity, ranking tenth in the nation in installed wind energy capability (American Wind Energy Association, 2019). Many wind energy installations are located on farmland and are clustered along Columbia Gorge. The attraction of wind energy to the state is partly due to the large open farm landscapes free from conflicting uses that are made possible by EFU zoning.

Solar energy development is rapidly growing in Oregon. In 2020, Oregon's installed solar capacity was 881 MW - almost double the installed capacity in 2017 (Solar Energy Industries Association, 2020). Many utility scale solar facilities are opting to locate on land zoned EFU due to proximity to high voltage powerlines and substations with interconnection opportunities, lower land acquisition or lease costs, availability of unobstructed sunlight, and ease of development due to flatter slopes.

Fig. 8, Solar Power Approvals on EFU, 2018-2019

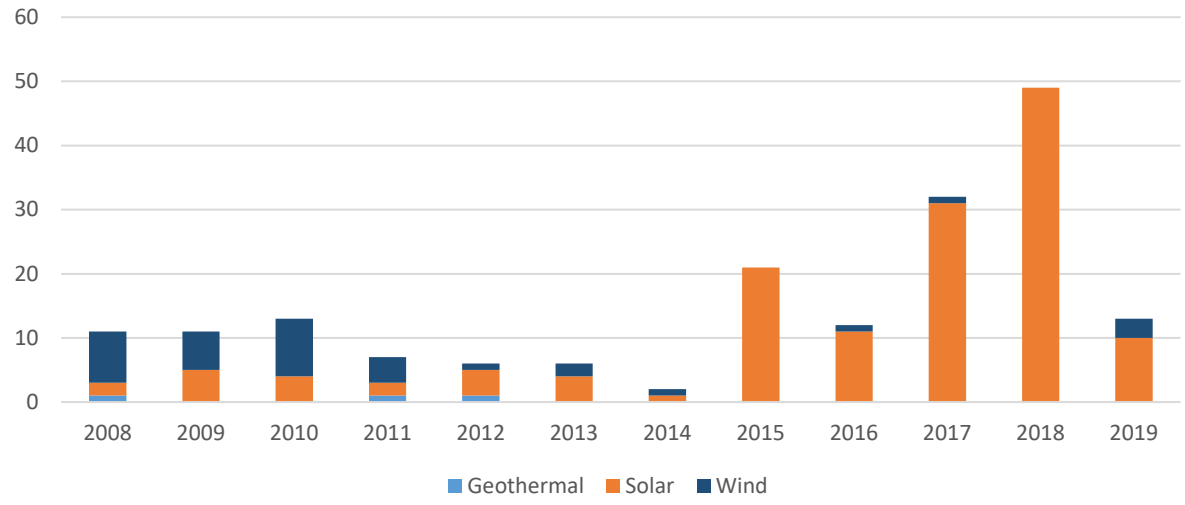


LCDC has limited the size of solar facilities on EFU with the goal of encouraging solar development on land that is the lowest capability for agricultural use rather than high-value farmland. Solar development in eastern Oregon tends to occur on larger parcels with less potential for agricultural use. In 2018-2019, 59 solar power project approvals were issued by local jurisdictions. There has been a sharp increase in the number of solar projects approved in the Willamette Valley on high-value farmland, specifically in Clackamas, Marion, and Yamhill counties. This is a continuation of a trend noted in the 2016-2017 Farm and Forest Report. In 2018-2019, 34 percent of the solar project approvals were issued by Clackamas County, 25 percent were issued by Marion County and 10 percent were issued in Yamhill County. Thirty percent of the approvals issued were for solar facilities exceeding 12-acres in size with the average project size reported as 70 acres. As shown in Figure 8, commercial solar approvals have been rising quickly compared to wind power approvals.

Renewable energy developers may also seek permit approval through the Oregon Energy Facility Siting Council (EFSC) under their standards for review. While facilities over a certain size are required to obtain site certificate approval from EFSC, other developers may choose to do so voluntarily. EFSC review criteria is somewhat different than review criteria in DLCD's rules – particularly for Goal 3 exceptions. Since 2008, EFSC has issued nine Site Certificate approvals for solar and wind power projects involving Goal 3 exceptions under the Department of Energy's Goal 3 exception process. As of November 1, 2020, EFSC currently has an additional seven solar projects under review requiring Goal 3 exceptions.

The rise in renewable energy production on farmland, together with new major transmission line corridors to bring that energy to market, has raised questions and concerns about potential impacts to farm operations, wildlife habitat, scenic viewsheds, and tourism. Other concerns have been raised about the need for a state energy policy and more proactive state and regional roles in the siting of major transmission line corridors and energy facilities that may have regional impacts. At the same time Oregon is committed to the important role renewable energy development will play in addressing climate change and a balance is needed that affords renewable energy developers a degree of security in pursuing certain development sites over others while protecting our limited supply of working farmland for food production.

Fig. 9, County Renewable Energy Approvals on EFU, by year, 2008-2019



Land Divisions and Property Line Adjustments

Local governments approved 181 new parcels on farmland in 2018-2019. These numbers are consistent with the average over the past 5 years. New parcels created in each county are shown in Table 7.

Land divisions on farmland must meet the statutory minimum parcel size of 80 acres (160 acres for rangeland) or be in counties that have approved "go-below" parcel minimums below these sizes. A "go-below" is a parcel size below 80 or 160 acres that has been approved by LCDC as adequate to protect existing commercial agriculture in an area.

State statute also provides several options for creating new parcels smaller than the required minimum parcel size. A county may authorize creation of up to two new nonfarm parcels (each containing a dwelling) if the new parcels are predominantly comprised of non-agricultural soils. In addition, counties may approve nonfarm land divisions for approved conditional uses on farmland. Counties may also approve substandard divisions along urban growth boundaries (UGBs).

In 2018-2019, 38 percent of land division approvals were for conditional uses or nonfarm dwellings. Forty-five percent of new parcels created on farmland were under 10 acres in size and 38 percent were over 80

acres in size. Some of these parcels were created for farm use in counties with reduced "go-below" minimum parcel sizes. The most common reported reason for partitions in 2018-2019 was to create a new parcel for a nonfarm dwelling. Appendix table 6 contains more detailed information on land division approvals in 2018-2019.

Property line adjustments

Property line adjustments are commonly employed for a variety of reasons. However, property owners may not use them to allow the approval of dwellings that would not otherwise be allowed. Many of the reported property line adjustments involve more than two tax lots. In 2018, 277 property line adjustments were approved and 284 were approved in 2019 for total of 561 property line adjustments. During 2016-2017 and 2014-2015, 632 and 593 property line adjustments were approved respectively.

III. Oregon's Forestland Protection Program

Statewide Planning Goal 4

To conserve forest lands by maintaining the forest land base and to protect the state's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture.

The conservation of forest land is one of the primary objectives of Oregon's statewide planning program. Oregon has determined that it is in the state's interest to protect the land resource foundation of one of its largest industries – forestry. Forestry products and services employ over 61,000 people directly in Oregon and are critical to Oregon's rural communities (OFRI, 2019). Oregon is the top producer of softwood lumber and plywood in the United States (OFRI, 2019).

Statewide Planning Goal 4 seeks to maintain Oregon's forests for tree harvesting in balance with the sound management of soil, air, water, fish, and wildlife resources. Healthy forests provide vital ecosystem functions and environmental, social, and economic benefits that people value: air, healthy soils capable of carbon storage, clean water, riparian areas, streams, wetlands and estuaries that enhance habitat for fish and wildlife. Investments in healthy ecosystems also provide recreational opportunities for those who live in and visit Oregon. Recreational opportunities and agriculture are also encouraged on forest land. Other uses allowed on forest land (e.g. dwellings) are limited and subject to standards that make them more compatible with forestry, agriculture, and the preservation of habitat and natural resources. Large minimum lot sizes are prescribed to help ensure land is used in accordance with the purposes of Goal 4.

Plans providing for the preservation of forest lands for forest uses must consider the carrying capacity of the air, land and water resources of the planning area. The land development actions provided for by such plans should not exceed the carrying capacity of such resources.

Forestlands

Oregon's forested landscape consists of a mosaic of land uses including working forests, conservation reserves, and those associated with human-dominated uses. Oregon is home to some of the world's most productive forests, ranging from dense Douglas-fir forests of the Willamette Valley and Coast Range to the high desert Ponderosa Pine stands in the Cascades and Blue Mountains. Forests cover over 30.5

> "Forest lands" as defined in Goal 4 are those lands acknowledged as forest lands, or, in the case of a plan amendment, forest lands include:
>
> (a) Lands that are suitable for commercial forest uses, including adjacent or nearby lands which are necessary to permit forest operations or practices; and
>
> (b) Other forested lands that maintain soil, air, water and fish and wildlife resources.

million acres of Oregon, almost half of the state. Sixty percent of the forest land base, approximately 16 million acres, is owned and managed by the federal government under management plans for different benefits. The Oregon Department of Forestry (ODF) estimates that there are approximately 10.4 million acres of nonfederal wildland forests and approximately 853,000 acres of mixed forest/agriculture. 11.8 million acres of the forest land base have been inventoried by counties as forest and mixed forest/agricultural lands and protected under zoning designations. These are the subset of lands subject to Goal 4.

Subsequent to original county designations, there are now provisions in administrative rules for the identification of forest lands which must be contemplated as part of an amendment to a county's comprehensive plan. Like the requirements for identifying agricultural lands, OAR 660-006-0010(2) requires forest land determinations be based on scientific data for vegetative capability classes published by the Natural Resource Conservation Service (NRCS) or other specific technical resources if such data is not available.

There is also a definition for high-value forest land at ORS 195.300(11) which is tied to the published vegetative capability classes for soils. However, while certain nonfarm uses and rules for UGB and URA expansions rely on the definition of high-value farmland at ORS 195.300(10), the definition for high-value forest land at 195.300(11) is not currently applied to land use reviews outside of procedures related to Measure 49 claims.

Forest and Mixed Farm-Forest Zones

Forest zoning has been instrumental in maintaining working forests in Oregon. ODF reports that Washington's loss of wildland forest between 1974 and 2014 was nearly three times the amount of wildland forest lost in Oregon (Gray et al, 2018).

Lands inventoried as forest land are required to be zoned forest or mixed farm-forest by counties. Approximately 11.8 million acres in Oregon are included in forest or mixed farm-forest zones. Mixed farm-forest zones must comply with both Goal 3 and Goal 4 requirements. A variety of uses are allowed in forest and mixed farm-forest zones. Some activities allowed under the Forest Practices Act (e.g. logging, reforestation) do not require county land use approval. Dwellings may be allowed under certain circumstances. Counties may also permit nonresidential uses that are compatible with farm and forest practices.

The required minimum parcel sizes of 80 acres is intended to support opportunities for economically efficient forest operations, the continuous growing and harvesting of trees, and conservation of natural resource and recreation values consistent with the Forest Practices Act Policy (ORS 527.630).

Minimizing fire risk is a major concern in forest zones and is reflected in siting and fire standards applied to all structural development in designated forest zones. New dwellings and structures are required to have defensible fuel-free space around them. Dwellings must be in a fire protection district or have other sufficient means of suppressing fire such as an onsite lake and sprinklers. Fire retardant roofs and spark arrestors are required for dwellings. County road design requirements for firefighting equipment also need to be met.

Wildfire

Climate change, population growth, and record levels of forest fuel volumes all contribute to the growing wildfire risk in Oregon. Population growth adds increasing pressure for development of housing stock within the Wildland Urban Interface (WUI). Climate change is anticipated to result in higher rates of tree mortality from droughts, insects and disease, warmer temperatures and changes to hydrologic cycles. All of these factors contribute to increased risk and severity of wildland fires.

Over the past 30 years:

84% of wildfires in Oregon's 31-million-acre wildland - urban interface were human caused

73% of all wildfires on lands protected by ODF were human caused.

In 2018, a total of 2,019 wildland fires burned approximately 892,707 acres of forested and non-forested lands during Oregon's 2018 fire season (Northwest Interagency Coordination Center, 2018). The total cost to fight fires across the state was estimated at over $500 million for 2018. The 2019 wildfire season was relatively short and mild, a breath of fresh air following two back-to-back challenging fire seasons in 2017 and 2018. That said, 79,732 acres were consumed by 2,293 wildland fires in 2019 (Northwest Interagency Coordination Center, 2019). Over the 2018-2019 biennium, fire danger forced thousands of Oregonians to evacuate their homes. With large blazes consuming hundreds of thousands of acres, destroying structures, damaging recreation sites and pouring hazardous smoke into communities, much of the state also experienced significant economic loss, natural resource damage and threats to watersheds. At the time of drafting this report, the 2020 fire season is ongoing with several active clusters of fires and over a million acres burnt. 2020 has been one of the most destructive years on record in the state of Oregon, significantly exceeding the impact of the 2018 fire season.

Studies suggest that impacts from wildland fires far exceed the direct cost of suppression by over 11x including economic losses, lost taxes, damages to ecosystem services, destruction of infrastructure, depreciated property values, etc. (Headwaters Economics. 2018). As noted above, firefighting costs have exceeded $500 million during high-fire seasons - meaning that the comprehensive costs to Oregonians from fire-related causes can total several billion dollars in a single year.

Approximately 9,550 km^2 (3,687 sq. mi.) or 3.8% of Oregon's land base is considered to be Wildland Urban Interface (WUI) (Martinuzzi, 2010). These are areas where conditions are conducive to a large scale

wildland fire disturbance event, thereby posing a significant threat to human life or property. Thirty-six percent of the homes built in Oregon in 2010 were built within the wildland urban interface (WUI) and 80.4% of the vacation homes in Oregon were built in the WUI (Martinuzzi, 2010).

In addition to the increased risk for causing wildfires, the presence of dwellings can significantly alter fire control strategies and can increase the cost of wildfire protection by 50 to 95 percent (Gorte, 2013). In order to protect dwellings, firefighters must devote manpower and resources to activities like establishing fire perimeters, conducting burnouts around structures and addressing combustible materials commonly found around residential structures – like gas, propane and electrical lines. Isolated rural dwellings particularly increase suppression costs. The incremental cost of protecting two homes instead of one within six miles of a wildfire is estimated to be over $31,000 (Gude et al, 2012). For comparison, the incremental cost of protecting 100 homes instead of 99 homes within six miles of wildfire is estimated at $319 (Gude et al, 2012).

Oregon's statewide land use planning program significantly limits this kind of residential development on resource lands which helps to minimize wildfire risk, reduces firefighting costs, and protects human lives. The program further discourages conversion of resource lands to more intensively developed uses with an increased risk of fire danger. Oregon requires residential and other developed uses in forest zones and mixed farm-forest zones to incorporate fire safety measures, such as fuel-free breaks around buildings. As illustrated in Figure 10, the land use planning program has helped reduce the number of dwellings built in our WUI since the mid-1980s when compared to other states by limiting development on rural resource lands and requiring development standards intended to mitigate fire risk.

Figure 10: Number of houses in the WUI by state, 2010 (Radeloff 2017)



Climate adaptation and carbon sequestration

Oregon's forest ecosystems will be significantly affected by anticipated changes to climate in the coming decades. Our forest landscapes are already experiencing altered distributions of plant species, longer fire seasons, and higher numbers of wildfires. Warmer temperatures and changes to hydrologic systems are anticipated to result in increased invasive species and pests, changes in wildlife distribution, and increases in both drought and landslides seasons (Oregon Climate Change Adaptation Framework 2010). All of these factors have the potential to negatively impact our forest lands. At the same time, our forest lands are a critical tool in mitigating climate change.

Forested ecosystems are a basic component of the carbon, oxygen and water cycles. Oregon's forests make an enormous contribution to carbon sequestration. ODF has recently released a report with

estimates for the status and trends of carbon in Oregon's forest ecosystems and ownerships and concludes Oregon's forests have been functioning as a net sink of carbon even after accounting for forest land use conversions and non-CO2 greenhouse gas emissions from wildfire (Glenn 2019). The report also notes that 58% of the net CO2 sequestered annually from tree growth occurs in the forests of the Western Cascades and the Oregon Coast Range. ODF concludes that these two regions are the most important in the state for annual carbon flux due to their high rate of annual tree growth, output of wood products and relatively less area impacted by tree mortality. The report also notes that Lane County leads the state in this regard and is responsible for nearly a quarter of all the CO2e sequestered each year by Oregon's forests.

State statute specifically prohibits land use regulations limiting forest practices on designated forest lands (ORS 527.722). The Oregon Department of Forestry (ODF) is the agency charged with regulation of forest management practices. Oregon's coordinated land use program was founded to preserve the state's working forest lands for resource use and the value they provide for soil, air and habitat. That includes keeping these lands in production, rather than converting them to other developed uses that release sequestered carbon as well as protecting them for their tremendous potential to store carbon in biomass and in soils. DLCD is currently collaborating with other state agencies to identify opportunities for aligning our various programs and regulatory frameworks to expand on that capacity in ways that can mitigate climate related impacts to our natural working lands.

Recreation and tourism



Both public and private forest lands have long provided a variety of recreational opportunities. Interest in outdoor activities continues to grow across the state. Recreation and tourism in and around forest areas provides personal and societal benefits and generates significant economic activity. Many locations within Oregon, including those near forests, serve as appealing day and overnight destinations for both Oregon residents and out-of-state visitors who participate in outdoor activities. Forest zones allow a variety of recreation and tourism pursuits appropriate to a forest environment. Recreation and tourism opportunities in and near forest areas can be expected to continue to grow in the future.

IV. Land Use Decisions on Forestland

Dwellings

Table 4, Forest dwelling approvals, statewide summary, 2018-2019

Dwellings in Forest Zones	Summary of Opportunity*	2018	2019
Large Tract Dwelling	Located on a tract of 160-240 acres depending on the location.	16	20
Lot of Record Dwelling	Located on a parcel owned continuously since 1985 or inherited from someone who owned the parcel continuously since 1985.	11	9
Alternative/Template Test Dwelling	Parcel is located in an area of residential development and parcelization as of 1993.	117	137
Temporary Health Hardship Dwelling	Located on a parcel with an existing dwelling for a caregiver or person suffering a medical hardship.	16	19
Replacement Dwelling	Allows the replacement of a legally established dwelling.	50	56
Family Forestry Dwelling**	Allows a second dwelling to be established on a parcel with an existing dwelling that is in commercial forest use subject to a forestry management plan.		
**The basic essence of the test is described here. All referenced tests have additional, more specific criteria.* ***This dwelling type became effective in 2020*			

In 2018-2019, 451 dwellings were approved on forestlands which is consistent with the trend over the past several years. In 2016-2017 and 2014-2015, 457 and 447 dwellings were approved respectively. Appendix tables 7, 13 and 14 have detailed information on forest dwelling approvals in 2018-2019 and historically. As shown in Figure 11, the bulk of approvals in 2018-2019 were for template test and replacement dwelling which is consistent with historical trends. Since 1994, 56 percent of approvals for dwellings on forestlands have been for template test dwellings and 23 percent have been for replacement dwellings.

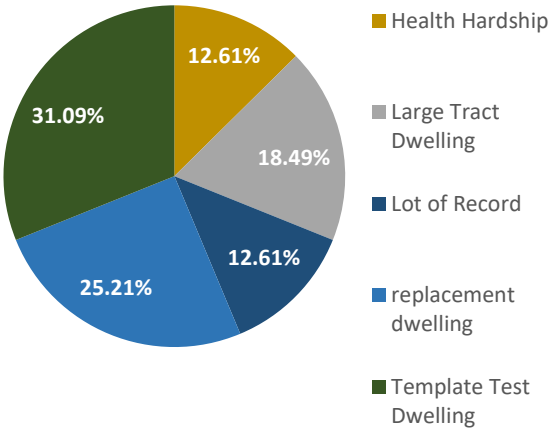
In 2019 the legislature authorized a new type of dwelling approval in the forest zone – a family forestry dwelling. This opportunity is for a second dwelling to be established on a parcel that is in commercial forest use with an existing dwelling. Review of a forestry management plan is a condition of this dwelling type. This opportunity became effective January 1, 2020.

Template Dwellings

"Template dwellings" are allowed on forestland in areas that were subject to certain patterns of development and parcelization up to 1993 when this development option was adopted into statute. Counties may approve template dwellings where a certain amount of pre-1993 dwellings and parcels were

established within a 160 acre "template" centered on the parcel. Locating multiple dwellings in the same area provides greater opportunity for fire protection and services than more remote forest dwellings. Conversely, the statute does not allow "template dwellings" in areas with no or very few existing dwellings, where establishment of new dwellings would introduce greater fire protection issues and create new conflicts with forest practices.

Fig. 11, Forest dwelling approvals by type, 2018-2019



In 2018-2019, 254 template dwellings were approved which is consistent with historical average approvals of 125-180 template test dwellings per year. In 2016-2017 and 2014-2015, 255 and 278 template test dwellings were approved respectively. Template Dwellings account for 56 percent of all dwelling approvals on forestlands since 1994. Additional information on 2018-2109 and historic forest template dwelling approvals are contained in Appendix tables 8, 13 and 14.

The legislature enacted HB 2225 in 2019 to address some "loopholes" in the Forest Template Dwelling Test that have contributed to the high number of approvals. The bill precluded the use of property line adjustments to 'move' a parcel into an area where it would qualify for a dwelling, and eliminated an opportunity for a property owner to secure additional template dwelling approvals on contiguous properties following the sale or transfer of a developed property. The new provisions are currently effective in five counties. HB 2225 staggers implementation of the provisions over a four year period in order to reduce mailing costs to the agency related to notices we are required to send to all landowners who may be impacted by legislative changes ("Measure 56 Notices").

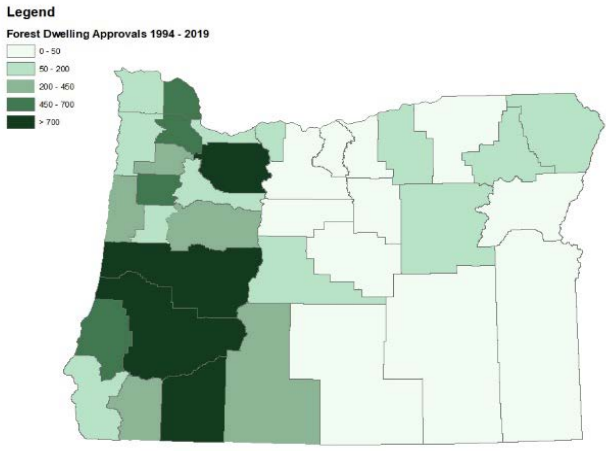
Large Tract Dwellings

Landowners with large amounts of forest land may construct a dwelling in a forest zone based on the acreage owned. In western Oregon, large tract dwellings must be on ownerships of at least 160 contiguous acres or 200 noncontiguous acres. In eastern Oregon, they must be on ownerships of 240 or more contiguous or 320 or more noncontiguous acres. In 2018-2019, 36 large tract dwellings were approved statewide. This is consistent with the 5- and 10-year averages of 15 large tract dwelling approvals a year. Additional information on 2018-2109 and historic forest dwelling approvals are contained in Appendix tables 7, 13 and 14.

Lot of Record Dwellings

Forest landowners and families who have owned the same property since 1985 may be eligible for a lot of record dwelling. The property must have a low capability for growing merchantable tree species and be located near a public road. Counties approved 20 lot of record dwellings in 2018-2019. This is consistent with the 10-year averages of 11 large tract dwelling approvals a year. Lot of record dwelling approvals are spread fairly evenly across the state and are on a variety of parcel sizes. Additional information on 2018-2109 and historic forest dwelling approvals are contained in Appendix tables 7, 13 and 14.

Fig. 13, Dwellings approved on forestland 1994-2019, all counties



Temporary Health Hardship Dwellings

Temporary hardship dwellings are approved for relatives with a medical hardship and must be removed at the end of the hardship. A temporary health hardship dwelling must be sited in conjunction with an existing dwelling and tied into an existing sanitation system. DLCD does not currently track the removal of these dwellings when they are no longer needed.

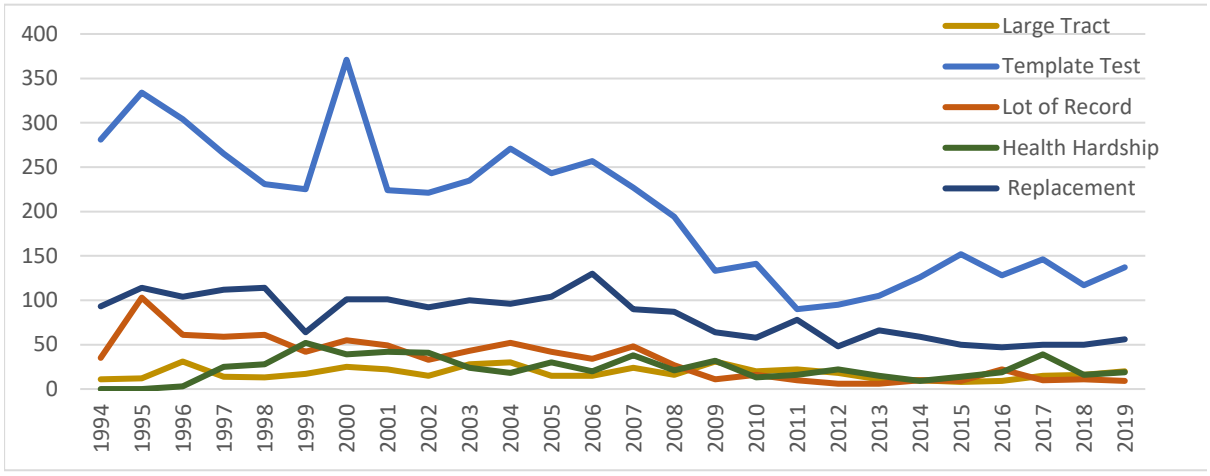
Counties approved 35 temporary health hardship dwellings in 2018-2019 which is consistent with the 10-year average of 18 temporary health hardship dwelling approvals per year. Additional information on 2018-2109 and historic forest dwelling approvals are contained in Appendix tables 7, 13 and 14.

Replacement Dwellings

A replacement dwelling is a new home that replaces an older dwelling on a parcel. Counties approved a total of 106 replacement dwellings in 2018-2019 which is consistent with the 10-year average of 56 dwelling approvals per year. The dwellings that were designated to be replaced must be removed, demolished or converted to another allowed use within three months of completion of the replacement dwelling.

Forty-seven percent of dwellings approved for replacement were removed, 34 percent were demolished, and 13 percent were converted to non-residential use with 5 percent not specified. Additional information on 2018-2109 and historic forest dwelling approvals are contained in Appendix tables 7, 13 and 14.

Fig. 12, Total dwelling approvals on forest land by year, all counties, 1994–2019

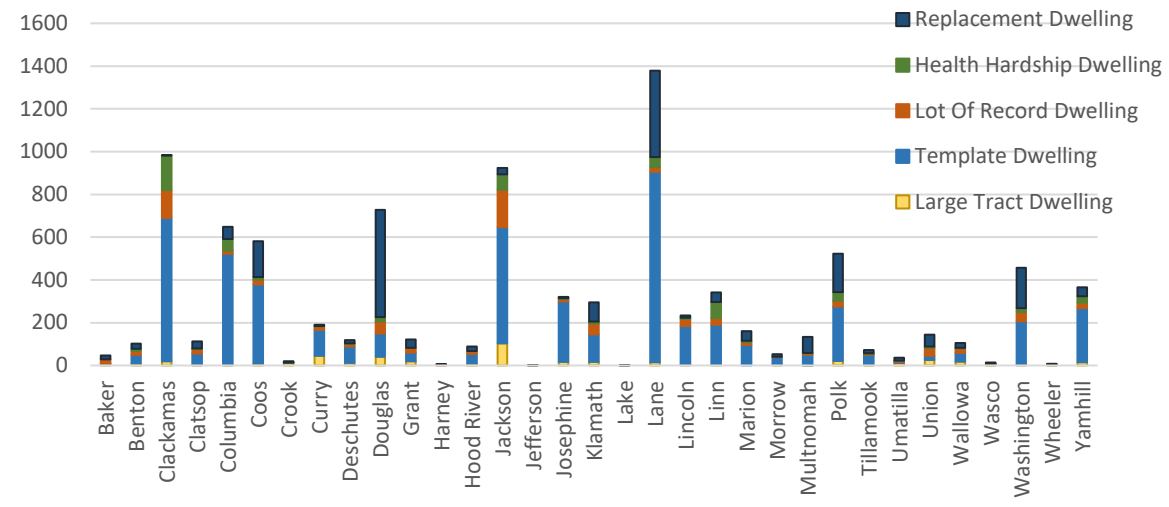


Cumulative dwelling approvals

Between 1994 and 2019, over 9,000 dwellings of all types were approved on forest land across the state. Figures 12 and 14 show the number of dwelling unit approvals since 1994 for the different dwelling types. A total of 9,308 dwellings were approved over this timeframe. Additional details are provided in Appendix tables 13 and 14.

Fifty-six percent of all dwelling approvals from 1994-2019 were template dwellings, 23 percent were replacement dwellings, nine percent were lot of record, six percent temporary hardship, and five percent large tract dwellings. Fifteen percent of all forest dwelling approvals during this timeframe occurred in

Fig. 14, Total dwelling approvals on forest land, by county, 1994–2019



Lane County with 1,378 dwellings approvals, 890 of which were template dwellings. The map in Figures 12 and 14 shows dwellings approvals on forest land from 1994- 2019.

Nonresidential uses

In addition to a range of traditional forest-related uses, the commission has recognized that some non-forest uses are acceptable in forest and mixed farm-forest zones. These uses are set forth in OAR 660-006-0025 for forest zones and OAR 660-006-0050 for mixed farm-forest zones. Mixed farm-forest zones provide opportunities for all those nonresidential uses permitted in EFU zones and those uses permitted in forest zones. Non-forest uses are subject to local land use approval and must demonstrate that they will not force a significant change in or significantly increase the cost of accepted farm or forest practices on farm or forest land and that they will not significantly increase fire hazard risk, fire suppression costs or the risk to fire suppression personnel. Appendix table 9 provides detailed data on nonresidential uses approved on forest and mixed farm-forest land in 2018-2019. The most commonly approved uses in 2018-2019 were agricultural buildings, marijuana production, residential accessory structures, home occupations and telecommunication facilities. Approvals in Jackson County accounted for 14 percent of all nonresidential permits issued in forest and mixed farm-forest zones in 2018-2019. Nearly half of the approvals in Jackson County were for marijuana production.

Land divisions

Counties authorized creation of 57 new parcels on forestland in 2018-2019. These numbers represent a slight decrease from the 2016-2017 and 2014-2015 biennium.

In 2018-2019, 13 parcels, or 23 percent of divisions, met the minimum parcel size of 80 acres. Non-forest land divisions are allowed in only a few circumstances, including the creation of a parcel or parcels to separate one or more existing dwellings on a property and for certain approved conditional uses. Counties may also approve a substandard division along an urban growth boundary (UGB). The most common reported reason for creating smaller parcels in 2018-2019 was to divide a parcel that has multiple dwellings (8 approvals).

Property line adjustments

Property line adjustments on forest land may occur for a variety of reasons. Occasionally they are used to adjust parcels to areas where they can be approved for dwellings. Many of the reported property line adjustments involve more than two tax lots. In 2018, counties approved 115 property line adjustments and approved 74 in 2019, for total of 189 adjustments on forest land.

V. Conversion: Zone changes, UGB Expansions and Other Metrics for Consideration

A primary goal of Oregon's land use program is the preservation of working agricultural and forest lands. Thus, the less agricultural and forest land that is converted to urban and rural development relative to the total amount zoned for exclusive farm use or forest use, the greater the indication that the land use program is working.

DLCD has traditionally measured conversion by tracking the amount of land that has been re-zoned from EFU and forest to other zones and by the amount of EFU and forest land added to Urban Growth Boundaries (UGBs). By 1986, LCDC had acknowledged the majority of local comprehensive plans and ordinances to be in compliance with statewide planning goals, thus making 1987 an appropriate base year from which to measure the success of the land use program. At that time approximately 16.1 million acres of land in Oregon were zoned EFU and 11.7 million acres were zoned forest. For comparison, information from three other sources that take different approaches to measuring resource land conversion has been included below as well.

Zone Changes

Table 5, Zone changes involving agricultural lands, statewide summary, 2018-2019

Year	From EFU to Rural (Acres)	From EFU to Urban (Acres)	From EFU to Forest (Acres)	From EFU to Aggregate (Acres)	To EFU from Other Zone (Acres)	Total Rezone (Acres)	Net Rezone (Acres)
2018	400	194	112	160	269	1,059	790
2019	364	1,294	83	124	143	1,865	1,722
Total	2,781	1,321	278	408	4,789	555	2,512

Local governments rezoned 2,512 acres of EFU land to other uses in the 2018-2019 biennium. From a base of 16.1 million acres of EFU-zoned land in 1987, a total of 37,983 net acres have been rezoned from EFU to other urban and rural uses through 2019. **This means that 99.8 percent of land zoned EFU in 1987 was still zoned EFU in 2019.**

Table 6, Zone changes involving forestlands, statewide summary, 2018-2019

Year	From Forest to Rural (Acres)	From Forest to Urban (Acres)	From Forest to EFU (Acres)	From Forest to Aggregate (Acres)	Total Rezone (Acres)	To Forest from Other Zone (Acres)	Net Rezone (Acres)
2018	111	43	262	147	565	228	337
2019	163	0	0	58	221	83	138
total	274	44	263	205	786	311	475

475 acres of forest land were rezoned in the 2018-2019 biennium. From a base of 11,766,543 acres in 1987, a total of 10,813 net acres have been rezoned from Forest to other urban and rural uses through 2019. **This means that 99.9 percent of land zoned forest in 1987 was still zoned forest in 2019.**

Counties usually approve rural zone changes in order to allow land uses that otherwise would not permitted in an EFU or forest zone. Examples include clustered rural residential parcels, mineral and aggregate quarries, and institutional uses such as schools serving an urban population. **The majority of zone changes for both classes of resource lands have been to rural residential use accounting for more than half of the re-designations in both cases.**

A zone change typically includes an exception to Statewide Planning Goals 3 or 4 based on existing development, development patterns on surrounding lands, or other reasons unique to the properties involved. A goal exception is not required if it can be demonstrated that a parcel does not qualify as agricultural or forest land and is therefore 'nonresource' land. Appendix tables 11, 17 and 18 contain detailed information on zone changes involving resource lands from 1989-2019.

Nonresource Land Designations

In 2009, the Legislature adopted provisions that allow counties to designate land for nonresource use (see ORS 215.788 – 794). This process requires coordination with state agencies to ensure such lands are truly nonresource and that future development would not conflict with wildlife, water quality, or increase the costs of public facilities and services. Counties and landowners have not used this process but rather continue to designate rural resource lands on a case by case basis through comprehensive plan amendments. Ten counties have designated rural resource lands as shown in the table below. Several counties have recently expressed interest conducting countywide evaluations of land that could be rezoned for nonresource use.

Table 7, Acres of nonresource designations, by county

County	Acres Designated Prior to 2018	Acres designated in 2018-2019
Clatsop	2,351	
Crook	23,261	
Deschutes	452	
Douglas	3,341	
Jackson	545	
Josephine	15,573	
Klamath	34,797	80
Linn	122	109
Lane	559	54
Wasco	7,047	
Total	88,048	243

Rural resource lands (commonly referred to as nonresource lands) are rural lands that do not meet the state's definition of agricultural or forest lands. Rural resource lands are not subject to Statewide Planning Goals 3 and 4 and may be zoned by counties for other uses. These lands are commonly rezoned for rural residential development with minimum parcel sizes of 10 acres or less.

Urban Growth Boundary (UGB) Expansions

Table 8, Urban growth boundary expansions involving agricultural lands, statewide summary, 2018-2019

Year	Acres to be added to UGB	Acres Removed from UGB	Net Acres Added to UGB	EFU Acres Removed from County	EFU Added to County**	Net EFU Loss*	% of Land Added to UGB from EFU	Net EFU % of Net Land Added*
2018	415	208	99	194	0	194	47%	86%
2019	2,497	142	2,355	1,294	138	1,156	52%	49%
* "Zone swaps" include acreage added to EFU as well as acreage removed from EFU and added to an UGB. **Reflects only acreage designated EFU reviewed as part of a UGB expansion proposal.								

Table 9, Urban growth boundary expansions involving forest lands, statewide summary, 2018-2019

Year	Acres to be added to UGB	Acres Removed from UGB	Net Acres Added to UGB	Forest Acres Removed from County	Forest Added to County**	Net Forest Gain*	% of Land Added to UGB from Forest	Net Forest % of Net Land Added*
2018	415	208	99	44	108	64	11%	-15%
2019	2,497	142	2,355	0	0	0	0%	0%
* "Zone swaps" include acreage added to EFU as well as acreage removed from Forest and added to an UGB. **Reflects only acreage designated Forest reviewed as part of a UGB expansion proposal.								

Urban growth boundaries (UGBs) help prevent conversion of irreplaceable farm and forest lands, while limiting the cost of services associated with expansion of urban infrastructure into rural areas. Cities must have a 20 year supply of land within UGBs to meet their residential, commercial, and industrial needs. Periodically cities and counties must expand UGBs onto rural lands to meet those needs. Lands zoned EFU, forest, and mixed farm-forest are given lower priority for inclusion in UGBs than lands already zoned for rural development or nonresource lands.

DLCD tracks and reports on the amount of land zoned EFU that is added to UGBs. Performance on this measure has varied widely from year to year over the past decade, reaching a low of 8% converted resource lands in 2015 and reaching a high of 86% of converted resource lands in 2014. **In the past biennium, 1,487 acres of land previously zoned EFU and 44 acres of forest land were added to UGBs accounting for 53% of lands added.** Given the inter-annual variability in acreage added to UGBs, a longer look at trends in this area is merited. Between 1987 and 2019, local governments added just over 62,000 acres to UGBs statewide. Of this amount, 44 percent of land added was zoned EFU, forest or mixed farm-forest and 56 percent was in other rural zones. Appendix tables 11 and 16 contain additional information on UGB expansions involving resource lands for 2018-2019 and from 1989 to 2019.

A recent trend in UGB expansions has been 'zone swaps' where some amount of land meeting the definition of agricultural land is designated as EFU while some amount of land is moved into the urban growth boundary and re-designated for urban uses. These 'zone 'swaps' occurring with UGB amendments account for the majority of the acreage added to EFU zone in the past biennium. **In the past biennium, 1,285 net acres of EFU and forest land were lost to UGB expansions which accounts for 52% of net acres added to UGBs.**

Other Metrics for Evaluating Conversion

While the state's policy recognizes the significant role resource zoning plays in limiting alternative uses of farm and forest lands, many nonfarm and nonforest uses are allowed in statute and have the potential to contribute to de facto conversion of working lands even while the protective EFU and forest zoning remains in place. Zone changes may not capture actual conversion of agricultural and forest lands developed for permitted nonfarm or nonforest uses or pursuant to Measure 37 or Measure 49 orders (neither of which require actual rezoning of the land from EFU or forest to another zoning designation).

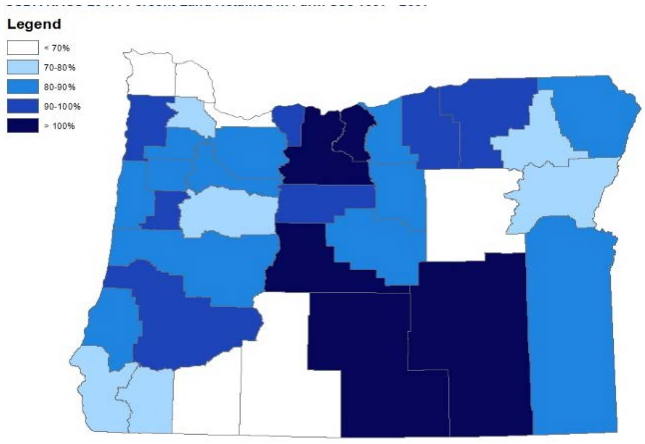
There are three additional data sources for considering farmland conversion in Oregon noted here: the USDA National Agricultural Statistics Service (NASS) Census of Agriculture, the ODF "Forests, Farms and People" report, and the "Farms Under Threat: State of the States" report released in 2020 by the American Farmland Trust (AFT).

Resource Zoning: As highlighted above, 99.8 percent of land zoned EFU in 1987 was still zoned EFU in 2019. 2,512 acres of EFU land were rezoned in the 2018-2019 biennium. From a base of 16.1 million acres of EFU-zoned land in 1987, a total of 37,983 net acres have been rezoned from EFU to other urban and rural uses through 2019.

99.9 percent of land zoned forest in 1987 was still zoned forest in 2019. 475 acres of forest land were rezoned in the 2018-2019 biennium. From a base of 11,766,543 acres in 1987, a total of 10,813 net acres have been rezoned from Forest to other urban and rural uses through 2019.

USDA NASS 2017 Census of Agriculture: USDA reports the current amount of land in farm use in Oregon at 15.9 million acres which is only 90% of the 17.7 million acres reported in farm use in 1997. The results represent a more significant decline in acres reported in farm use when compared to a measurement of whether land is maintained in EFU zoning.

Fig. 15, Percent land retained in farm use, by county, 1997-2017 (USDA 2017)



The Census of Agriculture has been conducted on five-year intervals since 1982. The responsibility for the census was transferred from the Bureau of Census to USDA in 1997. Over the twenty-year period, increases in working farm acreage were reported in five counties: Deschutes, Lake, Sherman, Harney and Wasco, while losses exceeding 30% were reported in six counties: Columbia, Grant, Clatsop, Jackson, Klamath and Multnomah. Appendix table 19 contains additional information from the 2017 Census of Agriculture on farmland conversion in Oregon from 1997 to 2017.

Oregon Department of Forestry (ODF) "Forest, Farms & People: Land Use Change on Non-Federal Land in Oregon 1974 – 2014"[6]: ODF performed land use cover review based on interpretation of aerial imagery for seven different years between 1974 and 2014. Based on that review, they categorized non-federal land into one of five resource land categories or into urban or low-density residential lands. ODF found that from a base of 15.4 million acres categorized as cropland, rangeland or mixed farm-rangeland land in 1984, 98.8% (15.4 million acres) was retained in 2014. However, the report also identifies less acreage in these land cover categories than is protected under resource zoning. As discussed above, Oregon's policies for agricultural lands and forest lands both acknowledge the need to preserve lands that are part of a cohesive working landscape in order to limit fragmentation and conflicting development, even when those lands may not be as productive as surrounding working lands. This may contribute to the difference in base acreage under resource zoning as tracked by DLCD and acreage in resource landscape cover as reported by ODF.

Table 10, Area of non-federal land in Oregon by land use class and year (ODF 2016)

	1984	1994	2000	2005	2009	2014	Land Retained
forest	10,570,000	10,512,000	10,497,000	10,468,000	10,455,000	10,446,000	98.83%
mixed farm forest	901,000	877,000	876,000	864,000	855,000	853,000	94.67%
SubTotal Forest/Mixed Forest	11,471,000	11,389,000	11,373,000	11,332,000	11,310,000	11,299,000	98.50%

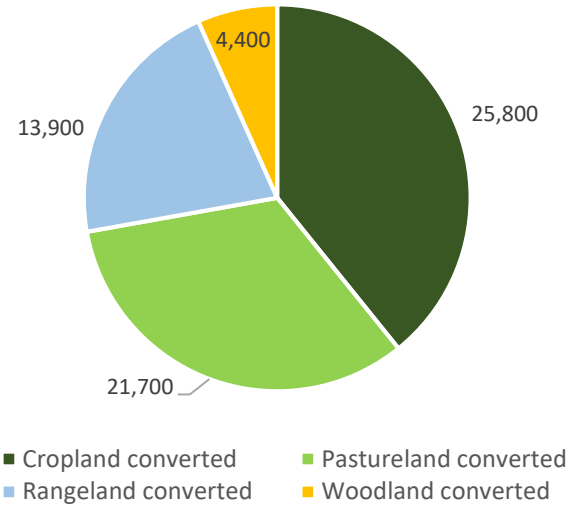
[6] ODF will be publishing data through 2018 shortly. This section of the report will be updated with most current numbers prior to submission to the legislature. Updates will include ~18,000 acres converted to residential use and a net loss of ~16,000 acres of resource land over the 2014-2018 period.

range	9,164,000	9,116,000	9,087,000	9,045,000	9,034,000	9,013,000	98.35%
mixed range forest	664,000	666,000	678,000	690,000	690,000	699,000	105.27%
cropland	5,806,000	5,786,000	5,757,000	5,747,000	5,733,000	5,740,000	98.86%
SubTotal Ag Land	15,634,000	15,568,000	15,522,000	15,482,000	15,457,000	15,452,000	98.84%

American Farmland Trust 'Farms Under Threat: State of the States ': The report documents a multi-year effort to document the extent of agricultural land in four categories across the continental U.S. and assess the conversion of those lands to urban and rural residential use in the period from 2001 and 2016. The American Farmland Trust (AFT) also assigned scores to each state based on a suite of policy and incentive tools related to farmland preservation. Oregon ranked ninth in the nation, primarily based on the strength of our land use planning and farm tax assessment programs.

AFT estimates 65,800 acres of agricultural lands were converted during the 2001-2016 period – which is more than double the amount of land re-zoned from EFU to other designations during the same period (24,256 acres). Of those 65,800 acres, the report identifies 32,800 acres as converted to urban and highly developed uses while 33,000 acres were converted to low-density residential uses.

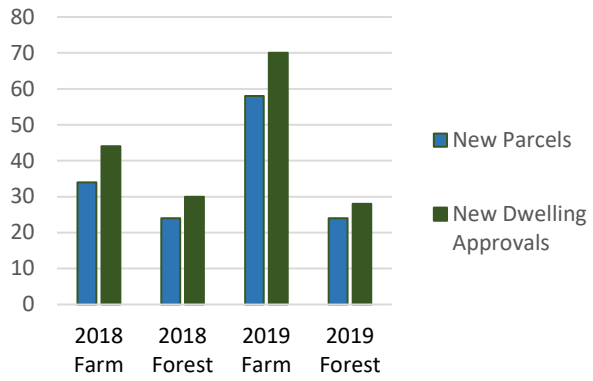
Fig. 16, Acres of farmland converted by use type, 2001-2016 (AFT 2020)



In the past, conversations around farmland preservation have focused on constraining urban sprawl. There is a growing concern within farmland preservation communities about recent trends in increasing low-density rural development. This happens even while land remains under exclusive farm use zoning. The report by AFT found that agricultural land in areas with patterns of scattered large-lot residential development were 95 times more likely to be converted to urban and high-density development over the five-year period than agricultural lands in large, cohesive blocks of working land. This is a concern to keep in mind as Oregon considers the number of nonfarm and non-forest land use approvals and development on working lands - historically and over the 2018-2019 biennium.

VI. Ballot Measures 37 and 49

Fig. 17, Approvals pursuant to M49, 2018-2019



If a state or local government enacts a land use regulation that restricts a residential use or a farm or forest practice, and thus has the potential to reduce the fair market value of a property, then the landowner may qualify for compensation under Ballot Measure 49. Oregon voters initially passed Ballot Measure 37 in 2004, which was later modified by the Oregon legislature and approved by the voters in 2007 as Ballot Measure 49. Enactment of Measure 49 retroactively voided some Measure 37 claims. Measure 49 relief for former Measure 37 claims ended in 2011. DLCD received 4,960 Measure 49 claims and authorized 3,542 claims for residential development. The difference between claims received and authorizations issued is partly due to multiple claims being filed for contiguous properties. Under Measure 49, contiguous properties were combined into single claims.

The vast majority of claims were resolved by granting reversionary development rights rather than providing compensation for lost property value. Due to the variability in receiving notice of Measure 49 development from counties, DLCD periodically estimates the total numbers of Measure 49 dwellings built and parcels created since 2009, when the first authorizations were issued. This is accomplished by analyzing county tax assessor's data for counties that share this data. DLCD estimated that by 2016, 12 percent of new dwellings and 28 percent of new parcels authorized by Measure 49 had been completed.

Appendix table 15 shows the number of new dwellings and new parcels authorized under Measure 49 for each county. A total of 6,417 new dwellings and 4,096 new parcels were authorized. Approximately 90 percent of Measure 49 approvals have been on land in farm and forest zones.

Measure 49 authorizations are tied to a specific property and may be conveyed to a new owner when the property is sold. Unless the new owner is a spouse or revocable trust, all authorized Measure 49 development must be completed within ten years of the property conveyance. DLCD anticipates that Measure 49 development will increase in the coming years as properties conveyed in 2009 and 2010 near the ten year deadline.

Many claimants who had completed development or who were vested in their Measure 37 projects on the date Measure 49 was enacted did not file a Measure 49 election. County approvals of Measure 37 developments are not included in this report. DLCD is working on tracking these developments and intends to provide that information in future reports.

VII. 2018 - 2019 Statutory and Rule Changes for Farm and Forest Lands Statutory amendments

Statutory Amendments, 2018-2019

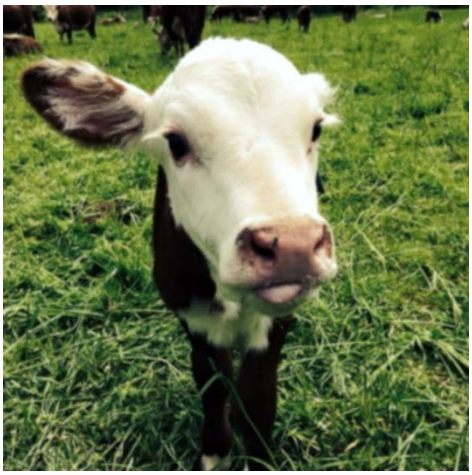
2018	SB 1533 A	Allows equine therapy (nonclinical) as a new use in exclusive farm use zones and mixed farm-forest zones.
2019	HB 2106	Allows dog training classes to be conducted in farm buildings existing on January 1, 2019 within counties that adopted marginal lands provisions. Allows counties to approve up to five additional one-year extensions of land use permits for residential development.
2019	HB 2222	Requires ODF to report annually on the development, implementation and administration of a Forestland-Urban Interface Protection Act.
2019	HB 2225	Clarifies the method used for determining "center of tract" when establishing a forest template dwelling. Prohibits the use of property line adjustments to qualify a parcel for a template dwelling. Prohibits the use of deed transfer to qualify parcels for template dwellings. Allows exceptions until November 1, 2023. Establishes effective dates by county.
2019	HB 2435	Repeals sunset on law allowing guest ranches to be established on lands zoned for exclusive farm use in eastern Oregon. Requires new guest ranches to report on operations to county.
2019	HB 2469	Allows a second dwelling on forestlands within the rural fire protection district near an existing dwelling for the owner or relative who supports the owner's forestry practices.
2019	HB 2573	Reduces the income test for adding a dwelling on a cranberry farm for three years provided the farm owner or operator agrees to a deed restriction preventing the use of the dwelling for rentals.
2019	HB 2844	Allows facilities for processing farm products under 2,500 sq. feet on lands zoned for exclusive farm use without regard to siting standards.
2019	HB 3024	Prohibits county from considering property tax classification of dwellings that were previously removed, destroyed, demolished or converted to nonresidential uses when reviewing application for replacement dwelling on lands zoned for exclusive farm use.
2019	HB 3384	Allows for expansion of non-conforming secondary schools if the school was established on or before January 1, 2009 and the additional property is contiguous and on the same tax lot on which the school was established.
2019	SB 287	Allow a farm brewery on lands zoned for exclusive farm use or mixed farm and forest use provided the brewery produces less than 150,000 barrels annually, less than 15,000 barrels on the farm brewery site and either owns an on-site hop farm of 15 acres or obtains hops from contiguous properties.
2019	SB 408	Allows a county to approve certain divisions of land zoned for exclusive farm use for the purpose of siting utility facilities.
2019	HB 2790	Allows counties to require mass outdoor gathering of more than 3,000 people, except for agri-tourism events, to obtain land use permit. Allows counties to charge larger fee for approval of larger mass outdoor gatherings.

2019	HB 2329	Revises the jurisdiction of the Energy Facility Siting Council for solar energy facilities and provides for county land use approval subject to certain conditions.

Rule amendments, 2018-2019

2019	Solar Rule Revisions	OAR 660-033-0130(38) was revised to modify requirements for siting solar power facilities on high-value farmland.

VIII. Conclusion



Oregon's farm and forest land protection program has provided a significant level of protection to the state's working landscapes over the last several decades. As shown in Figure 16, the total acres of farm and forest lands converted to low density residential and urban uses in Oregon has slowed considerably since the adoption of county comprehensive plans in 1984.

Over the years, the Legislature and LCDC have continued to refine the state's agricultural and forest land protections to accommodate changing needs and regional variation. As Oregon continues to change, it is important to remember the valuable role that agricultural and forest lands provide to the food and economic needs and health of all Oregonians. Agricultural and forest lands are also critical for the various industries that depend on Oregon produced farm and forest products and businesses that thrive on recreation and tourism opportunities. Maintaining the land base necessary to support agricultural and forestry operations is a critical component of a prosperous Oregon.

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APPENDIX

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Table 1, All Dwelling approvals on Farmland, type and county, 2018–2019

County	Primary Farm			Accessory Farm			Relative Help			NonFarm Dwelling			Lot of Record			Replacement			Health Hardship		
	2018	2019	Total	2018	2019	Total	2018	2019	Total	2018	2019	Total	2018	2019	Total	2018	2019	Total	2018	2019	Total
Baker			0		1	1		1	1			0		1	1	7	3	10	2		2
Benton		2	2			0			0			0			0	4		4	1	2	3
Clackamas	1	1	2			0	4	1	5		1	1	1	1	2	2	3	5	6	9	15
Clatsop			0			0			0		1	1			0		1	1			0
Columbia		2	2	1	1	2			0			0			0	2		2			0
Coos			0			0	1	1	2			0			0	2	2	4			0
Crook	3	2	5	2	2	4	2		2	9	1	10	3	3	6	4		4		1	1
Curry			0			0			0			0			0			0			0
Deschutes		1	1	1		1	1		1	23	21	44	3	1	4	15	14	29	7	11	18
Douglas	3	3	6			0	6	8	14	9	5	14		1	1	14	20	34	4	1	5
Gilliam			0		1	1	1		1	1	1	2			0			0			0
Grant	3	1	4			0	1	1	2	1	4	5	3	1	4	5	4	9			0
Harney	1	1	2		1	1	2	1	3		4	4	1		1		3	3			0
Hood River	1		1	9	10	19			0	1		1	2	1	3	13	9	22	1	1	2
Jackson	1		1			0	1	2	3	5	6	11		1	1	1	2	3	3	3	6
Jefferson	1	2	3	1		1			0		2	2	1		1	5	4	9	1		1
Josephine			0	1		1			0	1	1	2			0		1	1			0
Klamath	1	1	2			0			0	1	1	2			0			0			0
Lake	6	2	8	3		3	1		1	24	15	39			0	6	6	12			0
Lane			0			0	1	2	3	1	4	5			0	7	13	20	2	3	5
Lincoln			0			0			0			0			0			0			0
Linn	2	1	3	2	3	5	1	2	3	5	3	8	1	1	2	30	25	55	9	8	17
Malheur			0		4	4			0	10	4	14			0	6	9	15	1	1	2
Marion	1	3	4	4	4	8			0	3	2	5	1	1	2	9	7	16	11	11	22
Morrow			0	1		1	1	1	2	4	5	9	1		1		2	2			0
Multnomah			0			0			0			0			0		2	2			0
Polk	1	1	2		3	3	1	3	4			0		1	1	18	15	33	4	5	9
Sherman		1	1			0			0	3	2	5			0	1	1	2			0
Tillamook	1	2	3	1	1	2	1	1	2	2	2	4			0	8	2	10			0
Umatilla		1	1	3	1	4	1	1	2	2	2	4	1		1	21	15	36	1		1
Union	1	2	3		1	1	1		1	3	2	5	2	1	3	12	5	17		1	1
Wallowa	8		8			0	1		1		1	1	5	2	7	3	4	7			0
Wasco	3		3			0			0	4		4	1		1	6	4	10	1		1
Washington	3		3		1	1	1		1	2		2	3	6	9	9	10	19		1	1
Wheeler	2		2	1		1			0		1	1			0	2	1	3			0
Yamhill	4	6	10			0	2	3	5	1	1	2			0	1	2	3	11	6	17
Grand Total	47	35	82	30	34	64	31	28	59	115	92	207	29	22	51	213	189	402	65	64	129

Table 2, Primary farm dwelling approvals, option and county, 2018-2019

	Total			HV Income		Non-HV Income		Large Lot		HV Capability	
County	**2018**	**2019**	**Grand Total**	2018	2019	2018	2019	2018	2019	2018	2019
Baker	0	0	**0**								
Benton	0	2	**2**		2						
Clackamas	1	1	**2**	1	1						
Clatsop	0	0	**0**								
Columbia	0	2	**2**		1		1				
Coos	0	0	**0**								
Crook	3	2	**5**			2		1	2		
Curry	0	0	**0**								
Deschutes	0	1	**1**				1				
Douglas	3	3	**6**				1	2	1	1	1
Gilliam	0	0	**0**								
Grant	3	1	**4**					3	1		
Harney	1	1	**2**					1	1		
Hood River	1	0	**1**	1							
Jackson	1	0	**1**							1	
Jefferson	1	2	**3**			1			2		
Josephine	0	0	**0**								
Klamath	1	1	**2**					1	1		
Lake	6	2	**8**	1			2	5			
Lane	0	0	**0**								
Lincoln	0	0	**0**								
Linn	2	1	**3**	2	1						
Malheur	0	0	**0**								
Marion	1	3	**4**	1	3						
Morrow	0	0	**0**								
Multnomah	0	0	**0**								
Polk	1	1	**2**		1	1					
Sherman	0	1	**1**						1		
Tillamook	1	2	**3**		1	1	1				
Umatilla	0	1	**1**						1		
Union	1	2	**3**		2			1			
Wallowa	8	0	**8**					8			
Wasco	3	0	**3**	1				2			
Washington	3	0	**3**	2		1					
Wheeler	2	0	**2**			1		1			
Yamhill	4	6	**10**	4	6						
Grand Total	**47**	**35**	**82**	**13**	**18**	**7**	**6**	**25**	**10**	**2**	**1**

Table 3, Primary farm dwelling approvals on Farmland, parcel size and county, 2018-2019

County	Total			0 to 10 Acres		11 to 20 Acres		21 to 40 Acres		41 to 79 Acres		80 to 160 Acres		> 160 Acres		Acreage Not Reported	
	2018	2019	Grand Total	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	0	0	**0**														
Benton	0	2	**2**		1		1										
Clackamas	1	1	**2**				1			1							
Clatsop	0	0	**0**														
Columbia	0	2	**2**		1				1								
Coos	0	0	**0**														
Crook	3	2	**5**									1		1	2	1	
Curry	0	0	**0**														
Deschutes	0	1	**1**										1				
Douglas	3	3	**6**							1			2	2	1		
Gilliam	0	0	**0**														
Grant	3	1	**4**											3	1		
Harney	1	1	**2**											1	1		
Hood River	1	0	**1**	1													
Jackson	1	0	**1**					1									
Jefferson	1	2	**3**										1	1	1		
Josephine	0	0	**0**														
Klamath	1	1	**2**											1	1		
Lake	6	2	**8**	1										4	2	1	
Lane	0	0	**0**														
Lincoln	0	0	**0**														
Linn	2	1	**3**			1						1	1				
Malheur	0	0	**0**														
Marion	1	3	**4**		1				1	1					1		
Morrow	0	0	**0**														
Multnomah	0	0	**0**														
Polk	1	1	**2**							1	1						
Sherman	0	1	**1**												1		
Tillamook	1	2	**3**						1	1	1						
Umatilla	0	1	**1**												1		
Union	1	2	**3**											1	2		
Wallowa	8	0	**8**	3								2		2		1	
Wasco	3	0	**3**											3			
Washington	3	0	**3**	1		1						1					
Wheeler	2	0	**2**											2			
Yamhill	4	6	**10**	1	2				1		1	1		2	1		1
Grand Total	**47**	**35**	**82**	**7**	**5**	**2**	**2**	**1**	**4**	**5**	**3**	**6**	**5**	**23**	**15**	**3**	**1**

Table 4, Nonfarm dwelling approvals on Farmland, parcel size and county, 2018-2019

County	Total			0 to 5 Acres		6 to 10 Acres		11 to 20 Acres		21 to 40 Acres		41 to 80 Acres		> 80 Acres	
	2018	2019	Grand Total	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clackamas	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Clatsop	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crook	9	1	10	0	0	2	0	2	0	2	0	3	1	0	0
Curry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschutes	23	21	44	6	9	3	1	8	7	5	0	1	1	0	3
Douglas	9	5	14	5	3	3	0	0	2	1	0	0	0	0	0
Gilliam	1	1	2	0	0	0	1	0	0	0	0	1	0	0	0
Grant	1	4	5	1	0	0	1	0	3	0	0	0	0	0	0
Harney	0	4	4	0	0	0	1	0	1	0	2	0	0	0	0
Hood River	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Jackson	5	6	11	4	3	0	1	0	0	0	1	1	1	0	0
Jefferson	0	2	2	0	0	0	0	0	0	0	1	0	0	0	1
Josephine	1	1	2	0	0	1	1	0	0	0	0	0	0	0	0
Klamath	1	1	2	0	0	0	0	1	0	0	1	0	0	0	0
Lake	24	15	39	10	6	3	2	7	5	3	2	0	0	1	0
Lane	1	4	5	0	3	0	1	0	0	1	0	0	0	0	0
Lincoln	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Linn	5	3	8	3	0	2	1	0	0	0	1	0	0	0	1
Malheur	10	4	14	2	3	3	1	0	0	0	0	1	0	4	0
Marion	3	2	5	2	2	0	0	0	0	1	0	0	0	0	0
Morrow	4	5	9	1	1	3	2	0	1	0	0	0	1	0	0
Multnomah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sherman	3	2	5	1	0	1	0	1	0	0	2	0	0	0	0
Tillamook	2	2	4	0	0	2	0	0	0	0	1	0	1	0	0
Umatilla	2	2	4	1	0	0	1	0	1	0	0	0	0	1	0
Union	3	2	5	2	0	0	0	0	0	0	1	1	1	0	0
Wallowa	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
Wasco	4	0	4	0	0	0	0	3	0	0	0	1	0	0	0
Washington	2	0	2	0	0	1	0	0	0	1	0	0	0	0	0
Wheeler	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Yamhill	1	1	2	1	0	0	0	0	1	0	0	0	0	0	0
Grand Total	**115**	**92**	**207**	**40**	**30**	**24**	**14**	**22**	**22**	**14**	**14**	**9**	**6**	**6**	**6**

Table 5, Nonresidential use approvals on Farmland, 2018-2019

	TOTAL	Baker	Benton	Clackamas	Clatsop	Columbia	Coos	Crook	Curry	Deschutes	Douglas	Gilliam	Grant	Harney	Hood River	Jackson	Jefferson	Josephine	Klamath	Lake	Lane	Lincoln	Linn	Malheur	Marion	Morrow	Multnomah	Polk	Sherman	Tillamook	Umatilla	Union	Wallowa	Wasco	Washington	Wheeler	Yamhill
Home occupation	77	1	2					1		2	2		1		13	12				1	1				13	1		4				5	4		1		13
Processing of farm crops/biofuel/poultry	72		3	15				2		6					1	14		3			10	1	3					4						1	1		8
Solar power generating facility	59	1		20				1		2						1			1	4				1	15	2		3						2		6
Commercial activities with farm use	51		2	2			2			1	3					4	1	1			3		8		14			2			2					6
Marijuana Production	40			4						15	1															4		1			1			1	6		7
Other	39				2			2		2	1				1	6									1	6					2	3	1	7	1		4
Utility facility	36	4		1				6		3	1		1	1		1	1							1		2	1	1			5			2		4	1
Winery	31		1												3	2									4									1	3		17
Accessory use	20						1	2		5					2											1							4	5			
Agricultural building	19						1									2																5	3		8	
Agri-tourism & other commercial events	13			2						2							1								1											7
Farm stand	8		1	4											1													1								1
Landscape contracting business	8			1						1						1							1		4											
Aggregate processing into asphalt/cement	7																		1					3		1							1	1			
Processing Marijuana	6			1				1		2																										1	1
Utility facility service lines	6		1					1		1																1	1			1							
Mining/crushing of aggregate/other minerals	5																			1						3					1						
Outdoor mass gathering	5			1						3																							1				
transmission line	5							2												1						2											
Private park/campground	4				1															2											1						
Cider business	3																																1	1		1
destination resort	3									3																											
Fire service facility	3																								1			1			1						
Guest ranch	3									1																1					1						
Personal-use airport	3							1		1																										1	
Public/private school	3																											2		1						
Wetland creation/restoration	3															2																					1
Wind power generating facility, com.	3																									2								1			
Church/cemetery with church	2									1																	1										
Commercial dog boarding kennel	2									1																											1
Communication facilities	2																														1				1		
natural resources	2																	1							1												
Residential home	2												1								1																
Road improvements, conditional	2															1																					1
Road improvements, outright	2									1						1																					
Commercial power generating facility	1																													1						
Firearms training facility	1																			1																
Irrigation reservoir/canals	1															1																					
Land application of reclaimed water	1																														1						
Living history museum	1															1																					
Model aircraft landing site	1			1																																	
Public park	1									1																											

Table 6, New parcel approvals on Farmland, parcel size and county, 2018-2019

County	Total		0 to 10 Acres		11 to 20 Acres		21 to 40 Acres		41 to 80 Acres		81 to 160 Acres		> 160 Acres		Division in conjunction with a Nonfarm Dwelling		Division in conjunction with a conditional use	
	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	1	4	1	1	0	0	0	0	0	1	0	1	0	1				3
Benton	0	0																
Clackamas	0	3		0		0		1		1		1		0				
Clatsop	0	6		6		0		0		0		0		0				
Columbia	0	0																
Coos	0	0																
Crook	4	5	2	0	1	0	0	2	1	0	0	0	0	3	4	1		
Curry	0	0																
Deschutes	2	7	2	7	0	0	0	0	0	0	0	0	0	0	2	5		2
Douglas	9	10	6	1	0	0	0	0	0	0	2	5	1	4	6	1		
Gilliam	4	0	1		0		0		0		0		3					
Grant	2	1	1	0	0	0	0	0	0	0	0	0	1	1	1			
Harney	0	0																
Hood River	0	0																
Jackson	1	2	0	0	0	0	0	0	0	0	1	0	0	2				
Jefferson	1	0	0		0		0		0		0		1					
Josephine	3	0	2		1		0		0		0		0					
Klamath	7	0	2		1		0		0		1		3					
Lake	16	5	4	2	2	1	2	0	1	0	1	1	6	1	3		1	
Lane	1	6	0	4	0	1	1	0	0	0	0	1	0	0		2		1
Lincoln	0	0																
Linn	3	5	0	4	2	0	0	0	0	0	1	1	0	0		1	1	3
Malheur	1	0	1		0		0		0		0		0		1			
Marion	1	1	1	1	0	0	0	0	0	0	0	0	0	0			1	1
Morrow	11	5	7	1	1	0	0	0	2	1	0	1	1	2	4	2	1	
Multnomah	0	0																
Polk	0	2		1		0		0		0		1		0				1
Sherman	2	1	2	0	0	0	0	1	0	0	0	0	0	0	2	1		
Tillamook	0	0																
Umatilla	12	9	2	5	0	2	0	0	0	0	3	2	7	0	2	3		
Union	3	3	2	1	0	0	0	0	0	0	0	0	1	2	2			
Wallowa	0	0																
Wasco	2	2	0	0	2	0	0	0	0	0	0	1	0	1	2	1		
Washington	1	5	1	5	0	0	0	0	0	0	0	0	0	0		5		
Wheeler	2	1	0	0	0	0	0	1	0	0	0	0	2	0	1	1		
Yamhill	5	4	4	2	1	0	0	1	0	0	0	1	0	0				
Grand Total	94	87	41	41	11	4	3	6	4	3	9	16	26	17	30	23	4	11

Table 7, Dwelling approvals on Forestland by type and county, 2018–2019

County	Total			Health Hardship		Large Tract Dwelling		Lot of Record		Replacement dwelling		Template Test Dwelling	
	2018	2019	Grand Total	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	1	1	2						1	1			
Benton	6	1	7	2		1				1		2	1
Clackamas	21	20	41	6	2		2	1			1	14	15
Columbia	10	6	16						2			10	4
Coos	22	15	37							8	6	14	9
Crook	1	1	2				1			1			
Curry	2	1	3									2	1
Deschutes	4	8	12			1	2	1	2		3	2	1
Douglas	10	7	17	1	1	2		1		3	5	3	1
Grant	2	5	7			1	1	1	1		3		
Hood River	3	4	7							3	1		3
Jackson	18	25	43	1	3		5	2		1	1	14	16
Josephine	1	4	5			1	2						2
Klamath	7	6	13			4			1			3	5
Lane	25	58	83		2	1				8	14	16	42
Lincoln	1	0	1									1	
Linn	10	12	22	1	2					4	3	5	7
Marion	3	6	9							2	1	1	5
Morrow	0	1	1										1
Multnomah	1	7	8							1	4		3
Polk	18	12	30	1	1		1		1	9	3	8	6
Tillamook	1	0	1							1			
Umatilla	3	3	6			3	2						1
Union	1	5	6			1	1				4		
Wallowa	2	4	6			1		1	1		1		2
Wasco	1	0	1							1			
Washington	22	13	35		1		1	3		6	6	13	5
Wheeler	0	1	1				1						
Yamhill	14	15	29	4	7		1	1				9	7
Grand Total	**210**	**241**	**451**	**16**	**19**	**16**	**20**	**11**	**9**	**50**	**56**	**117**	**137**

Table 8, Template dwelling approvals on Forestland, parcel size and county, 2018–2019

County	Total			Not Reported		VC Class 1		VC Class 2		VC Class 3		0 to 5 Acres		6 to 10 Acres		11 to 20 Acres		21 to 40 Acres		41 to 79 Acres		> 80 Acres	
	2018	2019	Grand Total	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	**0**	**0**	**0**																				
Benton	**2**	**1**	**3**							2	1	0	0	1	0	1	0	0	0	0	1	0	0
Clackamas	**14**	**15**	**29**						2	14	13	7	2	1	2	3	5	0	4	3	1	0	1
Clatsop	**0**	**0**	**0**																				
Columbia	**10**	**4**	**14**							10	4	2	1	1	0	3	1	3	2	1	0	0	0
Coos	**14**	**9**	**23**	1						13	9	4	3	3	2	5	2	2	0	0	1	0	1
Crook	**0**	**0**	**0**																				
Curry	**2**	**1**	**3**			1		1			1	1	0	0	0	0	0	0	0	0	1	1	0
Deschutes	**2**	**1**	**3**					2	1			0	0	0	0	1	1	1	0	0	0	0	0
Douglas	**3**	**1**	**4**							3	1	0	0	2	0	0	1	0	0	0	0	1	0
Gilliam	**0**	**0**	**0**																				
Grant	**0**	**0**	**0**																				
Harney	**0**	**0**	**0**																				
Hood River	**0**	**3**	**3**								3		2		0		1		0		0		0
Jackson	**14**	**16**	**30**			1	1	1	2	12	13	5	2	2	5	3	3	2	4	1	0	1	2
Jefferson	**0**	**0**	**0**																				
Josephine	**0**	**2**	**2**								2		0		0		0		1		0		1
Klamath	**3**	**5**	**8**			1		2			5	0	1	0	0	0	1	3	0	0	0	0	3
Lake	**0**	**0**	**0**																				
Lane	**16**	**42**	**58**			10	12			6	30	2	10	1	16	8	9	4	7	0	0	1	0
Lincoln	**1**	**0**	**1**							1		1		0		0		0		0		0	
Linn	**5**	**7**	**12**			1				4	7	2	2	0	2	2	0	0	2	1	1	0	0
Malheur	**0**	**0**	**0**																				
Marion	**1**	**5**	**6**						3	1	2	0	4	0	1	0	0	0	0	1	0	0	0
Morrow	**0**	**1**	**1**						1				1		0		0		0		0		0
Multnomah	**0**	**3**	**3**								3		2		0		1		0		0		0
Polk	**8**	**6**	**14**						4	8	2	2	0	2	2	3	3	0	0	1	1	0	0
Sherman	**0**	**0**	**0**																				
Tillamook	**0**	**0**	**0**																				
Umatilla	**0**	**1**	**1**				1						0		0		0		0		1		0
Union	**0**	**0**	**0**																				
Wallowa	**0**	**2**	**2**				2						0		1		0		1		0		0
Wasco	**0**	**0**	**0**																				
Washington	**13**	**5**	**18**				3			13	2	5	1	2	1	0	0	3	3	2	0	1	0
Wheeler	**0**	**0**	**0**																				
Yamhill	**9**	**7**	**16**			1	1		2	8	4	1	4	5	0	2	1	1	1	0	0	0	1
Grand Total	**117**	**137**	**254**	**1**	**0**	**15**	**20**	**6**	**15**	**95**	**102**	**32**	**35**	**20**	**32**	**31**	**29**	**19**	**25**	**10**	**7**	**5**	**9**

Table 9, Nonresidential use approvals on Forestland, 2018-2019

	TOTAL	Baker	Benton	Clackamas	Clatsop	Columbia	Coos	Crook	Curry	Deschutes	Douglas	Gilliam	Grant	Harney	Hood River	Jackson	Jefferson	Josephine	Klamath	Lake	Lane	Lincoln	Linn	Malheur	Marion	Morrow	Multnomah	Polk	Sherman	Tillamook	Umatilla	Union	Wallowa	Wasco	Washington	Wheeler	Yamhill
Accessory use	**43**						4			4			1			15					3						3						3			10		
Agricultural building	**26**						4									17																			5		
Home occupation	**20**								2						3	5		1			1							2				1	2		1		2
Other	**20**						3		2	1	2				1	5																1	1	1	1		2
Communication facilities	**14**						3									1		1			6						1			1			1				
Private park/campground	**5**	2		1	1																1																
Commercial power generating facility	**4**			2																								2									
Road improvements, conditional	**4**		1								1					1					1																
Mining/processing of aggregate	**3**				1						1																									1	
Winery	**3**																																				3
Public park	**2**																				1	1															
Reservoirs/water impoundment	**2**																											2									
Utility facility	**2**																														2						
Cemetery	**1**															1																					
Church/cemetery with church	**1**			1																																	
Cider business	**1**																											1									
Commercial activities with farm use	**1**																											1									
Commercial dog boarding kennel	**1**																																				1
Exploration for minerals/aggregate	**1**						1																														
Exploration/production of geothermal/gas/oil	**1**																				1																
Fire station	**1**																																			1	
Forest management research	**1**															1																					
Logging equipment repair/storage	**1**																						1														
Outdoor other gathering	**1**															1																					
Private hunting/fishing without lodging	**1**			1																																	
Processing	**1**							1																													
Road improvements, outright	**1**																											1									
Solar power generating facility	**1**			1																																	
Transmission lines with ROW of up to 100 feet	**1**																													1							
Uses to conserve soil/air/water quality	**1**																										1										
Water intake facilities/canals for irrigation	**1**																										1										
Youth Camp	**1**																															1					

Table 10, New parcel approvals on Forestland, parcel size and county, 2018-2019

County	Total New Parcels			0 to 10 Acres		11 to 20 Acres		21 to 40 Acres		41 to 79 Acres		80 to 160 Acres		> 160 Acres		Division associated with Dwelling		Division associated with Conditional Use	
	2018	2019	Grand Total	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Baker	0	0	**0**																
Benton	0	1	**1**		1		0		0		0		0		0				
Clackamas	4	3	**7**	3	2	0	1	0	0	0	0	1	0	0	0				
Clatsop	3	0	**3**	0		1		0		0		2		0					
Columbia	0	2	**2**		0		0		1		0		1		0				
Coos	5	1	**6**	5	1	0	0	0	0	0	0	0	0	0	0				
Crook	0	3	**3**		2		0		0		1		0		0				
Curry	0	0	**0**																
Deschutes	2	0	**2**	0		0		0		0		0		2					
Douglas	0	6	**6**		4		0		0		0		0		2				
Gilliam	0	0	**0**																
Grant	0	1	**1**		0		0		0		0		0		1				
Harney	0	0	**0**																
Hood River	0	0	**0**																
Jackson	1	1	**2**	1	1	0	0	0	0	0	0	0	0	0	0				
Jefferson	0	0	**0**																
Josephine	0	0	**0**																
Klamath	8	0	**8**	2		0		0		2		0		4		8			
Lake	0	0	**0**																
Lane	1	4	**5**	0	4	1	0	0	0	0	0	0	0	0	0				
Lincoln	0	0	**0**																
Linn	0	2	**2**		1		0		1		0		0		0				1
Malheur	0	0	**0**																
Marion	0	0	**0**																
Morrow	0	0	**0**																
Multnomah	0	0	**0**																
Polk	0	1	**1**		1		0		0		0		0		0				
Sherman	0	0	**0**																
Tillamook	1	0	**1**	0		0		0		1		0		0					
Umatilla	0	0	**0**																
Union	0	0	**0**																
Wallowa	0	0	**0**																
Wasco	0	0	**0**																
Washington	2	1	**3**	2	1	0	0	0	0	0	0	0	0	0	0				1
Wheeler	0	0	**0**																
Yamhill	0	4	**4**		4		0		0		0		0		0				
Grand Total	**27**	**30**	**57**	**13**	**22**	**2**	**1**	**0**	**2**	**3**	**1**	**3**	**1**	**6**	**3**	**8**	**0**	**0**	**2**

Table 11, Dwelling approvals on Farmland, by county, 1994-2019

County	Total EFU Dwelling Approvals 1994-2019	% Approved by County	Primary Farm	Accessory Farm	Relative Farm	Non Farm	Lot Of Record	Temp Hardship	Replacement
Baker	**428**	**2.36%**	51	5	31	45	107	26	163
Benton	**188**	**1.04%**	14	3	22	15	21	49	64
Clackamas	**489**	**2.70%**	71	13	59	33	72	236	5
Clatsop	**75**	**0.41%**	4	0	5	22	7	2	35
Columbia	**52**	**0.29%**	12	4	0	7	9	6	14
Coos	**198**	**1.09%**	10	5	33	6	25	23	96
Crook	**924**	**5.10%**	138	17	14	475	50	29	201
Curry	**25**	**0.14%**	5	0	8	10	1	1	0
Deschutes	**1,293**	**7.13%**	47	7	21	865	75	111	167
Douglas	**2,260**	**12.47%**	126	2	224	492	134	151	1,131
Gilliam	**48**	**0.26%**	11	6	5	8	1	1	16
Grant	**301**	**1.66%**	30	7	20	65	43	2	134
Harney	**404**	**2.23%**	112	9	15	180	36	9	43
Hood River	**417**	**2.30%**	22	83	10	35	29	28	210
Jackson	**793**	**4.37%**	57	4	56	283	256	123	14
Jefferson	**324**	**1.79%**	71	8	10	29	30	32	144
Josephine	**98**	**0.54%**	7	6	5	63	9	6	2
Klamath	**577**	**3.18%**	102	3	38	227	25	13	169
Lake	**711**	**3.92%**	91	19	25	511	3	6	56
Lane	**674**	**3.72%**	47	2	80	60	6	112	367
Lincoln	**60**	**0.33%**	3	0	0	28	21	5	3
Linn	**696**	**3.84%**	36	9	42	68	57	296	188
Malheur	**839**	**4.63%**	89	9	26	203	36	38	438
Marion	**1,138**	**6.28%**	78	26	18	89	37	269	621
Morrow	**249**	**1.37%**	29	15	19	62	23	5	96
Multnomah	**72**	**0.40%**	6	1	11	6	4	3	41
Polk	**811**	**4.47%**	65	6	43	21	93	125	458
Sherman	**62**	**0.34%**	10	1	4	33	3	0	11
Tillamook	**215**	**1.19%**	8	7	17	29	1	12	141
Umatilla	**831**	**4.58%**	64	13	33	118	56	56	491
Union	**396**	**2.18%**	60	6	17	63	53	18	179
Wallowa	**232**	**1.28%**	44	2	12	34	61	3	76
Wasco	**462**	**2.55%**	68	205	15	81	15	16	62
Washington	**883**	**4.87%**	86	4	27	64	19	143	540
Wheeler	**126**	**0.70%**	17	6	2	67	6	1	27
Yamhill	**777**	**4.29%**	75	10	69	40	121	190	272
Grand Total	**18,128**		**1,766**	**523**	**1,036**	**4,437**	**1,545**	**2,146**	**6,675**

Table 12, Dwelling approvals on Farmland, by year, 1994-2019

Year	Total	Primary Farm	Accessory Farm	Relative Farm	Non Farm	Lot Of Record	Temp Hardship	Replacement
1994	**809**	77	0	48	226	105	127	226
1995	**899**	103	1	48	259	111	145	232
1996	**958**	75	0	56	264	132	116	315
1997	**1,028**	89	0	80	265	125	127	342
1998	**805**	69	0	60	183	103	102	288
1999	**751**	74	0	51	164	85	81	296
2000	**1,065**	96	0	59	279	106	146	379
2001	**825**	88	0	38	216	76	111	296
2002	**929**	76	0	48	283	87	102	333
2003	**835**	95	0	34	261	54	83	308
2004	**762**	87	0	53	193	64	71	294
2005	**715**	83	0	45	227	46	84	230
2006	**765**	102	0	33	239	54	82	255
2007	**789**	94	0	59	271	63	69	233
2008	**586**	67	4	37	123	53	52	250
2009	**521**	54	15	20	111	34	60	227
2010	**465**	34	26	25	84	20	58	218
2011	**393**	50	21	18	56	15	51	182
2012	**456**	38	57	22	71	21	59	188
2013	**459**	47	45	24	69	24	31	219
2014	**486**	45	31	36	70	28	54	222
2015	**530**	51	27	30	90	21	57	254
2016	**725**	41	189	23	117	39	64	252
2017	**578**	49	43	30	109	28	85	234
2018	**530**	47	30	31	115	29	65	213
2019	**464**	35	34	28	92	22	64	189
Grand Total	**18,128**	**1,766**	**523**	**1,036**	**4,437**	**1,545**	**2,146**	**6,675**
5-Year Average	**565**	45	65	28	105	28	67	228
10-Year Average	**509**	44	50	27	87	25	59	217
20-Year Average	**644**	64	26	35	154	44	72	249

Table 13, Dwellings approvals on Forestland, by county, 1994-2019

County	Total Forest Dwelling Approvals 1994-2019	% Approved by County	Template Test	Large Tract	Lot of Record	Replacement	Health Hardship
Baker	**46**	**0.49%**	2	8	18	18	0
Benton	**102**	**1.10%**	40	9	19	24	10
Clackamas	**983**	**10.56%**	670	20	131	1	161
Clatsop	**112**	**1.20%**	54	2	20	32	4
Columbia	**648**	**6.96%**	520	2	16	56	54
Coos	**581**	**6.24%**	370	9	22	167	13
Crook	**20**	**0.21%**	0	12	1	6	1
Curry	**191**	**2.05%**	121	45	17	7	1
Deschutes	**118**	**1.27%**	76	13	11	14	4
Douglas	**727**	**7.81%**	109	41	55	501	21
Gilliam	**0**	**0.00%**	0	0	0	0	0
Grant	**121**	**1.30%**	40	20	23	38	0
Harney	**6**	**0.06%**	0	0	5	1	0
Hood River	**88**	**0.95%**	45	9	13	21	0
Jackson	**923**	**9.92%**	544	103	175	30	71
Jefferson	**2**	**0.02%**	0	1	0	1	0
Josephine	**320**	**3.44%**	283	17	12	5	3
Klamath	**295**	**3.17%**	128	17	51	90	9
Lake	**2**	**0.02%**	1	0	0	1	0
Lane	**1,378**	**14.80%**	890	16	21	404	47
Lincoln	**234**	**2.51%**	177	7	34	11	5
Linn	**341**	**3.66%**	186	4	32	44	75
Malheur	**0**	**0.00%**	0	0	0	0	0
Marion	**161**	**1.73%**	96	0	12	46	7
Morrow	**53**	**0.57%**	33	6	2	12	0
Multnomah	**133**	**1.43%**	49	1	6	74	3
Polk	**522**	**5.61%**	254	21	27	179	41
Sherman	**0**	**0.00%**	0	0	0	0	0
Tillamook	**72**	**0.77%**	47	2	4	15	4
Umatilla	**36**	**0.39%**	3	13	6	13	1
Union	**144**	**1.55%**	19	26	38	56	5
Wallowa	**105**	**1.13%**	40	19	20	22	4
Wasco	**14**	**0.15%**	1	2	4	5	2
Washington	**457**	**4.91%**	202	5	43	189	18
Wheeler	**8**	**0.09%**	1	2	0	3	2
Yamhill	**365**	**3.92%**	252	16	26	42	29
Grand Total	**9,308**		**5,253**	**468**	**864**	**2,128**	**595**

Table 14, Dwellings approvals on Forestland, by year, 1994-2019

Year	Total	Large Tract	Replacement	Template Test	Lot of Record	Health Hardship
1994	**420**	11	93	281	35	0
1995	**563**	12	114	334	103	0
1996	**503**	31	104	304	61	3
1997	**475**	14	112	265	59	25
1998	**447**	13	114	231	61	28
1999	**400**	17	64	225	42	52
2000	**591**	25	101	371	55	39
2001	**438**	22	101	224	49	42
2002	**402**	15	92	221	33	41
2003	**430**	28	100	235	43	24
2004	**467**	30	96	271	52	18
2005	**434**	15	104	243	42	30
2006	**456**	15	130	257	34	20
2007	**427**	24	90	227	48	38
2008	**345**	16	87	194	27	21
2009	**271**	31	64	133	11	32
2010	**248**	20	58	141	16	13
2011	**216**	22	78	90	10	16
2012	**189**	18	48	95	6	22
2013	**203**	11	66	105	6	15
2014	**214**	10	59	126	10	9
2015	**233**	8	50	152	9	14
2016	**225**	9	47	128	22	19
2017	**260**	15	50	146	10	39
2018	**210**	16	50	117	11	16
2019	**241**	20	56	137	9	19
Grand Total	**9,308**	**468**	**2,128**	**5,253**	**864**	**595**
5-Year Avg	**234**	14	51	136	12	21
10-Year Avg	**224**	15	56	124	11	18
20-Year Avg	**325**	19	76	181	25	24

Table 15, Total approvals pursuant to M49, by county, 2010-2019

County	Claims	Claims Authorized	Authorized New Dwellings	Authorized New Parcels
Total	4,960	3,542	6,417	4,096
Baker	97	66	116	58
Benton	80	57	93	53
Clackamas	863	673	1,204	855
Clatsop	52	29	46	31
Columbia	79	50	92	64
Coos	135	96	182	104
Crook	33	21	44	27
Curry	75	48	102	50
Deschutes	116	83	133	97
Douglas	168	124	208	148
Gilliam	1	0	0	0
Grant	5	3	5	5
Harney	0	0	2	2
Hood River	160	117	180	121
Jackson	349	265	450	308
Jefferson	142	86	192	119
Josephine	124	82	142	106
Klamath	139	92	195	78
Lake	1	1	2	2
Lane	327	237	473	297
Lincoln	78	62	112	51
Linn	270	182	331	222
Malheur	19	11	33	21
Marion	322	211	361	223
Morrow	0	0	9	6
Multnomah	72	50	85	40
Polk	247	168	302	184
Sherman	0	0	0	0
Tillamook	67	40	78	46
Umatilla	34	25	72	45
Union	31	19	28	20
Wallowa	38	29	63	37
Wasco	31	26	45	21
Washington	485	360	607	390
Wheeler	2	0	29	15
Yamhill	318	229	401	250

Table 15a, Total Measure 49 authorizations, by county, 2018-2019

County	New Dwellings		New Parcels		Total New Dwelling Approvals	Total New Parcels
	2018	2019	2018	2019	2018-2019	2018-2019
TOTAL	**74**	**98**	**58**	**82**	**179**	**143**
Baker	4		4		4	4
Benton		2		0	2	0
Clackamas	18	28	16	29	46	45
Clatsop	0	1	2	2	1	4
Columbia	2		2		2	2
Coos		3		2	3	2
Deschutes	2	1	2	2	3	4
Douglas	2		2		2	2
Hood River	1	11	1	7	12	8
Jackson	2	1	2	0	5	2
Jefferson	2	5	2	4	7	6
Josephine	1		1		1	1
Lane	2	5	1	4	7	5
Lincoln		2		2	2	2
Linn	10	5	6	4	17	11
Marion	6		4		9	6
Multnomah	1		1		1	1
Polk	4	13	4	11	17	15
Union	1		0		1	0
Washington	11	18	3	12	29	15
Yamhill	5	3	5	3	8	8

Table 16, Farm and Forest Land included in UGBs by Year, 1989 – 2019

Year	Number of UGB Expansion Approvals	Acres added to UGBs	Acres from EFU Zones	Acres from Forest Zones
1989	25	1,445	259	100
1990	9	2,737	1,734	17
1991	21	1,480	177	70
1992	15	970	297	120
1993	22	2,277	1,390	448
1994	20	1,747	201	20
1995	15	624	219	143
1996	19	3,816	2,466	16
1997	12	668	508	40
1998	21	2,726	493	2
1999	10	927	587	72
2000	8	624	0	0
2001	4	140	11	0
2002	55	17,962	3,281	1,659
2003	10	385	124	85
2004	7	3,391	2,090	176
2005	10	739	70	8
2006	15	3,231	670	27
2007	19	292	105	65
2008	6	972	949	0
2009	7	782	686	4
2010	5	58	37	2
2011	6	2,738	1,662	699
2012	6	4,941	757	1,272
2013	7	894	559	0
2014	8	4,188	3,262	350
2015	7	1,028	79	1
2016	5	2,605	225	0
2017	10	1,845	1,192	135
2018	4	415	194	44
2019	7	2,497	1,294	0
TOTAL	**395**	**69,144**	**25,578**	**5,575**

Table 17, Farmland zone changes not involving urban lands, 1989–2019

	To Commercial*	To Industrial **	To Residential	Subtotal	To Forest or Natural Resource	To EFU from Other Zone	Net Zone Change
1989-2000	614	1,370	5,986	**7,970**	2,410	944,670	**934,290**
2001	11	31	283	**325**	67	148	**-244**
2002	18	69	147	**234**	202	10	**-426**
2003	21	2	283	**306**	90	77	**-319**
2004	25	1,681	220	**1,925**	269	52	**-2,142**
2005	479	772	414	**1,665**	988	21	**-2,632**
2006	31	539	1,468	**2,038**	311	777	**-1,572**
2007	2	342	1,704	**2,048**	1,115	2,020	**-1,143**
2008	79	10	1,011	**1,100**	73	0	**-1,173**
2009	6	375	396	**777**	459	53	**-1,183**
2010	30	439	402	**871**	546	41	**-1,376**
2011	0	288	270	**558**	199	0	**-757**
2012	57	1,075	42	**1,174**	517	0	**-1,691**
2013	0	0	380	**380**	1,316	0	**-1,696**
2014	22	55	2,987	**3,064**	6	916	**-2,154**
2015	640	569	10	**1,219**	204	8	**-1,415**
2016	103	167	206	**476**	0	93	**-383**
2017	8	157	184	**349**	432	54	**-727**
2018	106	505	674	**1,285**	498	263	**-1,521**
2019	0	248	728	**976**	166	0	**-1,142**
TOTAL	**2,252**	**8,694**	**17,795**	**28,741**	**9,868**	**949,203**	**910,594**

*Public zones are counted as commercial; ** Mineral and aggregate zones are counted as industrial.

Table 18, Forest and mixed farm-forest zone changes not involving urban lands, 1989–2019

	To Commercial*	To Industrial **	To Residential	Subtotal	To EFU or Natural Resource	To Forest from Other Zone	Net Zone Change
1989-2000	16	275	3,692	**3,983**	8,517	36,854	**24,354**
2001	0	0	232	**232**	0	0	**-232**
2002	0	0	113	**113**	109	0	**-222**
2003	0	0	520	**520**	113	0	**-633**
2004	0	82	95	**177**	50	0	**-227**
2005	0	31	101	**132**	44	50	**-126**
2006	0	3	292	**295**	0	163	**-132**
2007	2	5	1,269	**1,276**	0	90	**-1,186**
2008	3	212	5	**220**	131	509	**158**
2009	0	56	2,451	**2,507**	0	27	**-2,480**
2010	215	185	489	**889**	10	378	**-521**
2011	2	0	53	**55**	162	0	**-217**
2012	0	5	74	**79**	0	80	**1**
2013	18	129	0	**147**	288	0	**-435**
2014	4	0	159	**163**	0	11	**-152**
2015	0	197	164	**361**	0	204	**-157**
2016	0	32	120	**152**	35	0	**-187**
2017	16	136	32	**184**	41	432	**207**
2018	0	151	107	**258**	263	120	**-401**
2019	0	165	0	**165**	0	83	**-82**
TOTAL	**276**	**1,664**	**9,968**	**11,908**	**9,763**	**39,001**	**17,330**

** Mineral and aggregate zones are counted as industrial.

Table 19, USDA NASS Acres in Farm Use by County 1997 – 2017

Table: USDA NASS 2017 Census of Agriculture: Oregon Land In Farms by County 1997-2017

County	2017	2012	2007	2002	1997	2017 to 2012	2017 to 1997	Acreage
COLUMBIA	43,379	56,668	57,758	62,398	72,700	77%	60%	-29,321
GRANT	628,895	656,410	761,541	892,400	1,041,463	96%	60%	-412,568
CLATSOP	15,070	16,382	21,198	22,234	24,341	92%	62%	-9,271
JACKSON	170,298	214,079	244,055	252,185	254,607	80%	67%	-84,309
KLAMATH	482,999	650,416	675,127	702,951	713,255	74%	68%	-230,256
MULTNOMAH	25,435	29,983	28,506	34,329	36,503	85%	70%	-11,068
UNION	385,152	411,671	487,584	478,411	544,720	94%	71%	-159,568
WASHINGTON	104,715	135,733	127,984	130,683	140,884	77%	74%	-36,169
JOSEPHINE	27,866	28,256	37,706	32,370	37,170	99%	75%	-9,304
LINN	314,947	331,316	376,483	385,589	416,737	95%	76%	-101,790
CURRY	70,338	63,342	74,336	70,459	90,090	111%	78%	-19,752
BAKER	754,585	710,789	711,809	869,523	953,771	106%	79%	-199,186
WHEELER	556,967	649,086	757,780	738,207	694,696	86%	80%	-137,729
CLACKAMAS	157,426	162,667	182,743	215,210	195,602	97%	80%	-38,176
POLK	148,905	144,748	166,663	168,881	184,323	103%	81%	-35,418
LINCOLN	29,017	30,225	31,179	32,791	35,780	96%	81%	-6,763
GILLIAM	611,920	723,405	733,387	642,996	752,067	85%	81%	-140,147
YAMHILL	169,357	177,365	180,846	196,298	204,739	95%	83%	-35,382
COOS	138,171	157,496	145,675	144,077	166,082	88%	83%	-27,911
LANE	203,148	219,625	245,531	234,807	238,014	92%	85%	-34,866
WALLOWA	520,213	452,559	527,957	518,110	606,259	115%	86%	-86,046
MALHEUR	1,093,362	1,076,768	1,170,664	1,175,280	1,252,746	102%	87%	-159,384
CROOK	799,845	822,676	761,548	937,628	904,794	97%	88%	-104,949
MARION	288,671	286,194	307,647	341,051	325,048	101%	89%	-36,377
TILLAMOOK	32,936	36,551	37,780	39,526	36,551	90%	90%	-3,615
HOOD RIVER	28,451	25,817	26,952	29,064	30,834	110%	92%	-2,383
BENTON	127,626	123,975	114,558	130,203	137,465	103%	93%	-9,839
DOUGLAS	400,179	382,386	396,984	390,140	422,605	105%	95%	-22,426
UMATILLA	1,352,241	1,308,312	1,447,321	1,330,932	1,403,598	103%	96%	-51,357
MORROW	1,126,101	1,165,126	1,104,250	1,124,593	1,165,678	97%	97%	-39,577
JEFFERSON	792,920	817,051	708,974	701,440	793,525	97%	100%	-605
DESCHUTES	134,600	131,036	129,369	138,226	131,734	103%	102%	2,866
LAKE	755,639	657,055	692,778	747,888	737,531	115%	102%	18,108
SHERMAN	524,857	513,649	514,004	507,705	451,769	102%	116%	73,088
HARNEY	1,557,103	1,505,437	1,461,508	1,575,020	1,319,828	103%	118%	237,275
WASCO	1,388,988	1,427,324	949,462	1,086,817	1,140,704	97%	122%	248,284
						Percent Change	Percent Change	Change
STATE LEVEL	**15,962,322**	**16,301,578**	**16,399,647**	**17,080,422**	**17,658,213**	**98%**	**90%**	**-1,695,891**

Forest Practices Technical Guidance
Waiver of Statutory Written Plan

Effective July 1, 2023 for forestland owners who owner over 5,000 acres of Oregon forestland and submit a notification of operation on or after July 1, 2023. Otherwise, January 1, 2024 is the effective date for all forestland owners.

The Oregon Forest Practices Act (ORS 527.670 (3) and Rules OAR 629-605-0170 relate to Statutory Written Plan requirements to protect the physical components near identified natural resources. Waiver of the Statutory Written Plan (SWP) requirement may apply under specific circumstances, described in this document.

When are Written Plans Required?

Landowners, loggers, or others doing forestry work must submit a statutory written plan to the Oregon Department of Forestry (ODF) prior to working **within** the following specified resources:

- 100 feet of the following water classifications:
  - Type F – fish use
  - Type SSBT - salmon, steelhead, bull trout use
  - Type D domestic- household use
  - Significant wetlands (wetlands over 8 acres, bogs, or important springs in eastern Oregon)
- 300 feet of significant wetlands that are also estuaries
- 300 feet of resource sites for sensitive bird nesting, roosting, or watering sites or nest sites of threatened or endangered birds species

Note: Waiver of the statutory written plan is ***NOT*** a waiver of the 15-day waiting period before starting an operation.

What are Riparian Management Areas?

Riparian management areas (RMA) are designated areas with specific widths where work must be restricted or done to protect natural resources adjacent to specified waters of the state. Eligibility for waiver of the SWP requirement is indicated in Table 1., which is the difference between 100 feet and the width of the RMA that is less than 100 feet.

Table 1. RMA Widths and Eligibility for Waiver of the Statutory Written Plan Requirement

Area	Classification	Standard Practice	SFO[1] Minimum Option
Western Oregon	Large Type SSBT and Type F	110 feet (not eligible for SWP waiver)	100 feet (not eligible for SWP waiver)
	Medium Type SSBT	110 feet (not eligible for SWP waiver)	80 feet
	Small Type SSBT	100 feet (not eligible for SWP waiver)	60 feet
	Medium Type F	110 feet (not eligible for SWP waiver)	70 feet
	Small Type F	100 feet (not eligible for SWP waiver)	50 feet
	Significant wetlands (estuary)	300 feet (not eligible for SWP waiver)	300 feet (not eligible for SWP waiver)
Eastern Oregon	Large Type SSBT and Type F	100 feet *(not eligible for SWP waiver)*	100 feet *(not eligible for SWP waiver)*
	Medium Type SSBT and Type F	100 feet *(not eligible for SWP waiver)*	80 feet
	Small Type SSBT and Type F	75 feet	60 feet
	Important Springs	50 to 100 feet	50 to 100 feet
Statewide	Large Type D	70 feet	70 feet
	Medium Type D	50 feet	50 feet
	Small Type D	20 feet	20 feet
	Significant wetlands (not estuary)	100 feet (not eligible for SWP waiver)	100 feet (not eligible for SWP waiver)
	Bog	50 to 100 feet	50 to 100 feet

[1] SFO means a small forest landowner that qualifies for the small forest landowner minimum option practice

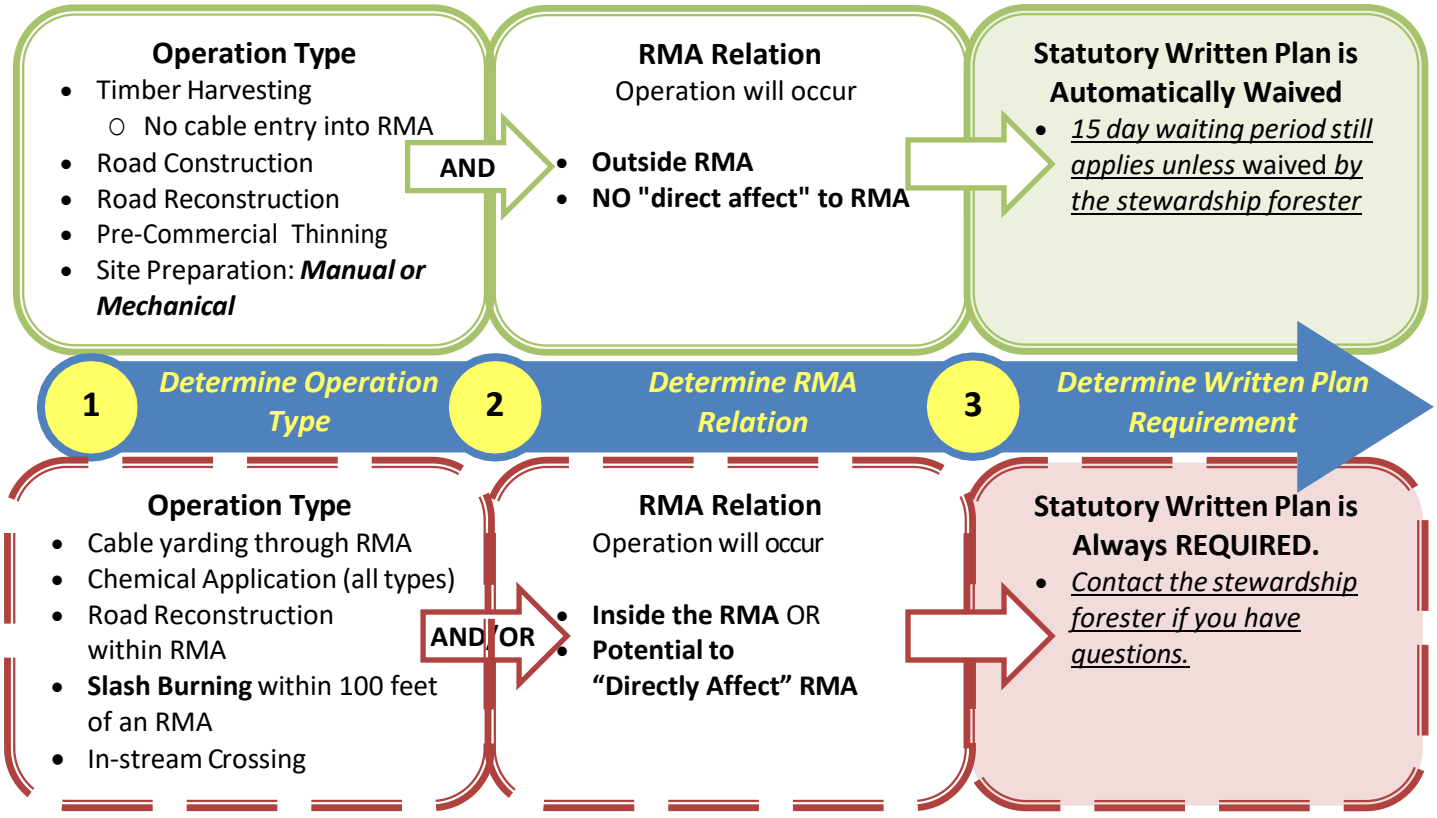
When are Statutory Written Plan Requirements *Always REQUIRED*?

- Any work inside an RMA
- Timber harvesting inside an RMA (cables in or over the RMA and yarding across or over the RMA)
- Chemical applications (all types) within 100 feet of a Type F, Type SSBT, or Type D stream, or significant wetland.
- Slash burning within 100 feet of Type F, Type SSBT, or Type D streams, significant wetlands (not estuary), bogs, important springs in eastern Oregon and within 300 feet of significant wetlands (estuary).

When are Statutory Written Plan Requirements *Automatically WAIVED*?

- Timber harvesting outside an RMA (no cables in or over the RMA and no yarding across or over the RMA)
- Road construction or reconstruction outside an RMA
- Pre-commercial thinning outside an RMA
- Manual or mechanical site preparation outside an RMA

Do I need a statutory written plan for operations near RMAs?



Written Plan Rule and Definitions

OAR 629-605-0170 Written Plan Rule

Physical Components: *Materials such as, but not limited to, vegetation, snags, rocks and soil.*

Directly Affect: *Means the operation will move, disturb or otherwise alter the physical components.*

Riparian Management Area (RMA): *Designated area adjacent to specified waters of the state within which vegetation retention and special management practices are required to protect water quality, hydrologic functions and fish and wildlife habitat.*

Estuary: *Body of ocean water which is connected to fresh water and partially surrounded by land.*

See also http://www.oregon.gov/ODF/Working/Pages/FPA.aspx or https://tinyurl.com/odf-find-a-forester

Oregon
Tina Kotek, Governor

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To: Energy Facility Siting Council

From: Kellen Tardaewether, Senior Siting Analyst

Date: July 5, 2023

Subject: Agenda Items B (Public Hearing) and H (Information Item): Boardman to Hemingway Transmission Line: Public Hearings on the Draft Proposed Order and Possible Council Review of Draft Proposed Order on Request for Site Certificate Amendment 1 for the July 17-19, 2023 EFSC Meeting

Attachments: Attachment 1: Draft Proposed Order on Request for Site Certificate Amendment 1 [hyperlink]
Attachment 2: Comments Received on Draft Proposed Order on Request for Site Certificate Amendment 1*
(*any comments received after the date of this staff report will be provided in Supplemental Council Packet Materials prior to the July 19, 2023 meeting)

STAFF RECOMMENDATION

The Oregon Department of Energy's (Department) Draft Proposed Order (DPO) on Request for Amendment 1 (RFA1) of the Boardman to Hemingway Transmission Line Site Certificate recommends the Energy Facility Siting Council (EFSC or Council) approve the requested site certificate amendment and grant issuance of a first amended site certificate, subject to compliance with existing, recommended amended and new site certificate conditions.

APPROVED FACILITY OVERVIEW

The Boardman to Hemingway Transmission Line is an approved facility that includes an approximate 300 mile (275 miles in Oregon) electrical transmission line (primarily 500 kilovolt (kV)) that crosses five counties in Oregon, Morrow, Umatilla, Union, Baker, and Malheur counties. Approved related or supporting facilities include the Longhorn Substation in Boardman, Oregon, communication stations, access roads, pulling and tensioning sites and construction laydown areas.

CHANGES PROPOSED IN AMENDMENT 1 REQUEST

RFA1 seeks Council approval to (a) add alternative route corridors for the transmission line on three properties to accommodate requests by landowners to re-locate the facility on their land to minimize impacts while being able to meet design criteria; (b) add and refine of the location of roads resulting from additional design and engineering review associated with the approved

and proposed RFA1 route alternatives; (c) amend language of site certificate conditions to support implementation. Proposed RFA1 site boundary additions include approximately 8.8 miles of 500-kV transmission line alternatives, and approximately 45.9 miles of access road changes associated with the approved route and routes in RFA1, as detailed in the below table.

Table 1: RFA1 Proposed Alternative Route and Access Road Additions[1]

Proposed Site Boundary Additions	County	Length of Addition – Transmission Line (miles)	Length of Addition – Access Road (miles)	Area of Addition (acres)	Description of Site Boundary Addition
Little Juniper Canyon Transmission Line Alternative[1]	Morrow	1.4	1.4	78.7	Shifted transmission line to the west to minimize impacts to proposed solar facility
Access Road Changes in Morrow County	Morrow	NA	4.2	61.9	Road design changes
Access Road Changes in Umatilla County	Umatilla	NA	3.4	71.3	Road design changes
Access Road Changes in Union County	Union	NA	1.8	36.7	Road design changes
True Blue Gulch Transmission Line Alternative[2]	Baker	4.6	8.6	422.8	Adjusted transmission line to the west and south to minimize noise and visual impacts
Durbin Quarry Transmission Line Alternative[3]	Baker	2.8	2.1	130.0	Shifted transmission line to avoid crossing ODOT quarry
Access Road Changes in Baker County	Baker	NA	17.0	95.5	Road design changes
Access Road Changes in Malheur County	Malheur	NA	7.4	139.1	Road design changes
TOTAL	**NA**	**8.8**	**45.9**	**1,036.0**	**NA**

Notes:
[1] The Little Juniper Canyon Transmission Line Alternative would be an alternative to 1.3 miles of Previously Approved transmission line.
[2] The True Blue Gulch Transmission Line Alternative would be an alternative to 2.9 miles of Previously Approved transmission line.
[3] The Durbin Quarry Transmission Line Alternative would be an alternative to 2.8 miles of Previously Approved transmission line.
Source: B2HAMD RFA1 2023-06-08, Table 4.1-1. Proposed Site Boundary Additions

[1] The route and road additions are "additive;" certificate holder therefore would have more options and flexibility to accommodate landowner preferences and final facility design needs, however, the final facility will ultimately select one approved route, approved alternative route, or proposed routes in RFA1. Actual acreage/disturbance impacts from the facility will be significantly less than approved in the ASC and evaluated in the DPO.

Recommended Amended and New Site Certificate Condition Summary

RFA1 Attachment 6-1 presents the certificate holder's proposed changes to the description of the site boundary, approved transmission line corridors and access roads; and amendments to site certificate conditions. Based on the evaluation presented in DPO Section III. *Evaluation of Council Standards*, as applicable based on the certificate holder's proposed change, the Department's recommended changes to the site certificate and conditions are presented in the draft amended site certificate (Attachment 1 of the DPO).

Other Department-recommended changes to conditions include administrative corrections and substantive changes to support certificate holder implementation and Department review and enforcement.

PROCEDURAL HISTORY FOR RFA1

December 7, 2022 - the certificate holder submitted pRFA1. The Department reviewed pRFA1 to determine whether or not the request contained sufficient information for the Council to make findings.
December 15, 2023 - the Department issued Public Notice that pRFA1 had been received as required by OAR 345-027-0360(2).
January 27, 2023 - the Department notified the certificate holder that pRFA1 was incomplete and requested additional information.
June 8, 2023 - following receipt and review of the additional information requested, the Department notified the certificate holder that pRFA1 was complete.
June 14, 2023 - the Department posted the complete RFA1 to its project webpage and issued a Public Notice of a comment period on the complete RFA and DPO.

As of the date of this staff report, the Department has not received any written comments on RFA1 or the Draft Proposed Order on RFA1. Any comments that are received will be provided to the Council and certificate holder in advance of the July 17-19, 2023 hearings and EFSC Meeting.

SCOPE OF COUNCIL REVIEW (OAR 345-027-0375)

For amendments to the site certificate that would add area to the site boundary, the Scope of Council Review under OAR 345-027-0375 requires that Council determine whether the preponderance of evidence on the record supports the following conclusions:

1. That the portion of the facility within the area added to the site boundary by the amendment complies with all laws and Council standards applicable to an original site certificate application; and

2. The amount of the bond or letter of credit required under OAR 345-022-0050 is adequate.

Because the certificate holder is proposing to add additional road and transmission line route options to the site boundary, the findings of fact and conclusions of law in the DPO focus on whether the portions of the facility within the area added to the site boundary by RFA1 comply

with all laws and Council standards applicable to an original site certificate application. The Scope of Council's Review for RFA1 does not include findings of fact or conclusions of law that apply to the approved facility as described in the ASC and *Final Order on ASC,* including transmission line routes and related or supporting facilities.

STAFF EVALUATION OF AMENDMENT REQUEST AND SUMMARY OF DRAFT PROPOSED ORDER

III.A. General Standard of Review: OAR 345-022-0000 p. 24-27

To issue an amended site certificate, the Council must determine that the evidence on the record, including information submitted to comply with Council-imposed site certificate conditions, demonstrates it is more probable than not that the certificate holder will comply with applicable standards for the areas added to the site boundary proposed in RFA1. The evaluation of requirements of the General Standard of Review (findings based on a preponderance of evidence on the record) are addressed in the recommended findings of facts and conclusions of law in the sections in the DPO, as summarized in this staff report. The facts and evidence in the record for RFA1, as well as the *Final Order on ASC*, are directly incorporated and or by reference in this order.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- General Standard of Review Condition 9, Site Certificate page 64: Monitoring/reporting under the Revegetation and Reclamation Plan is incorporated into the Noxious Weed Plan due to approved mitigation of temporary impacts treated as a permanent impact. Deleted to not conflict with overall reporting structures under the Revegetation and Reclamation Plan and Noxious Weed Plan (See also Recommended Amended Fish and Wildlife Habitat Condition 1);
- General Standard of Review Condition 11, Site Certificate page 23: Adds the proposed alternative routes to condition.

III.B. Organizational Expertise: OAR 345-022-0010 p. 28-31

Based on the recommended findings of fact in this order, there are not substantively new or different resources or impacts resulting from the proposed RFA1 site boundary additions that would necessitate a different level of organizational expertise as evaluated in the *Final Order on the ASC*. For these reasons, the Department recommends Council rely on its findings and conditions in the *Final Order on ASC*, which are summarized in DPO.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Organizational Expertise Condition 7, Site Certificate page 51: Clarifying/implementation language added.

III.C. Structural Standard: OAR 345-022-0020 p. 31-40

The analysis area for the Structural Standard includes the area within the proposed RFA1 site boundary additions, or approximately 1,036 acres extending across portions of Morrow, Umatilla, Union, Baker and Malheur counties. These areas would be located in the same vicinity as the approved site boundary; therefore, the seismic and non-seismic hazards evaluated in the *Final Order on the ASC* will not significantly differ for the proposed RFA1 site boundary additions. In the DPO, the Department recommends Council rely on its findings and conditions in the *Final Order on ASC*, which are incorporated and applied to the RFA1 analysis area as well as an analysis of the site-specific information in the areas proposed in RFA2.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Structural Standard Condition 1, Site Certificate page 52: Condition amendments included to support effective implementation and enforcement. Requiring that the geotechnical report identify potential blasting locations, in tabular format, is redundant and unnecessary given the requirements of the Blasting Plan.

III.D. Soil Protection: OAR 345-022-0020 p. 41-47

Of the 187 acres impacted, 129 acres would be restored and 58 acres would be permanently impacted by siting of facility infrastructure including 500 kV transmission towers and new and substantially modified access roads.

Table 2: Land Use and Cover Types within Proposed RFA1 Site Boundary Additions

County	Acres Within Analysis Area	High Value Farmland Soils within Analysis Area	Acres Impacted	Zone(s)	Land Cover Types
Morrow	140.6	73.8	23.8	Exclusive Farm Use	Agriculture; shrubland
Umatilla	71.3	59.4	11.1	Exclusive Farm Use; Grazing-Farm	Agriculture; forest/woodland; grassland; shrubland; riparian
Union	36.7	20.7	6.5	Exclusive Farm-Use; Agriculture-Grazing; Timber-Grazing	Forest/woodland; riparian; shrubland
Baker	648.3	479.1	120.6	Exclusive Farm Use	Forest/woodland; grassland; shrubland; riparian

Table 2: Land Use and Cover Types within Proposed RFA1 Site Boundary Additions

County	Acres Within Analysis Area	High Value Farmland Soils within Analysis Area	Acres Impacted	Zone(s)	Land Cover Types
Malheur	139.1	7.9	25.2	Exclusive Farm Use – Exclusive Range Use; Heavy Industrial	Agriculture; grassland; shrubland; open water

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Soil Protection Condition 1, Site Certificate page 25: Language of existing Soil Protection Condition 1 (Condition GEN-SP-01) could be interpreted to limit the ESCP to one version – a singular version finalized prior to construction. The existing condition also does not provide the Department the authority to require that changes be implemented in an ESCP. The Department must be given authority to require revisions to the ESCP because it is the ESCP that Council relies upon to ensure that erosion impacts are minimized, in compliance with the Soil Protection.
- Soil Protection Condition 2, Site Certificate page 25: Certificate holder requests that Council amend Soil Protection Condition 2 (Condition GEN-SP-02), to replace the SPCC Plan with a Hazardous Waste Management and Spill Response Plan (HWMSRP). Certificate holder agrees to include all prior representations of Final Order on ASC Attachment G-4 in the HWMSRP, and that the HWMSRP would continue to include the items detailed in the SPCC.
- Soil Protection Condition 4, Site Certificate page 25: The recommended condition amendment would only remove the process of final review and approval for elements of the plan for which neither the Department nor reviewing agencies have technical expertise or jurisdictional authority. The plan would still be required to be finalized prior to blasting activities; would be required to maintain all requirements described above; and would be required to be adhered to during all construction-related blasting activities.

III.E. Land Use: OAR 345-022-0030 p. 47-109

The proposed RFA1 site boundary additions would be located in the following zones:

- Morrow County: Exclusive Farm Use (EFU)
- Umatilla County: EFU; Grazing Farm (GF)
- Union County: EFU; Agricultural Grazing (A-2); Timber-Grazing (A-4)
- Baker County: EFU
- Malheur County: EFU-Exclusive Range Use (C-A1 and C-A2); Heavy Industrial (HI)

Under OAR 345-027-0375(3)(a), the proposed RFA1 site boundary additions must comply with the applicable substantive criteria from the comprehensive plans and land use regulations of these counties in effect on the date the preliminary request for amendment was submitted, December 7, 2022, the DPO recommends the Council find that the proposed RFA1 site boundary additions comply with the identified applicable substantive criteria and the directly applicable state statutes and rules and, therefore, complies with the Council's Land Use standard.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Land Use Condition 2, Site Certificate page 26-27: Adds reference to a RFA1 proposed route to MCZO

III.F. Protected Areas: OAR 345-022-0040 p. 110-148

Newly Identified Protected Areas in RFA1 Analysis Area:

- Glass Hill Preserve/ State Natural Area (SNA); Oregon Natural Areas Plan/Glass Hill; Union County, Oregon;
- The Boardman Research Natural Area (RNA); Oregon Natural Areas Plan; Morrow County, Oregon;
- Boardman/Willow Creek RNA (Boardman Area, COA 154); Morrow County, Oregon;
- Birch Creek Cove RNA Oregon Natural Areas Plan/Birch Creek Cove PRNA); Umatilla County, Oregon;
- Government Draw RNA (Establishment Record); Union County, Oregon;
- Payette River Wildlife Area; State Wildlife Refuge or Management Areas (Payette River Wildlife Management Area/Payette River WMA), Malheur County, Oregon;
- Indian Creek RNA, Lands Designated in Federal Management Plan (Oregon Natural Areas Plan/Indian Creek RNA); Union County, Oregon;
- Rebecca Sand Hill RNA/ Area of Critical Environmental Concern (ACEC) (Four Rivers Field Office Draft Resource Management Plan and Draft Environmental Impact Statement); Washington County, Idaho;

To update the visual impact analyses for the road and route alternatives proposed in RFA 1, the certificate holder followed similar visual impact assessment methodology, described in ASC Exhibit L, Attachment L-3, approved by Council in the Final Order on ASC, subsequently upheld by the Oregon Supreme Court. Because the vast majority of site boundary additions in RFA1 are roads, which do not have a vertical visual component associated with them, the visual impact assessment was further defined by proximity, i.e., foreground (<0.5 miles), middleground (0.5 to 5 miles), or background distances (> 5 miles).

Department recommends that the the design, construction and operation the facility in areas added to the site boundary proposed in RFA1 are not likely to result in significant adverse impacts from noise, increased traffic, water use, wastewater disposal, visual impacts of facility structures or plumes, and visual impacts from air emissions to any protected area under OAR 345-022-0040 as defined in OAR 345-001-0010(26).

No new or amended site certificate conditions recommended.

III.G. Retirement and Financial Assurance: OAR 345-022-0050 p. 148-152

Restoring the site to a useful, nonhazardous condition for the transmission line route alternatives and roads proposed in RFA1 would involve the same activities as Council approved in the Final Order on ASC. The Council previously reviewed the applicant's cost estimate and confirmed that the site restoration tasks, unit costs, labor rates, and cost estimate assumptions constitute a reasonable site restoration cost for the facility. Council previously found that $140,779,000 million (rounded to nearest $1,000 and in Q3 2016 dollars) was adequate to restore the site to a useful non-hazardous condition. The proposed transmission line routes, if selected, would increase the overall distance by 1.8 miles, which is than 0.1% change in the total length of the facility. Existing site certificate conditions require the certificate holder to adjust the bonding for construction and for operation based upon final design and adjusting to current dollars.

No new or amended site certificate conditions recommended.

III.H. Fish and Wildlife Habitat: OAR 345-022-0060 p. 152-165

Fish and wildlife surveys and protocols approved in the Final Order on ASC were implemented and followed for RFA1. Surveys included: terrestrial visual encounter (TVES); pygmy rabbit; Washington ground squirrel (WAGS); avian (for target species: great gray owl, flammulated owl, northern goshawk and American three-toed woodpecker); and noxious weeds.

Construction activities would result in approximately 170 acres of temporary impacts to Category 2, 3 and 5 habitats. Siting of facility infrastructure would result in approximately 51 acres of permanent impacts to Category 2, 3 and 5 habitats.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

Fish and Wildlife Habitat Condition 1, Site Certificate page 33: Because the certificate holder proposes to mitigate the temporal loss of habitat for all temporary impacts to Category 2, 3 and 5 by including equivalent acres within the permanent lands secured for long-term habitat mitigation, the Department recommends Council amend Fish and Wildlife Habitat Condition 1 to allow reduced monitoring if temporary impacts are otherwise mitigated through revegetation and compensatory mitigation. (See also revisions associated with General Standard of Review Condition 9, to be consistent with the mitigation representation).

Fish and Wildlife Condition 2, Site Certificate page 33-34: Condition currently requires that the Vegetation Management Plan be finalized in accordance with a formal reviewing agency process, prior to construction, and be implemented during construction and operations,

however, the Plan is actually final and does not need to be finalized. Further, the Vegetation Management Plan is applicable to operation and not to construction.

III.I. Threatened and Endangered Species: OAR 345-022-0070 p. 165-168

WAGS surveys were conducted April 4-11 and 19-27 and May 5-12 and 20-28, 2022 and included the area within a 1,000-foot buffer of suitable habitat. One WAGS colony was found within the ½-mile analysis area (the Little Juniper Canyon Alternative in Morrow County). WAGS are a state-listed endangered species. Council previously imposed T&E Species Condition 1 (Condition CON-TE-01) which precludes any ground-disturbing activities during construction to occur within WAGS-habitat. The condition also requires that if any WAGS are identified during the 3-year validity period of the surveys within areas of anticipated ground-disturbance, but after construction has commenced, that the certificate holder develop and avoidance and impact minimization plan.

T&E plant surveys were conducted at the Little Juniper Canyon Alternative and Durbin Quarry alternative. One population of Snake River goldenweed was found within the proposed RFA1 site boundary additions (the Durbin Quarry alternative). This population is located within and expands beyond a planned pulling and tensioning area. Council previously imposed T&E Species Condition 2 (Condition CON-TE-02) which precludes any ground-disturbing activities during construction from occurring within 33-feet of T&E plant species; or requires that protective matting be placed over the T&E plants if direct impacts are unavoidable.

No new or amended site certificate conditions recommended.

III.J. Scenic Resources: OAR 345-022-0080 p. 168-174

In preparation of RFA1, certificate holder reviewed the 47 applicable federal and local land use management plans or development codes within the 10-mile analysis area of the facility approved in the Final Order on ASC to determine if there had been updates to these plans that may identify new scenic resources. Based on this review of applicable land use plans, 23 of the 47 plans or codes have been updated or replaced by a new plan since the ASC. The review of these plan updates did not identify any new significant or important scenic resources and values.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Scenic Resources Condition 2, Site Certificate page 36: Certificate holder proposed minor condition amendment is recommended for Scenic Resources Condition 2, changing Natina finish to patina finish.

III.K. Historic, Cultural, and Archaeological Resources: OAR 345-022-0090 p. 175-183

In preparation of RFA1, certificate holder evaluated and surveyed for cultural, historical, and archaeological resources with similar methods as was done for the ASC. Record searches were

done to identify previously recorded archaeological and historic sites for all site boundary additions proposed in RFA1, and that might be encountered during the field surveys. Phase 1 field surveys consists of completed surveys of an intensive pedestrian inventory of the entire direct analysis area to which the applicant had right of entry to access for surveys. Any additional surveys required to complete an inventory of 100 percent of the final selected route, as well as any necessary subsurface inventory or evaluation efforts, would be conducted during Phase 2. Phase 2 is anticipated to occur after the site certificate has been issued, but prior to construction, when site access has been secured for all properties as captured in Historic, Cultural, and Archaeological Resources Condition 2.

DPO Table 21: Potential Impacts to Historic, Cultural, Archeological Resources for RFA1, provides the results from the surveys conducted in preparation of RFA1, which identifies if a resource is newly identified (not identified in the ASC) or if it was previously identified, in both cases, certificate holder provides an updated impact assessment based on the proximity of the road or route segment proposed in RFA1 to each resource and proposed or update mitigation measures.

During the review of the ASC, the Department compiled all the inventoried resources, proposed avoidance and mitigation measures associated with resource type, which include more specific mitigation requirements for Oregon Trail segments in each county into tables and added them to the Historic Properties Management Plan (HPMP) as Appendix A.1 *Inventory Tables with Management under OAR 345-022-0090*. The certificate holder adds the resources identified above to the HPMP Appendix A.1 Inventory Tables in RFA1 Attachment 7-14 in redline for convenient identification. Under applicable Historic, Cultural and Archeological Resources Condition 2, the Appendix A.1 Inventory Tables would be finalized and submitted based on final design and final routes selected and submitted to the Department prior to construction of the facility, or phase or segment of the facility.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Historic, Cultural and Archeological Resources Condition 2, Site Certificate page 37: changes reference from Final Order on ASC to Final Order on RFA1 for submission requirements of the HPMP.

III.L. Recreation: OAR 345-022-0100 p. 183-192

In preparation of RFA1, certificate holder evaluated online data, maps, reports, guidebooks, websites, and similar sources likely to provide site-specific information about recreational opportunities in the analysis area for the site boundary additions proposed in RFA1. Based on this assessment, certificate holder identified one new potential recreational opportunity, the Glass Hill Preserve/State Natural Heritage Area (SNHA). Because of the lack of public access (privately-owned lands), the lack of facilities on the site, as well as the conservation/research management intent of the Glass Hill Preserve, the Department recommends Council determine that the Glass Hill Preserve is not an important recreational opportunity.

The Department recommends the Council find that the design, construction and operation of the portions of the facility added to the site boundary in RFA1 are not likely to result in a significant adverse impact, including direct loss of recreational opportunities, potential visual, noise, and traffic-related impacts, to important recreational opportunities.

No new or amended site certificate conditions recommended.

III.M. Public Services: OAR 345-022-0110 p. 192-201

RFA1 does not propose any changes that would affect public service providers differently, that would introduce any new components or related or supporting facilities requiring new types of public service providers, or that would require changes to previously imposed conditions.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Public Services Condition 3, Site Certificate page 37-38: Certificate holder proposal to remove of timeframe of submission of Helicopter Use Plan prior to construction for flexibility.
- Public Services Condition 6, Site Certificate page 38-39: Minor administrative changes.
- Public Services Condition 7, Site Certificate page 39: Delete condition because of new Wildfire Prevention and Risk Mitigation Condition 1, which has the same requirements.

III.N. Wildfire Prevention and Risk Mitigation: OAR 345-022-0115 p. 201-211

When Council drafted and approved its Wildfire Mitigation standard under OAR 345-022-0115(2), the Council established that it may allow for the issuance of a site certificate without making the findings under section (1) of the rule (which has wildfire evaluation and wildfire mitigation plan requirements) if Council finds that the facility is subject to a Wildfire Mitigation Plan (WMP) that has been approved by the OPUC.

- April 28, 2022 – OPUC approved Idaho Power's 2022 Wildfire Mitigation Plan (dated Dec. 2021) on the condition that by June 28, 2022 the certificate holder file a Supplement to the 2022 WMP which must include the items identified by the OPUC in its order. Order No. 22-133.
- August 26, 2022 – OPUC approved the 2022 WMP Supplement. Order No. 22-312.

In the DPO, the Department recommends Council find that it does not need to make findings under OAR 345-022-0115(1) because the facility[2] is subject to a Wildfire Protection Plan that

[2] Department notes that under OAR 860-300-0001(1), Scope and Applicability of OPUC Rules for Wildfire Mitigation Plans, states "The rules in this division prescribe the filing requirements for risk-based Wildfire Mitigation Plans filed by a Public Utility that provides electric service in Oregon pursuant to ORS 757.005." The certificate holder is a Public Utility that provides electric service in Oregon, and therefore must comply with the Wildfire Mitigation Plan (WMP) rules. Which under OAR 860-300-0020(1)(a)(B), Wildfire Mitigation Plans and

has been approved in compliance with OPUC rules, and the OPUC has approved the certificate holder's WMP. To support this recommendation, the DPO discusses the following:

- Procedural History for Wildfire Mitigation Plans (WMP) in Oregon and Certificate Holder WMP;
- Summary of *Final Order on ASC* Findings for WMP;
- Summary of Findings for RFA1 to Support OAR 345-022-0115(2);
- Results of Wildfire Risk Assessment for Facility and OPUC-Approved WMP;
- Other Applicable Conditions Related to Operational Fire Risk.

Recommended New Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Recommended Wildfire Prevention and Risk Mitigation Condition 1, Site Certificate page 39: Substantively requires the same information as the previously adopted Public Services Condition 7. Requires that the WMP, consistent with OAR 860-300-0020(1)(a)(A) and (B), evaluate fire-related risks for the entire facility in all five counties in Oregon, regardless of certificate holder service territory or ownership of the facility. It also ensures that the required mitigation measures included in the WMP apply to the entire facility in all five counties in Oregon.
- Recommended Wildfire Prevention and Risk Mitigation Condition 2, Site Certificate page 68: During operation, on an annual basis consistent with the annual report under General Standard of Review Condition 4, requires certificate holder to submit the most recent OPUC approved WMP and a copy of OPUC approval.

III.O. Waste Minimization: OAR 345-022-0120 p. 211-213

The proposed RFA1 site boundary additions will not result in substantive changes to the type or amount of solid waste and wastewater generated during facility construction and operation. Therefore, the Department recommends Council rely on its findings and conditions in the Final Order on ASC.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Waste Minimization Condition 1, Site Certificate page 40-41: Revisions for implementation.

III.P. Need for a Facility: OAR 345-023-0005 p. 213-217

In the Final Order on ASC, the certificate holder and the Council agreed that the certificate holder demonstrated that the facility was needed under the least-cost plan rule (OAR 345-023-

Updates, a WMP must identify areas that are subject to a heightened risk of wildfire within the service territory of the Public Utility, *and outside the service territory of the Public Utility but within the Public Utility's right-of-way for generation and transmission assets*. [Emphasis added] RFA1 Section 7.1.10 and in the 2022 WMP Section 3.2.1 and Section 3.2.2.1, certificate holder states that it included the facility, including the areas added to the site boundary proposed in RFA1, in its wildfire modeling (with a 1.2-mile buffer - 0.62 miles on both sides of ROW) and that the WMP applies to the facility.

0020) and the system reliability rule for electric transmission lines (OAR 345-023-0030). Certificate holder maintains, and the Department recommends Council concur that the proposed site boundary additions proposed in RFA1 would not alter the findings Council relied upon in the Final Order on ASC for the Need Standard. The DPO provides a summary of findings in the Final Order on ASC.

No Site Certificate Conditions under the Need Standard.

III.Q. Siting Standards for Transmission Lines: OAR 345-024-0090 p. 217-218

The proposed RFA1 site boundary additions do not alter or change anything related to the previously approved facility components, other than potential final location. The changes proposed in RFA1 would therefore not impact the Council's findings of fact and conclusions of law as presented in the Final Order on the ASC, the DPO provides a summary of previously evaluated facts. The Department recommends Council continue to find that the facility, with proposed RFA1 site boundary additions, satisfies the requirements of this standard, and existing conditions would apply to the proposed transmission line routes.

No new or amended site certificate conditions recommended.

III.R.1. Noise Control Regulations: OAR 340-035-0035 p. 219-235

Council has the authority to interpret and implement other state agency and Commission rules and statutes that are relevant to the siting of an energy facility,[3] including noise rules adopted by the Environmental Quality Commission and previously administered by the Department of Environmental Quality (DEQ).[4, 5]

Operational noise generated by a new industrial or commercial noise source to be located on a previously unused site must comply with two standards: the "maximum allowable noise standard" and the "ambient antidegradation standard." Under the ambient antidegradation standard, facility-generated noise must not increase the ambient hourly L10 or L50 noise levels at an appropriate measurement point by more than 10 dBA. For the proposed site boundary transmission line route additions that are the subject of RFA1, the certificate holder used these

[3] See ORS 469.310 (stating that the legislative policy behind EFSC was to establish "a comprehensive system for the siting, monitoring and regulating of the location, construction and operation of all energy facilities in this state") and ORS 469.401(3) (giving EFSC the authority to bind other state agencies as to the approval of a facility).
[4] The Environmental Quality Commission and the DEQ suspended their own administration of the noise program because in 1991 the state legislature withdrew all funding for implementing and administering the program. A July 2003 DEQ Management Directive provides information on DEQ's former Noise Control Program and how DEQ staff should respond to noise inquiries and complaints. The Directive states (among other items) that the Energy Facility Siting Council (EFSC), under the Department of Energy, is authorized to approve the siting of large energy facilities in the State and that EFSC staff review applications to ensure that proposed facilities meet the State noise regulations.
[5] "We (the Oregon Supreme Court) conclude that EFSC had the authority to grant (1) an exception to the noise standards under OAR 340-035-0035(6)(a), and (2) a variance under OAR 340-035-0100 and ORS 467.060." B2HAPPDoc7 Supreme Court Decision Stop B2H Coalition v. Dept, of Energy 2023-03-09, pp 805-807.

same methods, comparing baseline ambient sound levels to the modeled predicted future sound levels at potentially affected Noise Sensitive Receptors (NSRs).

The evaluation in RFA1 was done for two NSRs, 3 and 5010, which fell within the analysis area of the one-half mile analysis area and out to a mile in an area with a low (26 dBA ambient noise level). The maximum modeled sound level would be 37 dBA, therefore, noise would not exceed the maximum allowable noise standard. The projected increase at NSR 3 would be 8 dBA, less than 10 dBA, which is allowed under the ambient antidegradation standard. The location of the True Blue Gulch Alternative route is 1,528 feet further away from NSR 5010 than the previously approved route, which would reduce the increase in the ambient baseline sound levels under foul weather conditions from 17 dBA to a 13 dBA increase in the ambient baseline sound levels.

The DPO provides a summary of the facts, findings, and conditions provided in the Final Order on ASC for the Council-approved exception and variance to the ambient antidegradation standard, which continues to apply to the facility and proposed site boundary additions in RFA1.

Recommended Amended Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Noise Control Condition 1, Site Certificate page 42-43: Implementation language added.
- Noise Control Condition 5, Site Certificate page 69: Noise Control Condition 5 as approved in Final Order on ASC was not the version that Council approved in it's Contested Case Order (CCO). Revisions to Conditions are to make the Condition consistent with the CCO, as agreed upon from the contested case proceeding.

III.R.2. Removal-Fill OAR 141-085-0500 through 141-085-0785 p. 235-239

Wetlands and waters of the state (WOS) were evaluated using the same desktop and field wetland delineation methodologies as done for the ASC. The estimated impact to field surveyed/delineated wetland features includes 0.06 acres of total permanent impacts and 0.04 acres of total temporary impacts. The estimated impact to field surveyed/delineated non-wetland WOS includes 0.105 acres of total permanent impacts and 0.386 acres of total temporary impacts. The combined total permanent and temporary impacts to wetlands and waters of the state is 0.591 acres.

Council previously found that a removal-fill permit is necessary for the construction and operation of the facility and imposed several site certificate conditions to implement the requirements under the Department of State Lands (DSLs) rules which govern wetland delineations, removal-fill permits and wetland mitigation. Department recommends several revisions to these conditions for clarity and implementation, as summarized below.

Recommended Amended and Deleted Conditions as provided in Draft Amended Site Certificate, Attachment 1 of the DPO:

- Removal Fill Condition 3, Site Certificate page 47-48: The existing condition requires that, prior to construction, the CWNWMP be finalized. However, for previously surveyed areas, concurred by DSL, the CWNWMP is final. The components of the CWNWMP that need to be finalized are those that apply to unsurveyed areas. The Department recommends amending the Condition for clarity.
- Amend Removal Fill Condition 6 and remove Removal Fill Condition 5, Site Certificate page 48: Council previously adopted Removal-Fill Permit Condition 5, specifying that the conditions set forth in the removal-fill permit are conditions of approval in the site certificate. Additionally, Council imposed Removal-Fill Condition 6 to ensure that the removal-fill permit is updated prior to construction of the facility and any impacts to wetlands or WOS. However, Removal-Fill Condition 5 and 6 contained redundant requirements to comply with the conditions set out in the removal fill permit. To reduce redundancy and to clarify that the removal fill permit conditions apply to pre-construction, construction, and operation of the facility, including the proposed RFA1 site boundary additions, the Department recommends Council remove Removal-Fill Condition 5 and amend Removal-Fill Condition 6.

III.R.3. Water Rights p. 239-240

In the Final Order on the ASC, the Council found that the certificate holder had established that it can obtain adequate water for construction and operation of the facility from municipal water service providers in the vicinity of the facility, and would not need a groundwater permit, surface water permit, or water right transfer. The scope and extent of construction activities associated with facility components located within the proposed RFA1 site boundary additions would not change the volume of water needed for construction or require a water permit.

No Water Right Site Certificate Conditions imposed in Final Order on ASC.

III.R.4. Fish Passage: OAR 635-412-0035 p. 241

The proposed RFA1 site boundary additions will not result in stream crossings where new artificial obstructions, or substantial modifications to existing obstructions, on any waters would occur.

Council previously imposed Fish Passage Condition 1 (GEN-FP-01) requiring, in part, that the certificate holder confer with ODFW and seek concurrence on the evaluation of crossings and fish presence to ensure that if construction is required for a crossing of any fish-bearing stream, existing or historic, where review and approval has not yet occurred, that the approach review of and approval of fish passage designs is completed prior to construction.

No new or amended site certificate conditions recommended.

RECOMMENDED COUNCIL ACTION

Based on the recommended findings of fact and conclusions of law included in the DPO, under OAR 345-027-0375, the Department recommends Council find that the preponderance of evidence on the record, including RFA1 and the record of the *Final Order on ASC* which includes the record of the contested case on Proposed Order on ASC, supports the following conclusions:

1. The proposed RFA1 site boundary additions comply with the applicable substantive criteria under the Council's Land Use standard, as described in OAR 345-022-0030, from the date RFA1 was submitted.

2. The proposed RFA1 site boundary additions comply with the requirements of the Energy Facility Siting Statutes ORS 469.300 to 469.520.

3. The proposed RFA1 site boundary additions comply with all applicable standards adopted by Council pursuant to ORS 469.501.

4. The proposed RFA1 site boundary additions comply with all other Oregon statutes and administrative rules.

5. Taking into account the proposed RFA1 site boundary additions, the amount of the bond or letter of credit required under OAR 345-022-0050 is adequate.

Accordingly, the Department recommends Council find that the facility, with the proposed changes, complies with the General Standard of Review OAR 345-022-0000 and OAR 345-027-0375, that the Council approve Request for Amendment 1 of the Site Certificate, and issue the first Amended Site Certificate.

ATTACHMENTS

Attachment 1: Draft Proposed Order on Request for Site Certificate Amendment 1 [hyperlink]
Attachment 2: Comments Received on Draft Proposed Order on Request for Site Certificate Amendment 1*(*any comments received after the date of this staff report will be provided in Supplemental Council Packet Materials prior to the July 19, 2023 meeting)

Oregon
Kate Brown, Governor

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"STEWARDSHIP IN FORESTRY"

February 19, 2019

From: Tom Fields
Fire Prevention Coordinator
Oregon Department of Forestry

To: Oregon Department of Energy
Re: Boardman to Hemmingway Powerline Construction Project

The Oregon Department of Forestry (ODF) has reviewed the application for site certificate from Idaho Power Company to the Oregon Department of Energy to construct, operate and maintain a high-voltage electric transmission line between Boardman, Oregon and the Hemingway Substation in southwest Idaho as an extension of IPC's electric transmission system.

The proposal includes provisions for meeting requirements under the Oregon Forest Practices Act and other laws and rules pertaining to fire prevention and suppression measures regarding industrial operations on private and public lands within ODF's protection boundaries. Additionally, the proposal details further expectations relating to ongoing and future maintenance upon establishment of the transmission line.

Upon review, ODF finds that fire prevention measures and vegetation management objectives are consistent with current policies, laws and rules under Oregon Revised Statute Chapters 477 (Fire Protection of Forests and Vegetation) and 527 (Forest Practices) and Oregon Administrative Rules Chapter 629 (Department of Forestry) as they relate to proposed operations with the following stipulations.

1) Update language in the Fire Prevention and Suppression Plan to be consistent with current administrative rules for fire prevention. This includes requirements for water supply and equipment for fire suppression under OAR 629-043-0020 and requirements for Firewatch under OAR 629-043-0030.
2) Remove language in the Fire Prevention and Suppression Plan section 1.3 inferencing that "fire danger is anticipated to be low during Project operations…" as the level of fire danger is difficult to predict prior to the Project.
3) Replace "During periods of high fire danger…" language in the Fire Prevention and Suppression Plan section 2.2 with "During fire season…"
4) In Attachment K-2, Right-of-Way Clearing Assessment, replace "wildfire hazard zones (OAR 629-044-0200)" with "regulated use zones," as wildfire hazard zones do not correlate with industrial fire prevention rules.

This letter of review in no way removes potential liability in the event of a wildfire. Should the project operation be out of compliance with any fire prevention and suppression requirements, the responsible

party is subject to full liability and all fire suppression costs. Liability is limited to $300,000 in fire suppression costs if the operation was in full compliance.

Sincerely,

Tom Fields