Conifer Restoration (Hardwood Tree Harvest) for Western Washington
December 15, 2020

Overview

The following is an experimental low impact alternate harvest prescription that is being offered only to small forest landowners (link to definition). It is intended to encourage the restoration of conifer stands in riparian areas where they once existed but have been replaced by alder or other short-lived hardwood species. This prescription includes allowances specifically established to help offset the costs for small forest landowners to conduct a successful restoration activity.

Many riparian areas that previously supported conifers are currently dominated by hardwoods and are not on an expeditious path to achieve the desired future condition (specified conifer basal area) at stand age 140 years, and are not providing the riparian functions at desired levels. Hardwood trees, such as red alder, are short-lived species, whose wood decays more quickly than conifer. When a hardwood stand dies and deteriorates, brush can dominate the area for an extended time until tree cover can naturally become re-established. Applying this alternate harvest prescription to achieve conifer restoration can therefore create riparian management zones (RMZ) providing the intended level of riparian functions sooner than would occur otherwise. However, we know from previous experience that successful conifer restoration is extremely challenging and requires some understanding of silvicultural processes and especially a dedicated commitment from the landowner to ensure effective and vigilant monitoring and maintenance practices are followed in order to establish the new conifer stand.

Using this alternate harvest prescription allows small forest landowners to prescriptively harvest hardwoods while maintaining existing conifers and re-establishing a viable conifer stand within the RMZ. Re-establishing a conifer dominated riparian stand by using this prescription is expected to achieve the goal of WAC 222-30-010(2) ". . . to protect aquatic resources and related habitat to achieve restoration of riparian function; and the maintenance of these resources once they are restored."

Process

An appropriate experimental low impact alternate harvest prescription form, available from DNR, must be included with your forest practices application (include link). The form documents the details of the landowner's site and plan for the alternate harvest. The form must be included with the forest practices application (FPA).

While an Interdisciplinary (ID) Team of specialists may be called to review the proposed harvest (see WAC 222-12-0401(5)), by following the provisions in this prescription the need for an ID Team will be reduced as compared to standard Alternate Plan review and typically be necessary only if specific issues related to site eligibility arise. However, ID Team review may also be necessary in certain situations.

Difference from Standard Riparian Management Zones Rules

This prescription differs from standard rules (WAC 222-30-21-(1)(i)(A) and (B)) by:

- Establishing prescriptions that do not change based on site class or stream size.
- Eliminating the requirement to own the forest 500 feet above and below harvest area.
- Eliminating the need to retain a 75-foot no cut buffer on opposite bank.

- Eliminating the need to conduct shade analysis.
- Allowing conifer restoration closer to the stream and for greater lengths along the stream.

Eligibility Requirements

This prescription can be used for hardwood stands located within an RMZ adjacent to Type S or Type F streams which have all of the following characteristics:

- Hardwood dominated stands containing 70% or more hardwood trees per acre.
- Proposed restoration area is capable of producing a conifer stand – this evidence can include generally well distributed conifer stumps, historical photos, conifer in the understory or other information that the site can support conifer. A proposed restoration area, where conifer stumps are confined to only isolated hummocks and not found throughout the rest of the area, does not meet this eligibility requirement.
- Hardwood stand has less than 100 conifer trees per acre greater than 4-inches in diameter at breast height (DBH) or less than 57 conifer trees per acre that are greater than 8-inches DBH.
- Conifer restoration area does not have stream-adjacent parallel roads located within 75 feet from the outer edge of BFW or CMZ (Include Illustration).
- Hardwood restoration area is not located on alluvial fans (include link to diagram) where streams may easily change their path over short time periods.
- Regardless of general eligibility of a stand for harvest under this prescription, all perennially saturated soils, headwall seeps, and springs (include link to diagram) within the conifer restoration harvest areas are to be surrounded by minimum 50-foot no-harvest buffers.

Applicants will be required to provide documentation that the proposed harvest unit meets these eligibility requirements (photos, plot data, stand survey, etc.). Technical assistance may be necessary to provide this documentation, especially for first-time applicants.

Harvest Prescriptions:[1]

The objective of this alternate harvest prescription is to achieve a **successfully restored** riparian forest. **Successfully restored** under this alternative harvest prescription means: having 150 trees per acre that are well distributed and undamaged conifer averaging 15 feet or greater in height with their leaders and first two whorls above competing brush and hardwood trees.

This prescription establishes a 110-foot-wide Riparian Management Zone (RMZ) which can be used to apply this prescription on only one side of the stream at a time:

[1] Restoring conifer in a riparian area can be challenging. Landowners are advised to carefully consider the acreage of harvest area created by their choice and the costs and effort (monitoring and maintenance) required to successfully restore these areas to conifer stands.

- The RMZ is measured from the outer edge of the stream's bankfull width or channel migration zone, whichever one is greater (include link to diagram).
- The upland area beyond the 110-foot-wide RMZ can be even- aged harvested (clear cut) of conifer and hardwoods.
- Within the area inside the RMZ only hardwoods can be harvested and removed (exceptions described below).
- Within the area inside the RMZ the operator must exercise extreme care during felling and harvest to minimize damage to all residual (retained) conifer trees.
- Forested areas upstream, downstream, and across the stream from a restoration harvest area, need to consist of stands of either: 1) hardwood or conifer having an average minimum height of 40 or 80 feet, respectively[2] (these adjacent stand conditions for restoration harvest only apply when the adjacent lands are regulated under forest practices jurisdiction), or 2) be a successfully restored stand of conifer having 150 trees per acre that are well distributed and undamaged averaging 15 feet or greater in height with their leaders and first two whorls above competing brush and hardwood trees
- A minimum 40-foot-wide no-harvest zone adjacent to the edge of the stream.
- A 70-foot-wide treatment zone wherein all hardwoods may be harvested and all conifers retained and where:
    - The maximum length of treatment area is 1,000 feet of stream reach, with these treatment areas separated by uncut patches of at least 500 feet on each side of treatment (illustration).
    - The adjacent uncut patches may themselves be harvested under this prescription (or non-template or alternate plan rules) once the initially harvested patches have been successfully restored (described above).

Illustration of Harvest Prescription:

Figure showing the maximum allowed 1000' harvest. *(Figure needs to be added)*

<u>Limited Conditions for Conifer Harvest</u>

Up to 5% of the conifer trees may be cut where necessary for operational or safety reasons under this prescription. However, these trees cannot be removed from the restoration area. Plan your skid roads to avoid the largest conifer trees, which must be retained. Conifers to be cut must be marked in the field and described on the Conifer Restoration Form for approval prior to felling.

Retention of some hardwoods for species diversity

[2] The retention or existence of uncut patches for this prescription is limited to the conditions which occur only on the owner's property. The prescription is not intended to be applied in consideration of the riparian stand conditions of neighboring landowners. Thus a harvest unit for this prescription can occur immediately adjacent to an adjacent landowner's property regardless of the condition of that landowner's riparian zone.

In order to maintain some species diversity, retain some dominant bigleaf maple and other desirable hardwood (Oregon ash, Oregon white oak, cottonwood, etc.) trees, when possible, but only where retention of such hardwood trees do not preclude successful conifer restoration.

Silviculture and Reforestation

- The landowner is responsible to ensure the conifer restoration area has been successfully restored with conifer trees. This reforestation and the conifer restoration is complete when the conversion areas have at least 150 generally well distributed free to grow conifer trees per acre (including both residual and new trees) that are averaging 15 feet or greater in height with their leaders and first two whorls above competing brush and hardwood trees.
- **Restoring conifers within riparian areas has proven to be very difficult and labor intensive. Active management is necessary to re-establish conifers in most hardwood-dominated riparian areas. Planting and tending conifers in riparian zones in western Washington present unique challenges, which if not carefully executed, often results in failure: a stand not of conifers but of hardwoods and/or brush. Continuous seasonal or yearly seedling maintenance is mandatory for success.**

Detailed Silviculture and Reforestation Plan

A reforestation plan is required as part of this alternate harvest prescription and must describe:

- Site preparation methods
- Trees per acre to be planted (footnote/link BM 6, Part 2, Table 6.1)
- The size, type, and species of planting stock. (Appendix D)
- When the trees will be planted.
- How each species will be generally be distributed throughout the conversion area.
- The method for protecting seedlings from animal browsing, as necessary.
- The method and schedule for brush control.

Consultation with a forestry professional in developing a silviculture and reforestation plan can greatly improve the success of your project. To improve the chances of reforestation success, landowners are strongly encouraged to consider and implement treatments appropriate to their specific site conditions for each of the following silvicultural activities:

- **Site Preparation:** Develop a site preparation plan, prior reforesting the hardwood conversion site, considering the following:
  - Most seedling mortality occurs in the first year after planting, so adequate control of vegetation prior to planting may be critical to reforestation success.
  - Reduction in shrub competition after mechanical site preparation lasts only one or two years – shrubs grow quickly with increased light resulting from clear-cuts.
  - Site prep can reduce salmonberry cover for about 5 years relative to no site prep.
  - Site prep can increase initial conifer height growth and survival rates.
  - Eliminate red alder and vine maple trees that will compete with the residual conifer or conifer seedlings prior to planting in the restoration area.
  - Pesticides being applied by hand must only be applied to specific targets, such as vegetation, trees, stumps and burrows, or as bait or in traps; no pesticides may be applied by hand within a core zone, unless necessary to meet requirements for noxious weed control.

- **Seedling Species Selection:** Reforest with conifers appropriate to the site; consider planting shade tolerant conifer species.

- **Seedling Stock Type:** Plant the most appropriate seedlings stock type for the site (See Appendix A). Unless significant site preparation is needed, this should generally occur in the first planting season following harvest. Consider:
  - Bigger seedlings/plugs are more likely to survive in brushy sites, and will likely reach free-to-grow status sooner than smaller seedlings/plugs.
  - Shade tolerance and browse susceptibility vary greatly among major PNW conifer species. Much of this difference likely relates to specific site conditions, and is not easily predicted.
  - Intense shrub competition may not kill planted conifer seedlings but will slow growth rates and attainment of free-to-grow status.
  - Clumping planting patterns may reduce costs and improve survival rates.

- **Animal Damage Protection:** Protect seedlings from animal damage using browse exclusion devices and/or other strategies. Consider that:
  - Mountain beavers can be the primary animal pest affecting conifers in riparian areas of western Washington.
  - Removing (trapping) mountain beavers can be an effective strategy to reduce damage and mortality of conifer, but trapping typically needs to be repeated over several years.
  - Trapping should occur within a minimum 100' perimeter around the planted area and across the stream of a riparian harvest unit
  - Practices that reduce hiding cover (i.e. slash) for mountain beavers can lower mountain beaver populations and potentially lessen browsing of young seedlings.
  - Individual tree barriers can be effective for protecting seedlings from mountain beaver. Yet barriers can also girdle trees, are expensive to install and maintain, and can deform growth of young trees.
  - Deer, elk and small rodents are other sources of animal damage and individual tree barriers can also be effective for protecting seedlings from these species.

- **Conifer Release:** Continue controlling competing vegetation (shrubs, grasses and volunteer hardwoods) at a minimum until trees are free to grow (Appendix B). Free to grow in this context means that the top of the tree is at least 15 feet tall and two whorls above the brush. Consider that:
  - Shrub, grass and volunteer hardwoods generally increase rapidly following harvest.
  - Release prescriptions will improve growth rates and survival in the short term.
  - Manual cutting can be effective, and some studies indicate it can be more effective than chemical treatments, which may inadvertently damage crop trees.
  - Manual release treatments include cutting to a stump height of not more than 6 inches all salmonberry and other woody vegetation within a 3-ft radius of a conifer. Salmonberry sprouting is lowest when cut in June or July, and is greatly reduced (along with cover and height) when the plant is cut over several growing seasons, particularly when cut over successive growing seasons. With each manual (or chemical backpack spray) cumulative application costs increase as does risk of harming planted seedlings.

- Conifers in riparian areas may need multiple release-treatments.
- Cut red alder late in the growing season. DeBell and Turpin (1989) recommends the optimal cutting time starts 8 to 10 weeks after red alder breaks bud and continues for approximately 8 weeks.
- Delay cutting until the red alder are at least 5 years old. DeBell and Turpin (1989) reported sprouting was most vigorous when 4 year- old red alder were cut. They recommend waiting until the red alder are at least 5 years old before cutting.
- Cut hardwood stumps to 4 inches or less.

See Appendix D for additional resources from Webster Forest Nursery, Washington State University Extension and Oregon State University Extension.

Reforestation Surveys

Reforestation surveys are required by the landowner following the 2nd, 5th, and 10th growing seasons after planting. However, to ensure prescription success and to protect the investment, landowners are strongly encouraged to evaluate planting success after the first growing season and to maintain the planted trees (see section above) on an annual basis.

Growing seasons typically end by October 1st of a given year. Late fall or winter reforestation surveys are preferred (compared to growing season surveys) in order to allow the surveyor to more easily find and observe the conifer seedlings, as well as identify actions needed to ensure restoration success.

Landowners are required to submit their 2nd, 5th, and 10th year reforestation surveys to the DNR office that approved the harvest. Once the conifer restoration standard (see Glossary) is met, a final report, with supporting reforestation survey information, is required to be submitted to the DNR. If the conifer restoration standard is met between the 5th and 10th year after planting, a final report and survey (to document that fact) may be submitted to DNR before the 10th year, and a 10th year reforestation survey is not required.

A preferred methodology for establishing reforestation survey plots is described in Appendix C.

The surveys will include the following information:

- The number of living conifer trees per acre
- Number of living conifer trees per acre that have at least two whorls above the brush.
- Number (or an estimate if too numerous to count) of hardwood trees per acre in the harvest area.
- What vegetation control measures are needed and when they will be performed.
- Additional surveys will be required after the 5th growing season (up until the 10th year) if the stand does not at least contain 150 conifer trees per acre that are “free to grow” (have at least two whorls above the brush). In such cases, additional planting and maintenance will be necessary to meet this conifer restoration standard and the landowner is required to document the specific reforestation measures employed.

Landowners who are not able to perform the survival and growth surveys will need to enlist the help of a professional forester. You can find a list of forestry consultants on the Washington State University Extension website. See Appendix D for additional information sources.

Monitoring

This is an experimental harvest prescription. By choosing this prescription, the landowner is providing DNR, in concert with other review and monitoring team members, permission to access the experimental harvest site to review the proposed harvest and to conduct specific effectiveness / response monitoring activities, such as measurement of pre- and post-harvest stand conditions and evaluation of the success of the experimental harvest prescription.

This access permission is only associated with site visits by DNR and other review and monitoring team participants (and not enforcement or compliance monitoring).

This access and right-of-entry must remain in place throughout the monitoring period, even in the case of a change in ownership of the property on which the experimental harvest occurs.

DNR will provide advanced notice to the landowner at least one week prior to monitoring visits.

The landowner will be required to notify DNR of any change in ownership of the property involving the experimental harvest site and of any significant weather events (windthrow, fire, snow-break events, etc.).

See Appendix E, the current Experimental Alternate Harvest Prescriptions Monitoring Scoping document.

DNR Review of this Experimental Prescription

This experimental prescription will be reviewed in 5-year cycles by DNR, and as sufficient data is collected the prescription will either be adjusted as needed to ensure it meets the intended level of riparian functions, or validated and converted to either a rule or an alternate plan template.

Appendix A Seedling Stock Types (Summary)

Courtesy of the Webster Forest Nursery, Olympia

1+1

This term designates a seedling grown for one year in a seedbed, harvested, root pruned to five inches and transplanted back into a nursery bed at seedlingsapproximately six seedling per square foot. The transplanting process results in a larger caliper and a more fibrous root system. The seedling will have more side branching, with a minimum of 10 inches in height and 4 millimeters in caliper (stem diameter at the root collar). The root system on a 1+1 plus the extra storage of food in the caliper and root system will allow the seedling to survive on an infertile site, compete with other vegetation and give it a better chance of surviving browse damage.

2+0

This designates a seedling that was grown at approximately 25 seedlings per square foot in the seedling bed and grown in the field for two years (never transplanted). After two years the seedling is ready for outplant. The production costs are low because the seedling had not been lifted, packed and transplanted as in all of the transplant stock types. The root systems on such stock type are pruned horizontally in the ground at a six-inch depth and vertically between each row at the end of the first growing season. These cultural activities encourage branching of the remaining roots and promote more fibrous roots required for out planting survival. This stock type will survive in a site tha has low competing vegetation and minimal levels of animal browsing.

Plug (P or S-8)

This is a seedling grown in a greenhouse in containers that are narrow and deep. For some species, this stock type reduces the time between request and outplant. For some species, growing plug stock type is necessary due to low germination and early growth. Various sizes of containers are available but the target is a styro-2A (two cubic inch containers) if the seedling will be used for a Plug+1 stock type. A styro-10 will be used if the seedling will be used for out planting.

Plug+1 (P+1)
After growing in the greenhouse for a year, the seedling is extracted from the container, root pruned at 5 inches and transplanted in a nursery bed at approximately six seedlings per square foot. As with the 1+1, the root pruning and transplanting generates a larger caliper stem and more mass in the root system. Cedar, hemlock, larch and some species of pine and true firs are propagated as Plug+1.

Plug+1/2 (P+1/2)
Like the P+1, this stocktype combines greenhouse and bareroot phases, but the process is completed in one year instead of two. Seedlings are started in late winter in the greenhouse in small containers (2 cubic inches or smaller). In early summer, seedlings are transplanted into nursery beds at approximately six seedlings per square foot. The early start and low transplant density allow for the production of a relatively large seedling in a short amount of time.

Appendix B Brush Control

From the Pacific Northwest Weed Management Handbook
Oregon State University March, 2000

Competition from brush is only part of the brush problem in areas due for reforestation. Brush is fine habitat for animals that feed on tree seedlings. Moreover, in heavy stands of brush, dead or alive, substantial shade will weaken trees and considerable debris can fall and crush small seedlings. An ordinary effort to establish trees in established shrub or sprout stands will surely result in failure. It is *always* best to provide for reforestation *before* brush becomes well established, and to avoid suppressing conifers by controlling fast-growing species such as alder and maple.

Tree seedlings used for reforestation in brush need to be substantially larger than those used for Christmas trees and planting old fields. Larger seedlings almost always are a good buy because they are more competitive and can tolerate more animal damage than smaller seedlings. Proper stock is an important element in managing competition. Even so, seedlings also may need treatment with repellent or be a species unpalatable to animals. Douglas-fir and western redcedar are attractive to animals and do best with little shade. Douglas-fir seedlings should be at least 24 inches tall for such areas; 30 inches is preferable if you can get them. Live cover uses water as well as shading seedlings, hence generally is undesirable on planted seedlings regardless of species or size unless there is a severe frost problem. All conifer seedlings grow best if free of weed competition for at least 2 yr. After that, vigorous seedlings will dominate most competitors.

Appendix C Preferred Reforestation Survey Plot Layout and Survey Procedures

Modified from Board Manual Section 6 – Guidelines for Determining Acceptable Stocking Levels

1. Determine the planted acreage of each conifer restoration treatment zone. For example, the acreage of the treatment zone would be calculated by multiplying the width of the treatment zone (up to 70 feet) by the length of the treatment zone (up to 1000 feet) divided by 43560 square feet per acre. Using these figures, (70' x 1000') divided by 43560 sq.ft. / acre produces 1.61 acres of treatment acreage.
   Your treatment zones may defer in width and length from these examples, but the calculation is simple if you follow the formula given above.

2. Sample each conifer restoration treatment zone at two plots per acre. the calculated 1.6 acres of treatment zone would require three (3) plots; for the

3. Establish plots as follows:
   a. Locate one of the two end points of the common line between your 40' No-Cut and your Conifer Restoration treatment zones. Using a compass, determine the rough compass bearing from this end point along the common line between these two zones back toward the other endpoint. Note or remember this compass bearing.
   b. Move half way up the side edge of your Conifer Restoration treatment zone from one of these two end points; in our example, move 35 feet up the side edge of your treatment zone. Hang a flag here; use a different color of flagging than you used previously to delineate the No-Cut and the Conifer Restoration treatment zones. This flag is the starting point for layout of reforestation survey plots along a centerline within your treatment zone.
   c. Establish this centerline by following the compass bearing you determined in Step 3a above, to the opposite side edge of your Conifer Restoration treatment zone. Hang flagging intervisibly (in sight of each other) along this compass line, as the centerline for layout of your reforestation survey plots. Hang your last flag where your compass line meets this opposite edge of your Conifer Restoration treatment zone.
   d. Once you have completed flagging this centerline, turn around. This last flag that you hung in Step 3c is the actual starting point for laying out your reforestation survey plots.

4. Reforestation survey plot centers should be roughly evenly spaced along the centerline you established in Step 3. Follow the following procedure to establish the spacing of plot centers:
   a. Determine the length of your treatment zone. Using the examples from Step 1 above, the treatment zone is 1000 feet.
   b. From the Step 2 examples above, the 1000-foot long treatment zone requires three (3).
   c. Divide 1000 feet by 4 (the number of required plots (3) plus one); the resulting distance is 250 feet. For this 1000-foot long treatment zone example, establish the plot center of your first reforestation survey plot (on the centerline you flagged in Step 3c) 250 feet from the starting point you established in Step 3d. The second plot center should be established 250 feet further along the centerline from the first plot center, the third plot

center established another 250 feet further along the centerline form the second plot center, and so on. The fifth plot center established should end up being roughly 250 feet from the edge of the other side of the treatment zone on the centerline you established in Step 3c.

5. The preferred plot size is 1/150 acre. Use a plot radius of 9.6'. A pole or rod five (5) feet in total length and marked with a length of 4.6 feet should be a useful tool to establish the outer extent of these 9.6-foot radius plots.

6. Count up to two established conifer seedlings, or count one advanced reproduction, sapling or merchantable conifer tree per plot. Record and total separately for ***one seedling / plot*** or ***one tree / plot***, for ***two seedlings / plot*** and for ***plots not stocked***. Do not count seedlings or trees less than half the height of the dominant seedling or tree in the plot. Also note whether conifer or hardwood, or indicate actual species.

7. Seedlings, advanced reproductions, saplings and merchantable trees must be vigorous, without damage to roots and stem that would cause mortality or reduce merchantability, free from competing vegetation, and must have survived at least one growing season on the site.

8. Acceptable stocking with seedlings means at least 55% of all the plots have two or more established seedlings / plot while 20% of all the stocked plots have at least one established seedlings / plot.

9. Acceptable stocking with advanced reproductions, saplings, or merchantable trees means 75% or more of all the plots are stocked with one or more trees / plot.

10. Calculation of seedlings/plot data.

Seedlings Plots	Plot Radius in Feet	Seedlings/Acre at 100% Stocking
Western Washington (190 seedlings/acre)	9.6	
Plots w/at least 2 or more seedlings		300
Plots w/only 1 seedling		150
Eastern Washington (150 seedlings/acre)	10.8	
Plots with at least 2 or more seedlings		240
Plots with only 1 seedling		120

Calculate the average number of well-distributed seedlings or trees per acre using Steps 6 and 7 and the arithmetic steps described below.

190 well-distributed seedlings per acre are required. Multiply 150 by the number of plots with only 1 seedling. Next, multiply 300 by the number of plots with 2 or more seedlings. Add the answers and divide by the **total** number of plots taken. If the answer is less than 190, the area may be under stocked.

The average number of established, well-distributed seedlings/acre is calculated by using the following formula:

Western Washington

Multiply 150 x _____ # of plots with only 1 seedling = _____Total 1

Multiply 300 x _____ # of plots with 2 or more seedlings = _____Total 2

Add Total 1 and Total 2 = _____TOTAL 3

Divide TOTAL 3 by the total number of plots taken
(Including the total number of plots with NO seedlings.)

This answer is the average number of well-distributed seedlings/acre. = _____

11. Calculations of plot data for larger trees.

Statewide (100 Trees/Acre)	**Plot Radius in Feet**	**Trees/Area At 100% Stocking**
Plots with 1 or more advanced reproduction, sapling, and merchantable tree	10.2	133

Calculate the average number of established, well-distributed trees/acre using this formula: 100 well distributed merchantable trees, saplings or advanced reproductions per acre are required. Multiply 133 by the number of plots with 1 or more trees. Divide the answer by the **total** number of plots taken. If the answer is less than 100, the area may be under stocked.

Plot Data for Larger Trees

Multiply 133 x _____ # of plots with 1 or more trees = _____Total 1

Divide Total 1 by the total number of plots taken = _____
(The answer is the average number of well-distributed trees/acre.)

The department may approve lower stocking levels that reasonably utilize the timber growing capacity of the site.

Note: Plot size and sampling procedures allow for some variation in distribution and stocking. Further adjustments are not needed.

Appendix D Sources for Additional Information

You can find additional information from these websites:

The Webster Forest Nursery – planting stock and tree planting
https://www.dnr.wa.gov/programs-and-services/forest-resources/webster-forest-nursery/plant-right-tree-seedlings

OSU Extension – Successful reforestation, forest health and management
https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec1498.pdf

https://extension.oregonstate.edu/forests/health-managment

https://catalog.extension.oregonstate.edu/ec1388

WSU Cooperative Extension site - pest control, consulting foresters list
http://ext.wsu.edu/forestry/

DNR Small Forest Landowner Office
https://www.dnr.wa.gov/sflo

Appendix E Experimental Alternate Harvest Prescription Monitoring Scoping

In development