Bolstering Timber Production while Conserving Older Forest
Under an Amended Northwest Forest Plan

K. Norman Johnson and Debora L. Johnson[1]

5/12/2026

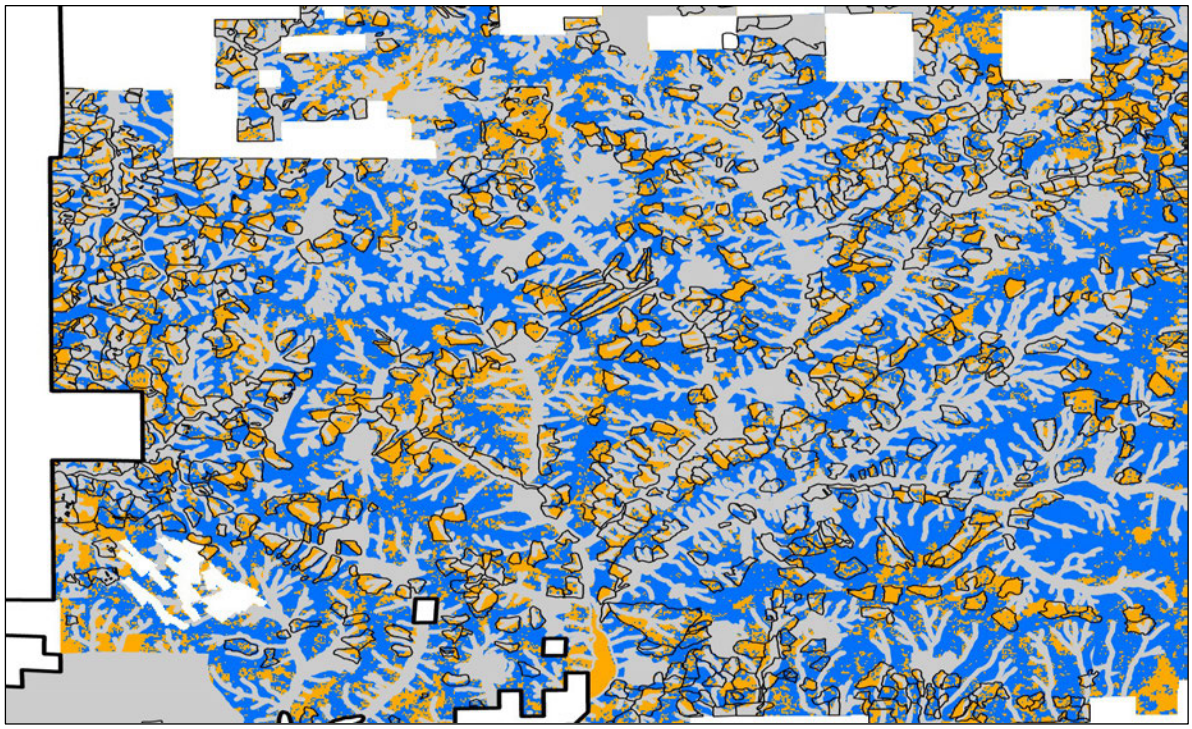

Figure 1. Landscape north of the McKenzie River on the Willamette National Forest highlighting the Older Forest (blue) and the Younger Forest (gold) in Matrix/AMA. Under the Proposed Action, the land suitable for timber production would be the Younger Forest shown here other than lands deemed unsuitable in the forest plans, riparian reserves, and other reserves shown in gray. Past timber sale boundaries are outlined in black.

[1] Dr. K. Norman Johnson is Emeritus Professor, College of Forestry, Oregon State University where the taught forest planning and policy. He is co-author of three books on forest management with the latest one (Ecological Forest Management, Waveland Press 2018) written with Dr. Jerry Franklin and Debbie Johnson. He led the harvest scheduling analysis for the Northwest Forest Plan and is senior author of *The Making of the Northwest Forest Plan* (with Franklin and Gordie Reeves). In the mid-1970s, Norm Johnson (and Lynn Scherman) developed the mathematical theory of timber harvest scheduling that provides the foundation for many forest planning models including PRISM, which is currently used by the Forest Service. Over time, he and Debbie have crafted a number of forest plans including a plan for the reservation forest of the Klamath Tribes (with Franklin) that is now part of the Fremont-Winema National Forest. Debbie Johnson is a Certified Forester and Certified GIS Professional (GISP) who provided the stand age analysis and spatial analysis and maps for this study. This is entirely a volunteer effort—no one contributed funds or food, not even dog cookies for Clancy.

Table of Contents

Summary

The Forest Service is currently amending the Northwest Forest Plan (NWFP) for the national forests within the range of the northern spotted owl (*Strix occidentalis caurina*). The Proposed Action in the Draft Environmental Impact Statement for the NWFP Amendment calls for bolstering timber production using ecological forestry in Moist Forests, while conserving older trees and stands and achieving other desired conditions. As part of this approach, the Proposed Action calls for withdrawing Moist Forests established before 1905 (now 120 years of age or older) from the lands managed for timber production, based on the recommendations of a group of people from different backgrounds and experiences formed by the Secretary of Agriculture under the Federal Advisory Committee Act (FACA) to advise the Secretary and Forest Service on the Amendment.[2] While these older forests were to be the primary source of timber harvest for a number of decades under the NWFP, they have generally not been logged in the last 20 years because of overriding regulations, litigation, and protest. Removing them from the timber-production land base would both conserve magnificent forests and resolve a lingering dispute over forest management under the NWFP that has bedeviled plan implementation.

In return, though, the Proposed Action does relatively little to bolster timber production in Moist Forests and, in some cases, makes it more difficult to advance that goal. Thus, the Proposed Action gives strong protection to mature and old-growth forests without making the changes needed to give strong protection and encouragement to timber production. In this report, we document the many difficulties we found in bolstering timber production and suggest how they might be overcome. In the discussion, we interpret "bolster" to mean both increasing the amount of timber production and making it more stable and secure. We use the Willamette National Forest to illustrate these difficulties and proposed remedies.

The NWFP employed a landscape design in which a network of large reserves (called Late Successional Reserves (LSRs)) would be designated for the conservation of the northern spotted owl and other species with most of the area between the large reserves, known as Matrix, managed for timber production and other uses. The portion of Matrix suited for timber production is of special interest to us in this analysis. Under the Proposed Action, most of the Matrix landscape between the LSRs will be allocated to reserves and other land withdrawals, leaving the area managed for timber production a relatively small, scattered portion of that landscape. Still, these lands are counted on to play a key role in timber production on the national forests:

- The FACA Committee advising the Forest Service on the Amendment recommended that the objective for these lands *"should be long-term, sustained-yield timber production consistent with ecological forestry principles."*
- The Proposed Action called for these lands to be "*designed to produce a sustainable supply of wood products while employing principles of ecological forestry."*

[2] See Federal Advisory Committee (2024) for membership, charge, decision process, and recommendations.

However the Proposed Action falls far short of achieving these goals and bolstering timber production on the remaining lands in Matrix suitable for that task. To address this problem we recommend that the Proposed Action be modified to:[3]

- Recognize that ecological forestry on the national forests includes pursuit of economic goals on lands suitable for timber production.
- Give a name and purpose to these nameless leftovers outside of reserves suitable for timber production, such as calling them the *Sustainable Timber Land Base,* and identifying sustainable timber production as their primary purpose.
- Recognize that the Desired Condition for the Sustainable Timber Land Base is management for timber production using ecological forestry to provide a stable supply of wood products over time.
- Remove Survey and Manage requirements and add species-specific protection only where there is evidence that the amended NWFP will be insufficient.
- Emphasize that management of the Sustainable Timber Land Base with ecological forestry is generally sufficient to meet ecosystem responsibilities there.
- Greatly expand the characterization of the timber harvest volume projected under the Proposed Action so that everyone can understand the source of this volume and the assumptions underlying it.
- Shift from the proposed complex, multi-level project planning process for the Sustainable Timber Land Base to a project planning process that recognizes the many decisions that have already been made for that land base and builds on recent Forest Service's experience in implementation, while also recognizing the rights, goals, and stewardship knowledge of Tribes in project decisions through co-stewardship.
- Highlight the importance of harvesting the portion of the Sustainable Timber Land Base that was established from 1905-1945 in the first few decades and is now 80-120 years of age.
- Change the requirements for retention of old trees in younger stands so that they do not interfere with harvest in the Sustainable Timber Land Base, especially in the 80–120-year age class.
- End the neglect of variable retention (regeneration) harvest for the Sustainable Timber Land Base and recognize it is a crucial element in:
    - maintaining and increasing the sustainable timber yield;
    - creating diverse early successional ecosystems; and
    - providing other values including foods and materials for Tribal communities.

  Significantly increase the proposed "treatment minimums" for Matrix, while setting quantitative treatment objectives for both plantation thinning and variable retention harvest for the Sustainable Timber Land Base.
- Highlight that the objectives set for variable retention harvest would cover only a relatively small part of the landscape in a decade. As an example, applying variable retention harvest to the

[3] These recommendations also apply to Adaptive Management Areas, which are managed similarly to Matrix but with added research objectives.

annual-acre equivalent of an 80-year rotation on the Suitable Timber Land Base would cover approximately 3% of the Matrix landscape and 1.5% of the Willamette National Forest as a whole per decade.

- Revise or reinterpret the requirements for calculating the culmination of mean annual increment in setting minimum rotation age.
- Work with US Fish and Wildlife Service (USFWS) to enable a reasoned rate of variable retention harvest in critical habitat for the northern spotted owl.
- Provide policy guidance for wildfire salvage in the Sustainable Timber Land Base that reflects its Desired Condition.

Timber can also be harvested from stands in the LSRs and in Riparian Reserves as a byproduct of achieving ecological goals. Thus, timber harvest under the NWFP comes from three sources, where one source has timber production as one of its goals (Matrix) and the other two (LSR and Riparian Reserves) have ecological goals, but timber can be harvested to help achieve them. Increased activity in these two allocations with ecological goals could also increase timber harvest volume over time.

The NWFP allows commercial thinning in the LSRs to improve late-successional conditions up to age 80. The Proposed Action lengthens the maximum thinning age in the Moist Forest LSRs from 80 to 120 years and states that this change would potentially make 824,000 additional acres in the LSRs eligible for forest management activities, with the expectation that this change would enable an immediate increase in activity levels and associated timber harvest volume from the LSRs. However, the analysis underlying the Proposed Action significantly overestimated the number of acres in the 80-120 age class potentially eligible for timber harvest to enhance late-successional conditions as almost all plantations, the focus of thinning in LSRs are under 70 years of age. Similar results are found in Riparian Reserves.

Our finding that the extension of maximum thinning age in the LSRSs will *not* result in an immediate increase in thinning opportunities for hundreds of thousands of additional acres, as described in the analysis underlying the Proposed Action, increases the dependence on the Sustainable Timber Land Base to provide abundant timber volumes in the near future. The recommendations above to clearly establish a Desired Condition for the Sustainable Timber Land Base, set quantitative treatment objectives for both thinning and variable retention harvest there, and remove obstacles in the path of conducting variable retention harvests become even more important.

In addition, we recommend that timber harvest become a secondary purpose of plantations in the LSRs and the Riparian Reserves to help compensated for the reduction in land suitable for timber production. That could occur without changing the overall purpose, size, or shape of the LSRs and Riparian Reserves. Such a change should give impetus to, and expectation for, the Forest Service to produce timber from these plantations consistent with their primary purpose.

Introduction

The NWFP was developed in 1994 for the 24 million acres of federal land that covered the range of the northern spotted owl in the United States, which included national forests, Bureau of Land Management lands, and national parks. The NWFP designated a network of Late Successional Reserves (LSRs) across the spotted owl's range following the approach developed in the Interagency Scientific Committee Report to conserve the northern spotted owl (Thomas et al. 1990). Federal forest between the LSRs was classified as Matrix or Adaptive Management Area (AMA). Under the NWFP, Matrix was intended to become the land base for sustainable timber production among other uses such as the riparian buffers needed along streams to conserve aquatic ecosystem processes and fish stocks (USDA and USDI 1994).

The USDA Forest Service (Forest Service) is currently amending the NWFP for its lands, and the Secretary of Agriculture chartered a committee under the Federal Advisory Committee Act (FACA) to recommend changes in the plan. The FACA Committee's charge did not include considerations related to endangered species like the northern spotted owl or changes in land allocation boundaries. The Forest Service largely incorporated the FACA Committee's recommendations into the Proposed Action in the Draft Environmental Impact Statement (DEIS) for an amendment to the NWFP (USFS 2024a).[4]

In the FACA Committee's recommendations, and in the Proposed Amendment, forests in the NWFP area would be characterized as "Moist Forest" or "Dry Forest" based on their fire history with infrequent, high severity fire being a defining feature of Moist Forests and frequent, low to moderate severity fire being a defining feature of Dry Forests.[5] In this report, we focus on Moist Forests, which cover approximately 12 million acres of national forest, mostly in western Washington and western Oregon (Figure 1).

[4] Alternatives to the Proposed Action were also included.

[5] See Franklin and Johnson 2013, Franklin et al. 2018 for more detail on this classification.

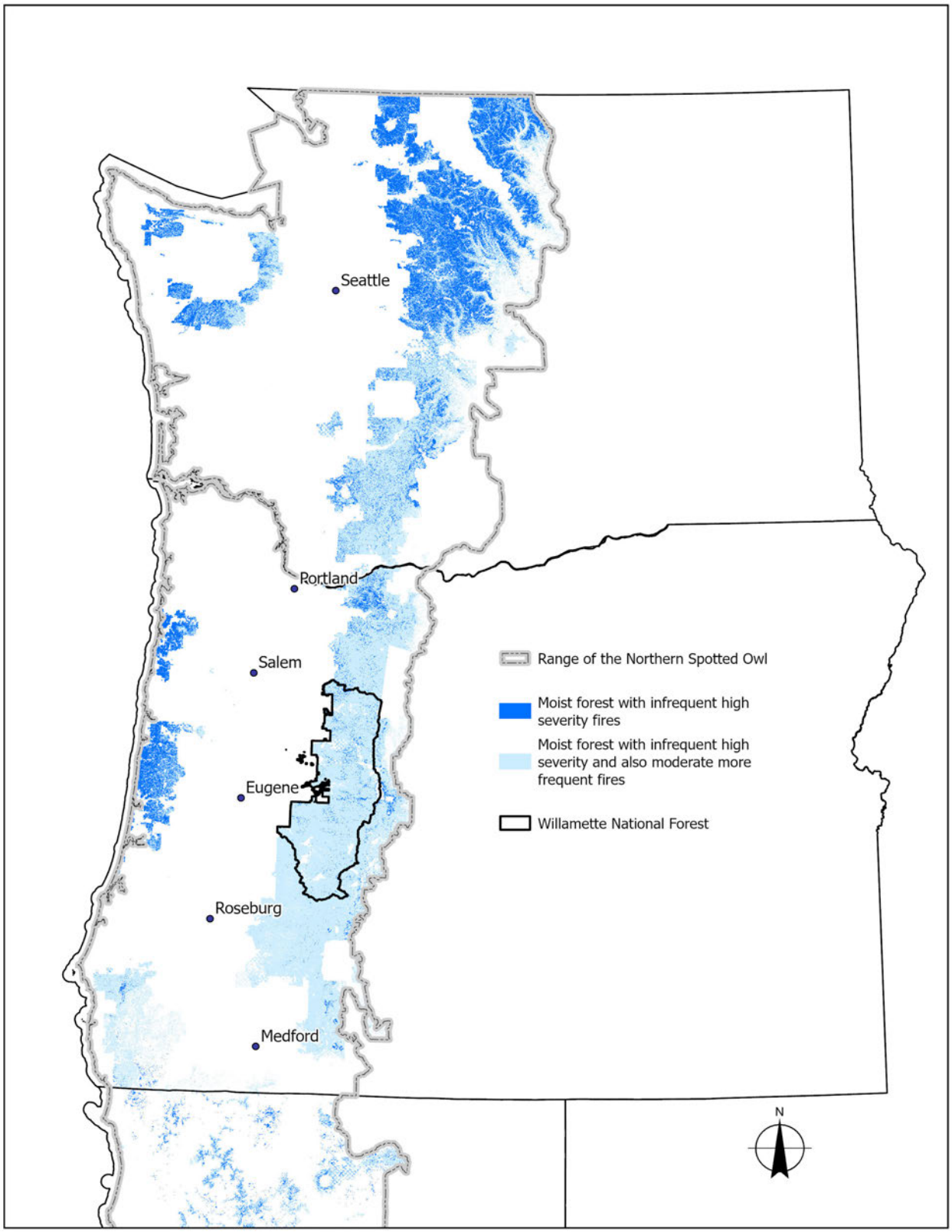

Figure 1. Moist Forest on the national forests in the range of the northern spotted owl. Source: Adapted from USFS 2024a.

The FACA Committee further recommended that Moist Forest originating before 1905 (currently 120 years old) be removed from the land base suitable for timber production (Federal Advisory Committee 2024). The Forest Service adopted these recommendations in its Proposed Action in the DEIS for the NWFP Amendment—an important step in removing mature and old-growth forest from that land base. The FACA Committee further stated that "The objective for young, moist, Matrix stands [defined as stands established after 1905] should be long-term, sustained-yield timber production consistent with ecological forestry principles" (Federal Advisory Committee 2024, p. 38), which the Forest Service also adopted in its Proposed Action: timber harvest in those stands "should be designed to produce a sustainable supply of wood products while employing principles of ecological forestry" (USFS 2024b, p. A1-20). Further, the Proposed Action states that young moist Matrix should be managed "using ecological forestry methods to bolster timber production while also conserving and retaining older trees and achieving other desired conditions" (USFS 2024a, p. 2-17; USFS 2024b, p. A1-19-20). In this report, we analyze the implications for forest management and timber harvest of removing the older forest from the land base suitable for timber production and recommend changes to bolster timber production on the remaining suitable land.

We break this report on the Proposed Action into three parts:

1) Descriptions of the size and spatial distribution of the major land allocations, silviculture, and acreage suitable for timber production under both the existing NWFP and the Amendment.
2) Recommendations for bolstering timber production in lands suited for that role and also increasing treatment rates in LSRs and Riparian Reserves where harvest can occur as a byproduct of achieving ecological goals.
3) Recommendations for broadening the management of plantations in LSRs and Riparian Reserves.

We will use the Willamette National Forest east of Eugene, Oregon to illustrate the spatial implications of the Proposed Action. Moist Forests cover the vast majority of the 1.7 million acre Willamette National Forest and contain a number of vegetation types such as Douglas-fir/western hemlock, true fir, and mountain hemlock. Our findings and remedies generally apply to other Moist national forests in the Cascades and in the Olympic Peninsula.

Overall Context

The issue studied here of how best to bolster timber production on the Moist Forests while conserving older forest on the national forests occurs, of course, in the context of other major considerations and issues. We briefly discuss three: (1) northern spotted owl conservation, (2) threats from wildfire, and (3) the effects of forest management on climate change.

Finding successful strategies for conservation of the northern spotted owl has been at the heart of the NWFP since its inception. That strategy focused on habitat protection for many years, expanding that protection over time in recovery plans and designating much of these forests as critical habitat. However that approach has proven to be insufficient in two ways. First, wildfire has reduced spotted owl habitat in many places. Second, it may not be possible to save the spotted owl because of competition from the barred owl (*Strix varia*): the spotted owl has now largely disappeared from federal lands in western

Washington and coastal Oregon and it is questionable whether it can be brought back. It is also in deep trouble in the cascades of Oregon, while holding on somewhat better in the Dry Forests of southwest Oregon and northern California where it can compete more successfully with the barred owl (Lesmeister, 2025). The USFWS recently called for a major culling of the barred owl over the next twenty years to help the spotted owl survive (USFWS 2024) and national forest plans should include barred owl control strategies as part of their management plans. Toward the end of this report, we suggest ways to integrate our recommendations with spotted owl habitat conservation.

Large, intense wildfires were relatively uncommon in Moist Forests for the first few decades of the NWFP, but the large, high severity wildfires that occurred in 2020 created great interest in forest management strategies that would enable these forests to survive and prosper in the warmer climates expected in the future. That has often been expressed in terms of an increasing emphasis on silvicultural prescriptions that create resistant, resilient and adaptive forests. This includes calls for both variable density thinning and variable density regeneration harvest that increase species diversity and horizontal and vertical complexity (Franklin et al. 2018; Palik et al. 2021). Examples of variable density thinning to accomplish these goals can be found in many recent projects in Moist Forests (USFS 2020, USFS 2025a, 2025b) and we discuss variable density regeneration harvest to accomplish these goals later in this paper. Also, the 2020 wildfires created great interest in managing the landscape to reduce fire risk and improve firefighting. Recent projects call for creating shaded fuel breaks along key roads and corridors to provide firefighters with opportunities to improve their effectiveness and safety, prevent further wildfire spread, and protect resource values at risk from wildfire (USFS 2025b). Our recommendations assume that these types of prescriptions will be utilized in management of Moist Forests. In addition, we provide recommendations for wildfire salvage in Matrix/AMA.

The effect of forest management on climate change has been hotly debated for many years, especially whether timber harvest and use of wood products reduces or increases the amount of CO_2 released into the atmosphere. That issue is especially important for the Moist Forests studied here as they are some of the most effective climate storage engines of any forests on the planet. We do not know where the readers of this paper stand on this debate, but we should point out that the types and rates of harvest proposed are small enough that, by themselves, they will not greatly influence the amount of carbon stored in these forests. On the other hand, if the silvicultural prescriptions and fuel breaks described in the previous paragraph do, in fact, result in less high-severity wildfire, that would aid the argument that forest management assists carbon sequestration.

Study Methods and Data

In our analysis, we integrated several layers of spatial information developed by the Forest Service.[6] From the DEIS for the NWFP Amendment, we used the following GIS layers:

- Moist_forest_stand_age_class
- NWFP_Landscape_Type_PA
- NWFP_LandUseAllocation_2023_FS_wRiparianReserves, and

[6] Maps created from these data layers are in Appendix C.

- RoadlessArea_2001_PA

which are available at https://usfs-public.app.box.com/v/PinyonPublic/folder/294104586601
From the FS Geodata Clearinghouse we used:

- Timber Harvest

which is available at: https://data.fs.usda.gov/geodata/edw/datasets.php

Part I. Land Allocations, Silviculture, and Land Base Suitable for Timber Production Under the NWFP and Proposed Action for Moist Forests

Land allocation maps for the NWFP typically highlight five primary allocations as shown for the Willamette National Forest (Figure 2):

- Congressionally Reserved—mostly Wilderness
- Administratively Withdrawn—other important areas withdrawn from timber harvest
- Late Successional Reserves (LSRs)—large areas managed to conserve and restore late-successional conditions for the northern spotted owl and other late-successional species and small areas around northern spotted owl nest sites.
- Matrix—areas between the large reserves managed for timber production and other uses.
- Adaptive Management Areas (AMAs)—areas managed similarly to Matrix that may have added research objectives.

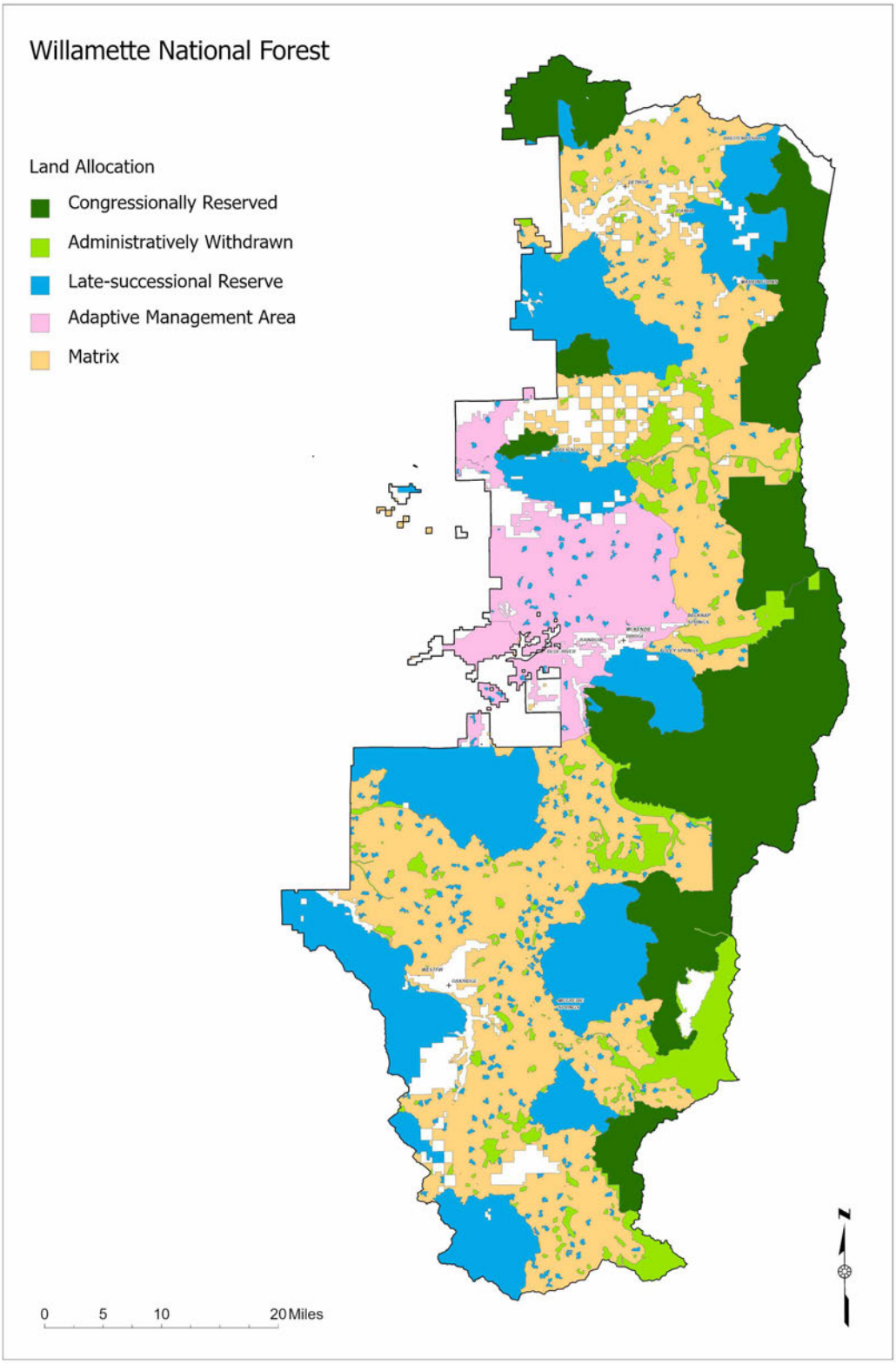

Figure 2. Major land allocations on the Willamette National Forest (Riparian Reserves not shown). We call the area (mostly gold or pink) between the large reserves the "Matrix/AMA landscape" in this report.

For our purposes, we will combine Matrix and AMA allocations and we will also combine Congressionally Reserved and Administratively Withdrawn while recognizing two more allocations (Figure 3):

1) Riparian Reserves—areas along streams within Matrix and AMA managed to enhance aquatic ecosystem process and provide habitat for riparian species.
2) Inventoried Roadless Areas (IRAs)—areas managed under the 2001 Roadless Rule, which was adopted after completion of the NWFP.[7]

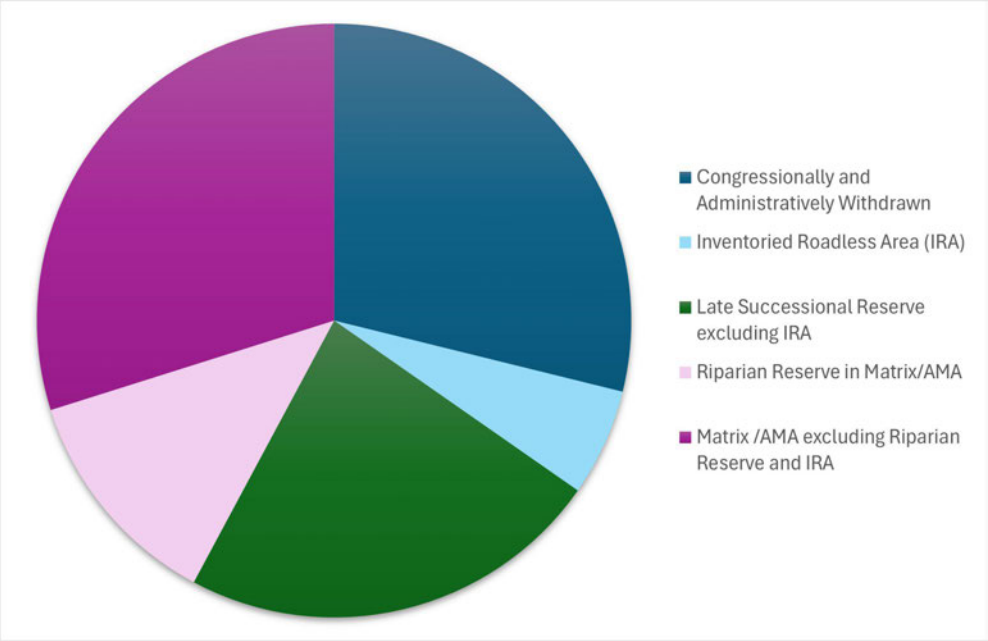

Figure 3. Proportionate distribution of the Willamette National Forest among selected allocation categories.

[7] Under the 2001 Roadless Rule, the harvest, sale, or removal of timber is not authorized in Inventoried Roadless Areas (IRAs), except for a limited amount of small diameter timber that can be harvested as part of ecological restoration and fuel treatment (USFS 2024a, p. 3-35). Administrative processes are currently under way to rescind the withdrawal of the IRA from Matrix/AMA. We estimate that about 10% of Matrix/AMA on the Willamette National Forest lies in IRAs. Most of the IRA acreage is within LSRs.

The “Matrix/AMA landscape” in this analysis represents the forest outside of the large NWFP reserves and the IRAs. Riparian Reserves are embedded within it. Riparian Reserves also are located within the LSRs as an overlapping allocation but are rarely recognized in the description of land allocations.

Land suitable for timber production (a focus of this study) is the portion of Matrix/AMA (excluding Riparian Reserves) that remains after deducting lands deemed unsuitable in individual forest plans such as unstable, inoperable, and noncommercial forests, and special places such as recreation sites and experimental forests. In the analysis underlying the NWFP (Johnson et al. 1993, Table 16), the land suitable for timber production was estimated as approximately 72% of Matrix/AMA.[8] Using the data sources described above on the Willamette National Forest, we estimate that Matrix/AMA covers approximately 470,000 acres, which results in an estimate of the suitable land base as .72* 470,000 = 340,000 acres or about 23% of the forested portion of the Willamette National Forest.[9]

National Forest timber sales before and after the NWFP—a complicated history

Timber sales began to pick up in the NWFP area in the late 1930s. This increase continued during WWII to help in the war effort and after the war to satisfy pent-up demand for homes and other products. The 1960s to 1980s saw the high point of old-growth logging on national forests in the NWFP area. Those massive sales came to an abrupt end in the late 1980s when an injunction was placed on national forest timber sales in northern spotted owl habitat until the federal government developed a scientifically credible conservation strategy for the spotted owl. That injunction led to the Northwest Forest Plan, approved in 1995, and timber sales on the Willamette National Forest plunged to levels close to those of the prewar period (Figure 4).

[8] “The FEMAT Report does not estimate land suitable for timber production. Rather, it estimates "matrix" land in each option. Matrix information by administrative unit for an option can be compared to suitable land for the option to develop a relationship between the two numbers (Johnson et al. 1993, Table 16). For the three options analyzed here, Options 4,7 and 9, suitable acres, on average, varied from 65-75 percent of matrix acres.” (Johnson et al. 1993, page 13). The FEMAT Report provided the scientific foundation of the NWFP and Option 9 became the NWFP after adjustment. Suitability adjustments for some other national forests in the Cascades for comparison were Gifford Pinchot (.91), Mt. Hood (.63), and Umpqua (.81).

[9] Looking at all Moist Forests in the NWFP, the suitable land base is about 14% of the forested area.

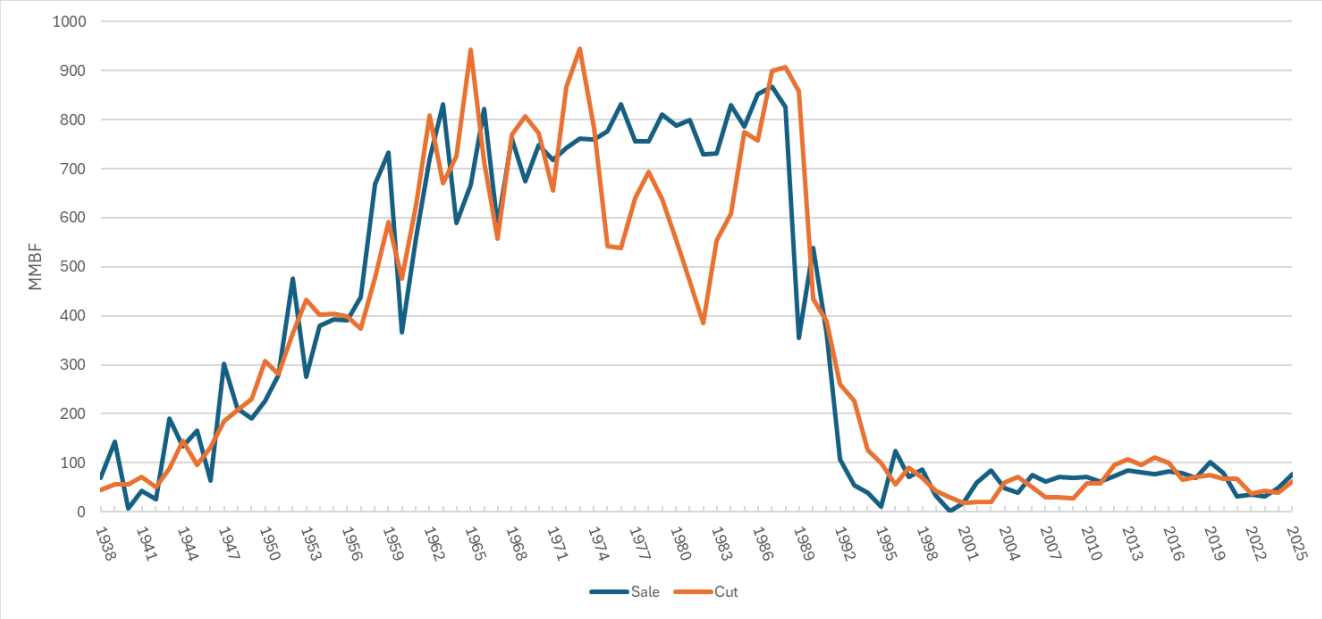

Figure 4. Timber sales and harvest from the Willamette National Forest over the last 90 years. Both sales and harvest are measured in "Convertible Products", which are the board feet in products convertible to that measure. During the days of old-growth logging (up to the early 1990s), sawtimber made up about 85% of sales/harvest with cull logs (less than 1/3 sound) making up the rest. Over the last 25 years, as the agency switched to plantation thinning, sawlogs made up over 95% of the sales/harvest with biomass and fuel wood comprising the rest. Annual sales and harvest per year do not entirely match as firms have a number of years to complete sales and (understandably) attempt to hit market peaks. In total, over the 90 years covered here, more than 95% of the timber sold was eventually harvested. Source of sales/harvest: Rakestraw, Lawrence and Mary 1991 (1938-1976); https://www.fs.usda.gov/managing-land/forest-management/products/cut-sold (1977-2025).

Under the analysis done for the NWFP, planners projected future timber sales for each national forest for each alternative considered in two steps: (1) they first used optimization models to calculate the maximum nondeclining sale level from the land suitable for timber production, under the allocations and restrictions of an alternative as best they could, (2) they next adjusted the projections downward to allow for the many, often fine scale, considerations that such modeling could not consider.[10] They called those estimates "probable sale quantity (PSQ)" to distinguish them from the maximum sale estimates (maximum allowable cuts) traditionally calculated. They did not include estimates of harvest from Reserves.

The PSQ estimates were revised in late 1990s to reflect changing conditions and policies, including the withdrawal of Inventoried Roadless Areas from the suitable land base. By 2000, the PSQs had stabilized and have remained at that level until today. As an example, the Willamette National Forest has a PSQ of 116 MM BDFT/yr (Mickey, 2019) for the suitable land base. In contrast, timber sales on the Willamette National Forest, including sales from both the suitable land base and the reserves, have not reached that level in the last 20 years (Figure 4), averaging slightly more than half of the PSQ over that time.

[10] See Johnson et al. 1993, Table 8 for those adjustments.

The planners making the original PSQ estimates for the NWFP had assumed that mature and old-growth forest in the suitable timber base could be logged using variable retention harvest, a type of regeneration harvest mandated in the NWFP. The scientists who helped develop the NWFP had been asked to find the highest harvest possible that met environmental laws and this the scientists tried to do (Johnson et al. 1993).

It should be noted, though, that the planners doing the harvest scheduling analysis expressed considerable skepticism in their report about this approach, given the controversies that existed over cutting old-growth forests and the superficial resemblance of the harvest methods to clearcutting (Johnson et al. 1993). The Oregonian newspaper (then delivered all over Oregon) aired these concerns in its main headline one day in August 1993 soon after President Clinton had formally endorsed the draft NWFP. That headline yelled: *President's Plan Doubly Flawed New Report S*ays, because the Plan still relied on cutting old growth and would not deliver stable timber harvests. Prophetic indeed!

The NWFP called for variable retention harvest in the suitable timber base to provide the bulk of the harvest over time, with most of that volume coming from mature and old-growth forests in the first 30 to 40 years of the Plan. Variable retention harvest (VRH) would be employed with retention of at least

Figure 5. A few decades after a variable retention regeneration harvest in which significant elements of the preharvest forest were retained, mostly as aggregates, from the postharvest ecosystem on the Willamette National Forest. (Source: USFS 2021)

15% of the harvest unit, mostly in groups (Figure 5). However, relatively little VRH occurred in mature and old-growth forest due to the presence of critical habitat designations for the northern spotted owl in parts of Matrix/AMA[11], Survey and Manage requirements (a late addition to the NWFP development to deal with poorly known species associated with old-growth forests (USDA and USDI 1994), and protest and litigation opposing the logging of old-growth and harvests that created openings (Johnson et al. 2023). By the year 2000, the Forest Service had largely given up on the harvest of mature and old-growth forests as the primary source of timber harvest volume in Moist Forests and timber sales reached the lowest level in 90 years (Figure 4).

On the other hand, commercial thinning sales in the LSRs were proceeding without much protest, where stands could be thinned to advance the development of late-successional structure up to age 80 irrespective of their origin (whether from past logging, wildfire, or other disturbance). Scientists assisting in development of the NWFP, led by Dr. Jerry Franklin, had chosen an age limit of 80 because they believed that stands over 80 years of age were beginning to develop late-successional structure and did not need logging to help them along. Managers also applied that age limit in practice to Riparian Reserves.

[11] The northern spotted owl was listed as "threatened" under the Endangered Species Act by the US Fish and Wildlife Service in 1990.

Needing timber harvest volume to report to the new Bush Administration, national forest sale planners noticed that timber sales in LSRs, which focused on thinning in plantations less than 80 years of age, were being successfully implemented. Thus, they began to shift harvest in the suitable timber base to plantation thinning as the focus of their timber sale program. Over time, the agency increasingly broadened the goals of this thinning program (called "Variable Density Thinning") to include increasing forest complexity in plantations, especially in Late Successional Reserves (Figure 6).

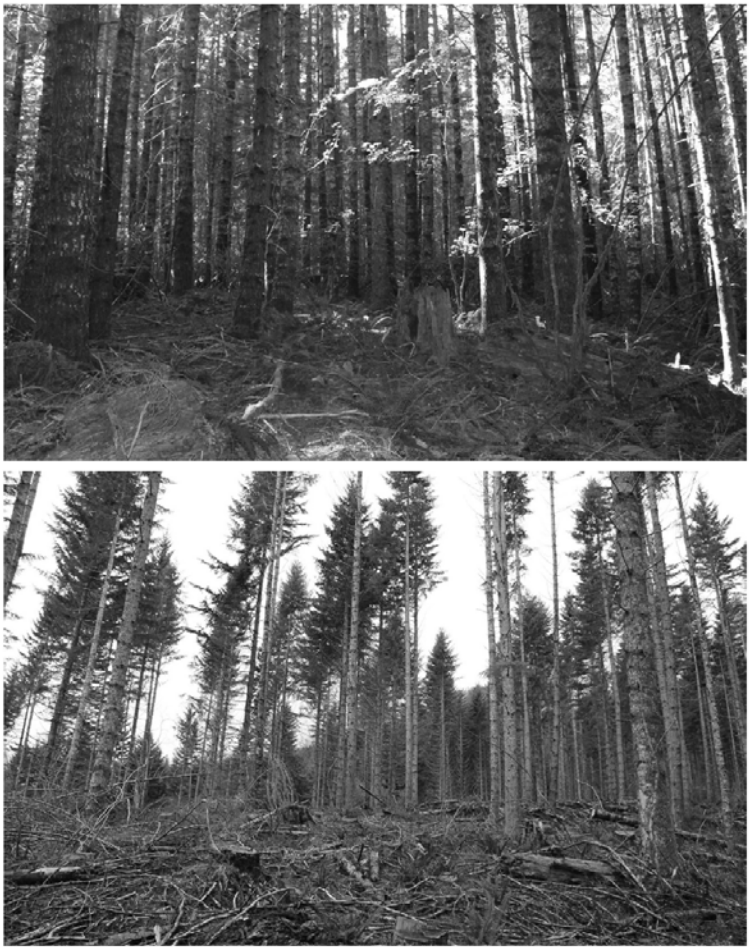

Figure 6. Plantation thinning on the Siuslaw National Forest to increase structural and compositional complexity, with the goal of accelerating development of late-successional conditions, before (above) and after (below) thinning. Notice the gappy/clumpy nature of the thinning and the opening in the foreground. (Courtesy of the Siuslaw Stewardship Watershed Restoration Project)

The 80-year limit on commercial thinning was given legal standing in the Pechman decision of 2003 that exempted Survey and Manage Requirements for projects that thinned or undertook hazardous fuels reduction in forests up to 80 years old (Johnson et al. 2023, p. 276). In addition, the USFWS, during consultation, generally concluded that thinning in stands less than 80 years of age would not jeopardize the continued existence and recovery of the northern spotted owl. Finally, thinning did not draw comparisons to clearcutting as variable retention harvest often did.

Thus, agency actions in Moist Forests in the early 2000s shifted from variable retention harvest of forests in mature and old-growth forest, as modeled in the timber scheduling projections, to plantation thinning, which was an afterthought in those projections. The focus on plantation thinning in Moist Forests continues (Figure 7). Almost all plantations that might be thinned are less than 80 years of age, with most from 25 to 65 years of age (Figure 8).

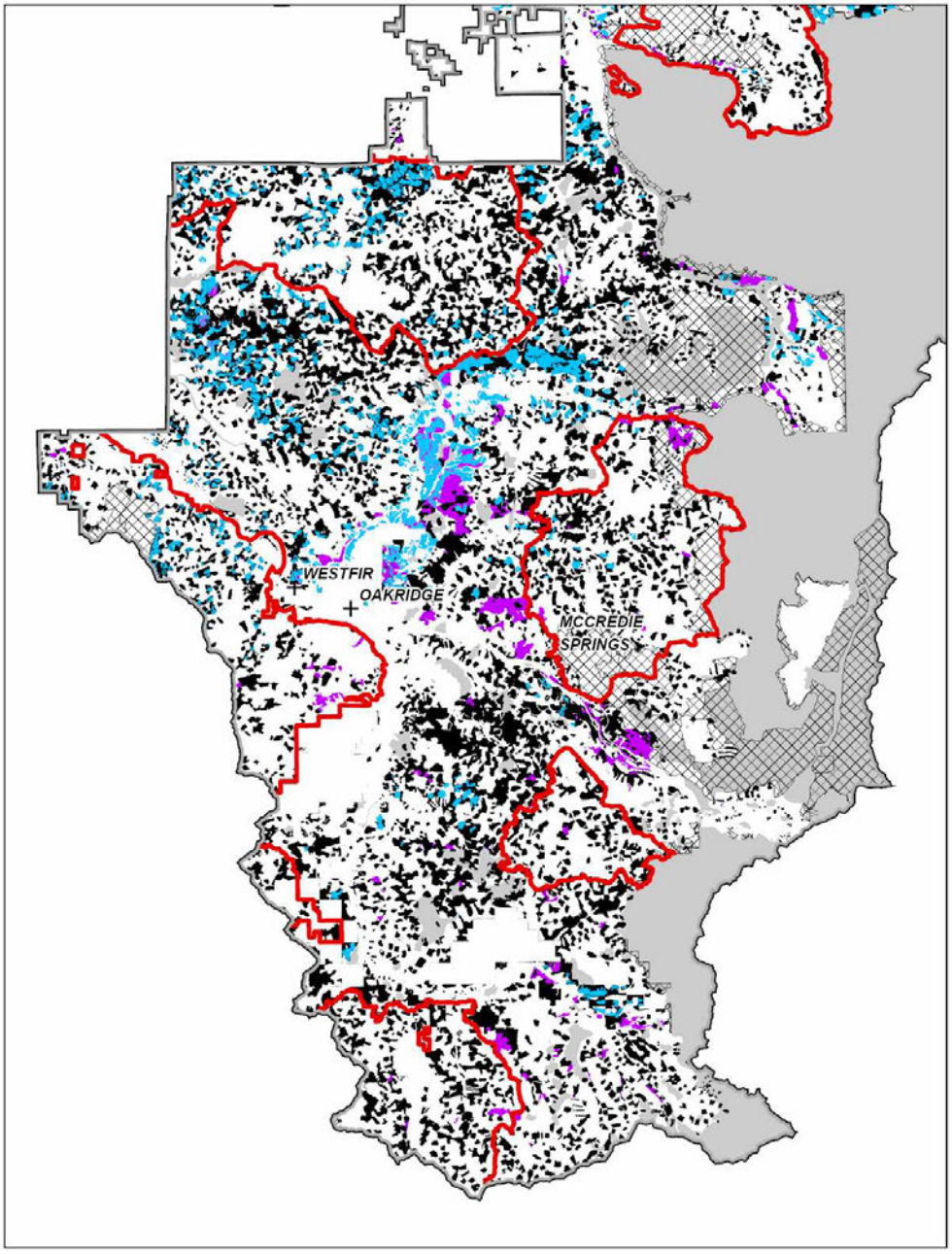

Figure 7. Commercial thinning and clearcutting over time on the Willamette National Forest. Clearcut harvest before 2000 is in black and commercial thinning before 2000 is in purple. The vast majority of these older harvests occurred before 1990. Plantation thinning from 2000 to 2025 on the sites of old clearcuts (both planned and completed) is in blue. LSR boundaries are outlined in red. The large amount of plantation thinning in and near the Fall Creek LSR (upper left) reflects the large ongoing Lowell Country Project (USFS 2020).

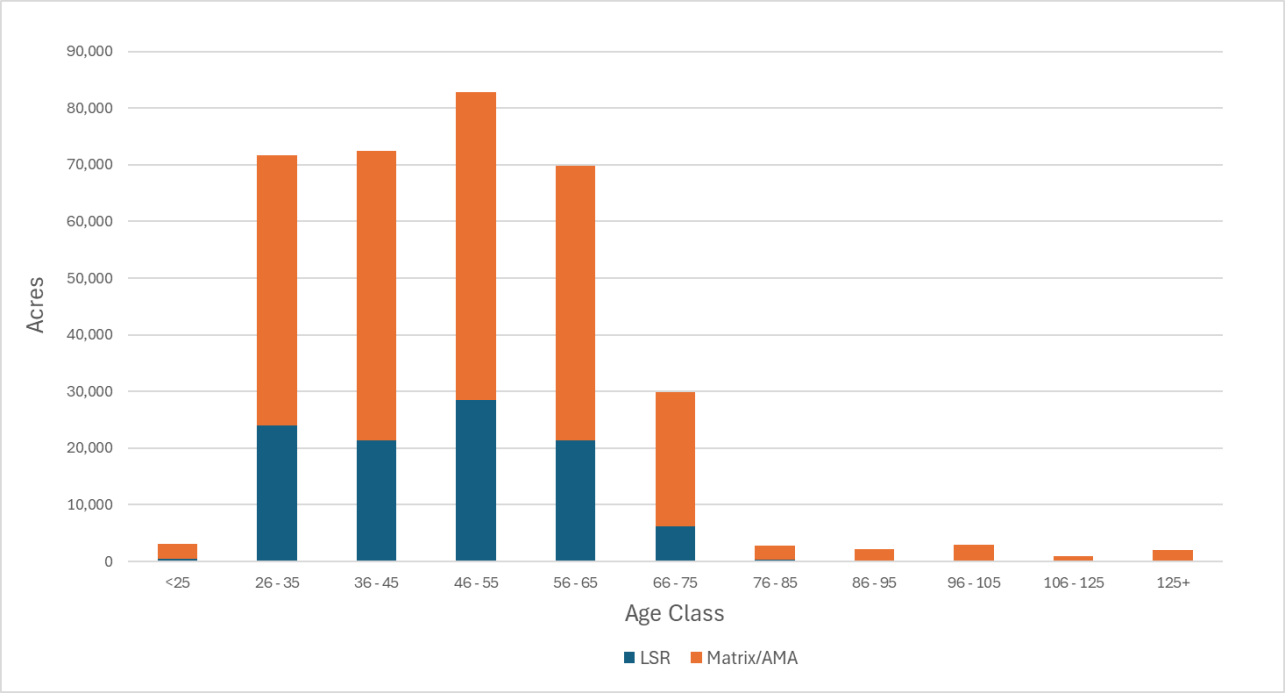

Figure 8. Estimated age of plantations in Matrix/AMA and LSRs on the Willamette National Forest based on the timber sale ending date for the lands on which they were established. Note: this acreage includes the embedded Riparian Reserves. This chart has not been updated for plantations that have severely burned, such as in the 2000 fires.

The Proposed Action

Withdrawal of the Older Forest from lands suitable for timber production

The Forest Service formed a committee under the Federal Advisory Committee Act (FACA) to develop consensus recommendations for amending the NWFP. The FACA Committee spent considerable time discussing the upper age limit in Moist Forests on land suitable for timber production in Matrix/AMA. They settled on 120 years of age, or forest established in 1905, and the Forest Service incorporated that recommendation into the Proposed Action in the DEIS for the NWFP Amendment.

Following the FACA Committee's recommended demarcation, we define "Younger Forest" as forest that originated on or after 1905/currently at or under 120 years of age and "Older Forest" as forest that originated before 1905/currently over 120 years of age. The Willamette National Forest provides a spatial illustration of this division (Figure 9). It may surprise some that Older Forests still dominate much of the forested landscape on that national forest, given the long history of clearcutting and the recent spate of severe wildfires. Using data supporting the proposed NWFP Amendment, we estimate that Older Forest occupies slightly more than 65% of the forested area on the Willamette National Forest, with that percentage varying from 40% in Matrix/AMA to 75% in Wilderness, Roadless, and other withdrawals that generally have not experienced timber harvest (Figure 10). [12] The proportion of Younger Forest in LSRs (36%) is close to that of Matrix/AMA (40%), in part, because the Forest Service historically spread the harvest over the commercial land base. Riparian Reserves within Matrix/AMA have a higher percentage of forest under 120 years old—areas along and in streams often provided pathways for early logging.[13]

[12] Moist Forests in the NWFP, on the whole, average slightly less Older Forest in Matrix/AMA and slightly more Younger Forest than that shown in Figure 10 for the Willamette National Forest.

[13] The approach taken to aging in the DEIS tends to exaggerate stand age. Thus, there is a somewhat higher percentage in Younger Forest and somewhat lower percentage in Older Forest than shown here.

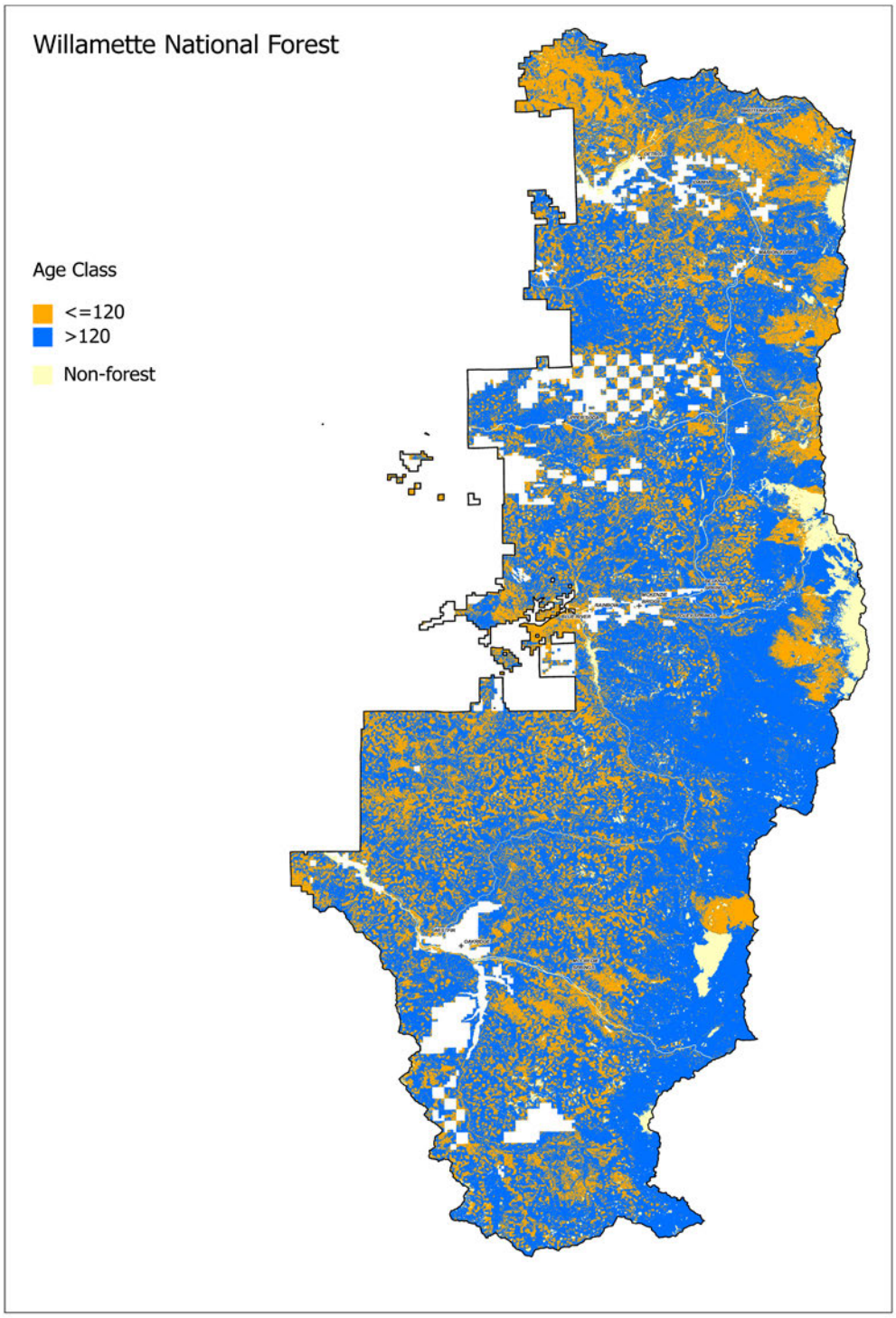

Figure 9. An estimate of the distribution of forests over 120 years of age and less than 120 years of age across the Willamette National Forest using the NEPA analysis for the proposed NWFP Amendment. Wildfires over time created large patches of Younger Forest, especially the 2020 fires that severely burned the northern and eastern parts of the Willamette National Forest and also the west-central part. The large patches in the southern part mostly come mostly from fires in the 1960s that were extensively salvaged.

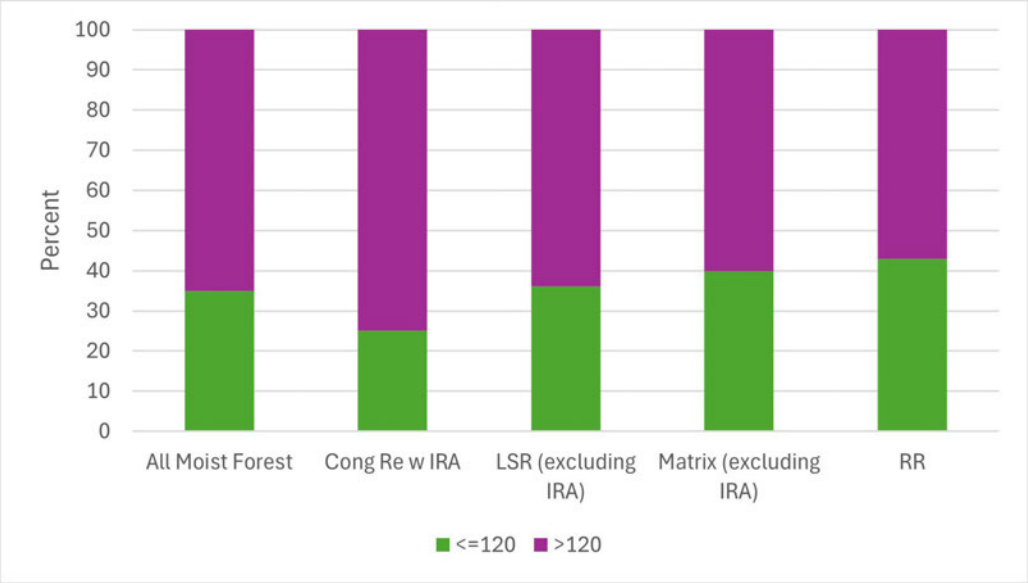

Figure 10. Proportionate distribution of Moist Forest in the Willamette National Forest among different age classes and allocations compiled from data used in the NEPA analysis of the proposed NWFP Amendment. IRA=Inventoried Roadless Areas, RR=Riparian Reserves. Note: this inventory tends to exaggerate forest age—there is a somewhat higher percentage in Younger Forest and somewhat lower percentage in Older Forest than shown here.

Looking at the acreage distribution of Older Forest, we see that the Willamette National Forest contains almost one million acres of forest over 120 years, with approximately 30% of that forest in Matrix/AMA outside Riparian Areas (Figure 11). Much of that Older Forest is in the land base suitable for timber production in the NWFP, after it has been reduced for acres that are noncommercial, inoperable, or assigned to other uses such as recreation sites or experimental forests.

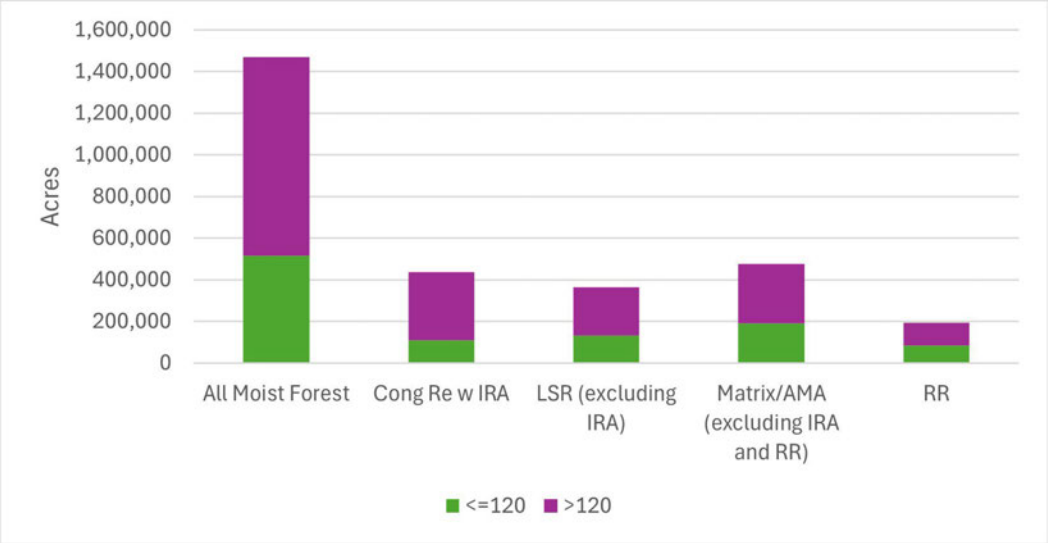

Figure 11. Acreage distribution of Moist Forest on the Willamette National Forest among different age classes and allocations compiled from data used in the NEPA analysis for the NWFP Amendment. IRA=Inventoried Roadless Areas, RR=Riparian Reserves. Note: age 120 is equivalent to establishment date of 1905. The discussion below focuses on timber harvest in the forest less than 120 years of age (born after 1905)—the green portions of the LSR, Matrix, and RR bars. Note: this inventory tends to exaggerate forest age—somewhat more area is in Younger Forest than shown here.

Increase in the maximum stand age for thinning in the LSRs

The FACA Committee also recommended that the upper age for thinning in LSRs should be raised from 80 to 120 years and that recommendation was incorporated into the Proposed Action. This change will also probably be applied to Riparian Reserves and we will assume that here.

It is important to note the 120-year threshold is treated differently in Matrix/AMA and the LSRs. In the case of Matrix/AMA, that threshold is the dividing line between land that potentially remains in the land base suitable for timber production (the Younger Forest) and the land that has been withdrawn (the Older Forest). If the Younger Forest is available for timber production, there is no upper age limit on harvest. In the case of the LSRs, on the other hand, 120 years of age is the upper age limit for thinning to improve late-successional conditions.

Assessing the policy implications of the Proposed Action

We first describe an error in inventory classification in the analysis underlying the DEIS, the consideration of which ripples through our assessment of policy implications of the Proposed Action. Then we assess the effect of the Proposed Action on timber production in Matrix/AMA and timber harvest in the LSRs.

An error in forest age classification should be acknowledged in analyzing effects of these new policies

As we analyzed the potential implications of the policy changes in the Proposed Action for Matrix/AMA and the LSRs mentioned above, we were puzzled by the age class distribution in the data supporting the

DEIS in which more acres were shown in the 80-120 age class than in the 0-80 year old age class (Table 1).

Table 1. Acreage in different age classes and allocation categories in Moist Forest Matrix/AMA and LSRs across the NWFP area. IRA = Inventoried Roadless Areas

	Moist Matrix /AMA with IRAs	Moist Matrix /AMA w/o IRAs	Moist LSR with IRAs	Moist LSR w/o IRAs
Non forest	81,649	72,192	117,857	78,236
0-80	503,114	466,407	713,678	597,628
80-120	639,193	575,268	823,460	641,546
120-200	864,912	743,140	1,397,515	977,011
200+	573,418	511,495	1,145,791	773,066
Total	2,662,286	2,368,503	4,198,300	3,067,486

We found it hard to believe that the 80-120 age class would contain more acres than the 0-80 age class, as shown in Table 1, for two reasons: (1) The vast majority of Moist Forest plantations were established between 1945 and 1990 during the heyday of old-growth logging. With that range of establishment dates, most plantations should be between 35 and 65 years old, with some between 65 and 75 years old, and relatively few between 80 and 120 years old. (See Figure 8 for plantation age distribution for the Willamette National Forest.) The other likely source for acres in the 80–120-year age class would be severe wildfire in the period of 1905-1945; however, we doubted that sufficient wildfire occurred in 1905-1945 such that it would exceed the combined total of wildfire and clearcut harvest from 1945 to 2025! So we began to investigate the issue by reviewing the data underlying the NWFP Amendment and also exploring the LSRs on the Willamette National Forest.

We took two approaches to investigating this issue. First, we compared the age class map for the 80–120-year-old forest (from the DEIS analysis) on the Willamette National Forest to a clearcut map for the period 1945-now (the last 80 years) (Figure 12). Sure enough, the timber sale map for the last 80 years almost entirely covered the patches of the 80–120-year-old age class. We then went to the Fall Creek

LSR, which is located in the upper left LSR in Figure 12, and took increment cores in selected stands (Figure 13). The core ages closely matched those derived from the timber sale completion dates.

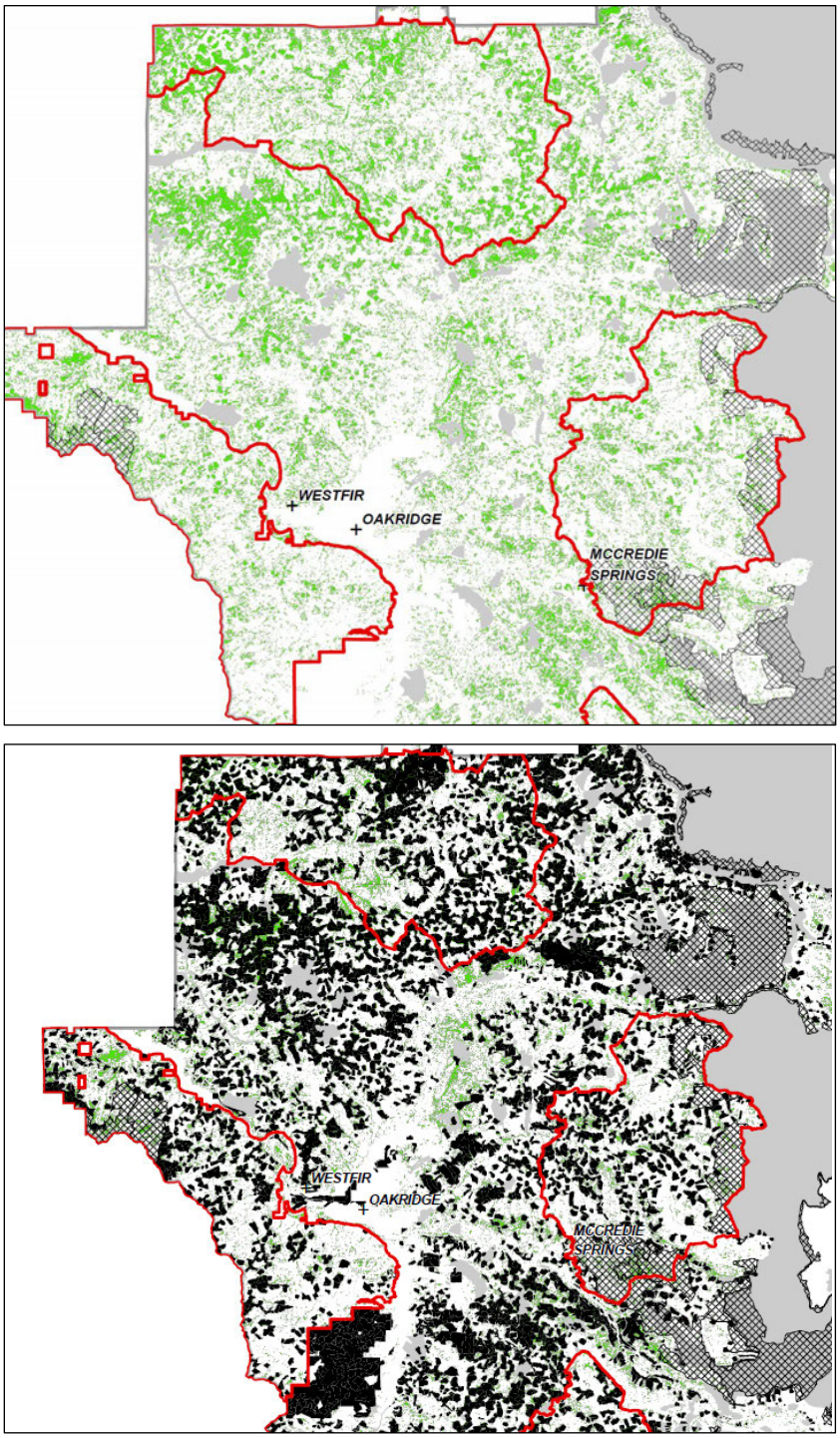

Figure 12. Analysis of the accuracy of stand ages placed in the 80–120-year-old age class in a portion of Willamette NF with LSRs outlined in red: Top: 80–120-year age class in green. Bottom: clearcut timber sales from 1945 to 2025 in black on top of 80–120-year age class. (Inventoried Roadless Areas are crosshatched.)

Figure 13. Debbie Johnson and Clancy taking increment cores in a 46-year-old stand in the Fall Creek LSRs labeled 80-120 years of age in the spatial inventory used in the NWFP Amendment.

Our conclusion: Almost all patches outside of roadless areas identified as 80-120 years of age are actually less than 70 years of age. We found this same issue in the characterization of the age structure in LSRs on the other national forests in the Cascades from the Mt. Baker-Snoqualmie National Forest in the north to the Umpqua National Forest in the south.

Finally, we should add that some 80–120-year-old forest does occur in Moist Forests, where it is usually characterized as Older Forest in the DEIS analysis. We looked for evidence that some forest 80-120 years of age was put into the 120–200-year class. We examined the wildfire records for the Willamette National Forest for the 1905-1945 period (Rakestraw and Rakestraw 1991). From those records, we estimate that about 70,000 acres burned during those years with potentially 25,000 surviving until today in Matrix/AMA outside of Riparian Reserves or other reserves and shown as older than 120 years of age. We found none in the LSRs. Other national forests like the Gifford Pinchot may have more forest of that age from the large fires there in the early 1900s, but it generally will be much less than the amount characterized as 80-120 years of age in the DEIS analysis.

The Proposed Action will make achieving the goal of bolstering timber production more difficult

Under the Proposed Action, the distribution of land allocations and age classes across the Matrix/AMA landscape on the Willamette National Forest displays a complex spatial pattern with Older Forest, Younger Forest, and Riparian Reserves highly intermixed (Figure 14). Most of this Younger Forest was established as Douglas-fir plantations after clearcut harvest of Older Forest between 1945 and 1990. Some of these stands have been commercially thinned. There is also a scattering of Younger Forest embedded in Older Forest (which are really part of Older Forest) and occasional patches of Younger Forest across the landscape resulting from past fires.

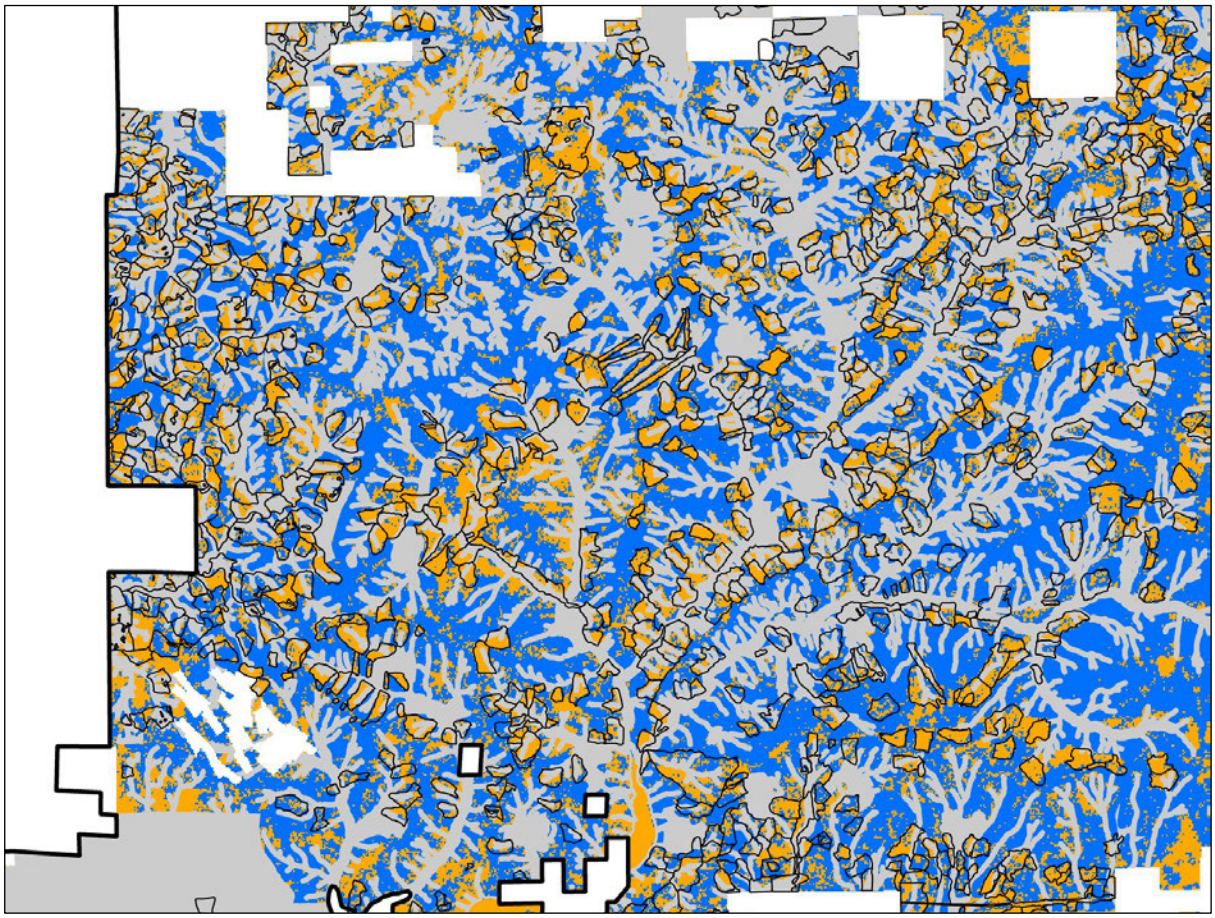

Figure 14. Landscape north of the McKenzie River on the Willamette National Forest highlighting the Older Forest (blue) and the Younger Forest (gold) in Matrix/AMA. Under the Proposed Action, the land suitable for timber production would be the Younger Forest shown here except for lands deemed unsuitable in the forest plans. Riparian Reserves and other reserves are shown in gray. Past timber sale boundaries are outlined in black.

With the withdrawal of the Older Forest from land suitable for timber production, the Younger Forest in Matrix/AMA that may be suited for timber production occupies a distinct minority of that landscape. Using the DEIS analysis, we estimated there are 190,000 acres of Younger Forest (gold in Figure 14) in Matrix/AMA on the Willamette National Forest. In addition, some of Younger Forest in Matrix/AMA may be allocated to other uses in the forest plan leaving the area suitable for timber production smaller than the golden patches shown on the map as we discuss below. This reality is much different from the sea of Matrix/AMA between islands of large reserves often displayed in the maps of the Northwest Plan (Figure 2).

Because the inventory analysis tends to overestimate age, as discussed in the previous section, the total amount of Younger Forest may be larger than estimated in the data supporting the DEIS. Thus, we checked whether some forest aged 80-120 was mapped as Older Forest. Reviewing timber sale maps for period 1905-1945 and updating them for wildfire and land exchanges since then, we estimate that 5,000 acres of older plantations may still exist in Matrix/AMA outside of Riparian Reserves. Further, as mentioned above, we estimate that about 25,000 acres in Matrix/AMA outside of Riparian Reserves

were established in 1905-1945 after severe wildfire. Aggregating these sources, we estimate a Matrix/AMA of Younger Forest of approximately 190,000 + 30,000 = 220,000 acres after withdrawal of the Older Forest, with more than 80% of those acres in plantations. For comparison, we estimated a total Matrix/AMA outside of Riparian Reserves of 470,000 acres for the NWFP.

Next, we estimate how much Matrix/AMA in Younger Forest is suitable for timber production. For the purpose of developing the NWFP, Johnson et al. (1993) estimated that the ratio of suitable land to Matrix/AMA was 0.72. What might it be now? On the one hand, much of Matrix/AMA in Younger Forest has been seen as eligible for clearcutting at some time in the past. On the other hand, the suitable land base will be more fragmented after the Older Forest withdrawals. All things considered, we will assume that the proportion suitable rises to .80 or approximately 176,000 acres suitable for timber production. That would imply that restricting the land suitable for timber production to Younger Forest would result in a 48% reduction in the suited land. Thus, we estimate that the land suitable for timber production covers 12% of the forested portion of the Willamette National Forest down from 23% before the Older Forest was removed.[14]

Table 2. Calculation of land suitable for timber production on the Willamette National Forest in the NWFP and the Proposed Action

	Matrix/AMA (acres)	Suitable (proportion)	Suitable (acres)
NWFP	470,000	.72	340,000
Proposed Action	220,000	.80	176,000

We have broad agreement across the previous and current Presidential Administrations that the Forest Service should bolster timber production on Moist Forests on these lands:

- the NEPA documents for the Proposed Action (completed under the Biden Administration): *[Use]ecological forestry methods [in young moist, Matrix stands] to bolster timber production while also conserving and retaining older trees and achieving other desired conditions (USFS 2024a, p. 2-17, USFS 2024b, p. A1-19-20)*
- the Trump Administration in Executive Order 14225 of March 1, 2025 titled "Immediate Expansion of American Timber Production:" called for the Chief of the United States Forest Service*…[to] issue new or updated guidance regarding tools to facilitate increased timber production and sound forest management, reduce time to deliver timber, and decrease timber supply uncertainty.*

Also, the proposed Action contains optimistic, reassuring statements that the important changes being recommended will improve both forest ecosystems and increase timber harvest. Those of us that have lived with the NWFP for a long time, though, have learned that the promised outcomes of a plan for

[14] Using the same methodology, land suitable for timber production will equal approximately 7% of all Moist Forests in the NWFP area.

federal forest management require careful scrutiny of the details in it. Too often, the promised timber harvest and timber production has been tripped up by countervailing goals, objectives, and requirements. We found the potential for that outcome in the Proposed Action.

The FACA Committee's recommendations, and the resulting Proposed Action, did not create some grand bargain where the Older Forest in the land base for timber production in Matrix/AMA (340,000-176,000 = 164,000 acres in Table 2) would be withdrawn in exchange for enabling timber production (both commercial thinning and variable retention harvest) in the land base that remained (the 176,000 acres in Table 2). Yes, the Older Forest would be withdrawn but very few of the requirements and qualifications that inhibit the Forest Service's ability to bolster timber production on the part of Matrix/AMA that is suited for that task have been removed, such as Survey and Management requirements, vague conservation responsibilities that make action difficult to justify, and the lack of distinction between the goals of the entire Matrix/AMA as compared to that of the suitable portion. In fact, new difficulties have been added, such as proposing a complex project planning process, ignoring the critical role that regeneration harvest plays in sustainable timber management, and placing tight limits on the age of trees in the suited land base that can be cut. The battle over timber production on the national forests will continue unabated, although on a shrunken playing field and in the face of additional barriers.

We describe the numerous existing and new difficulties in bolstering timber production in detail in Part II along with the suggested remedies.

The Proposed Action will not significantly increase timber harvest in LSRs

The DEIS for the NWFP Amendment states:

> "Under Alternatives B [the Proposed Action] and D for young moist forests in LSRs, stand age where forest management treatments can occur would be raised from 80 to 120 years old to extend opportunities to restore late-successional forest conditions in LSRs to meet the intent of the 1994 NWFP and purpose and need of the amendment. Approximately 824,000 additional acres could be eligible for forest management activities designed to improve and maintain late-successional and old-growth forest conditions within moist forest LSRs (Table 3-3)." USFS 2024a, p. 3-26).

That would more than double the LSR acres in Moist Forests that could potentially be thinned—a major increase! We also calculated that approximately 824,000 acres are in ages 80-120 in the LSRs based on the data underlying the Amendment (Table 1), although we found that almost one quarter of them were in Inventoried Roadless Areas. That does not seem consistent with the statements in the DEIS for the proposed Amendment that commercial timber harvest is generally prohibited in IRAs (USFS 2024a, p. 3-35).

A much bigger issue is that most forest classified in the LSRs as 80-120 years of age (outside of roadless areas) are less than 70 years of age as described in the previous section and are available now for thinning to enhance late-successional conditions. Certainly almost all plantations—the focus of LSR thinning—are less than 70 years of age.

Extending the age of thinning from 80 to 120 years in LSRs, by and large, will not add "additional acres" to thin nor will it have a substantial effect on the acres there that can be thinned over the next 10-15 years. Extending the LSR thinning age from 80 to 120 years could, though, enable a second or third thinning in LSR plantations 20-50 years into the future once these stands exceed 80 years of age.

As mentioned above, we found this same issue in the characterization of the age structure in LSRs on the other national forests in the Cascades from the Mt. Baker-Snoqualmie National Forest in the north to the Umpqua National Forest in the south.

Finally, we should add that some 80–120-year-old forest does occur in the LSRs of Moist Forests, where it is usually characterized as Older Forest in this analysis as described earlier. As an example, the Gifford Pinchot appears to have forest of that age in its LSRs from the large fires there in the early 1900s. However, the case for commercial thinning in the LSRs is keyed to the ability to treat plantations in ways that enhance late-successional conditions. Making the case for thinning a 100-year-old wild forest to enhance late-successional conditions is much harder. The Forest Service has rarely made the case recently for thinning in 80–120-year-old stands in Matrix/AMA where it does not have to justify that action based on contributing to development of late-successional forest!

Extending the maximum LSR thinning age will not significantly increase timber harvest in LSRs over the next decade.

Two conclusions from this analysis for the age-structure of the LSRs are:

1) Almost all acres outside of roadless areas in the LSRs identified as 80-120 years of age are actually less than 70 years of age and currently available for harvest to enhance late-successional conditions.
2) Extending the age of thinning from 80 to 120 years in LSRs, by and large, does not add "additional acres" to thin nor will it have a substantial effect on the acres that can be thinned over the next 10-15 years. Extending the LSR thinning age from 80 to 120 years could, though, enable a second or third thinning in LSR plantations 20-50 years into the future once these stands exceed 80 years of age.

Part II. Changes Needed in the Proposed Action to Bolster Timber Production on the Remaining Land Base Suitable for Timber Production

The LSR/Matrix structure was based on the concepts developed by the Interagency Scientific Committee (Thomas et al. 1990) to conserve the habitat of the northern spotted owl: provide a network of reserves (LSRs) with each large enough to allow a local population of spotted owls to persist and positioned close enough to each other that the owls could successfully move through the area (Matrix) between them (Figure 2). The Matrix would largely be managed for timber production, with rotation ages and practices that would enable successful movement of spotted owls between reserves (think of a forest in which half is at least 40 years of age at all times) (Johnson et al. 2023).

The Proposed Action results in a much different landscape plan for Moist Forest, where most area between the LSRs will be withdrawn from timber production (Figure 14) and the remaining land suitable for timber production is in relatively small and dispersed units that form a distinct minority of the

Matrix/AMA landscape. This make-up of the Matrix/AMA landscape prescribed in the Proposed Action should allow more certainty in forest management and more flexibility in reaching the goal of bolstering timber production. We review below how the Proposed Action should be revised to bolster timber production, decrease timber supply uncertainty, and produce a sustainable supply of wood products from the lands suitable for timber production in the national forests containing Moist Forests.

Recognize that ecological forestry on the national forests includes pursuit of economic goals on lands suitable for timber production

As explained by Franklin, Johnson, and Johnson in their book *Ecological Forest Management* (2018, Oregon State University Press, p. 11): "Ecological forestry can be useful over a wider set of goals and circumstances than ecological restoration. Ecological restoration, in its pure form, is an application of ecological forestry where ecological goals are the sole driver of actions. However, ecological forestry is a broader concept: It utilizes the ecological concepts of restoration but also builds in consideration of economic and social goals of both landowners and society." However, the DEIS describes the purpose of timber harvest primarily in terms of ecological restoration with economic contributions a byproduct such as in the statement: "Contribute to economic sustainability through restoration treatment of 660,000- 810,000 acres per decade (5,900 –13,500 MMBF sold)" (USFS, 2024a, p. 2-23).

A commitment to timber production and economic sustainability in Moist Forest requires more than ecological restoration in which a sequence of plantation thinnings will occur and the forest will then be left to develop into old growth. Rather, the commitment requires production of timber volumes and products useful to the local industry and community on a continuing basis from the land suitable for timber production—both plantations and forest that has not been previously harvested. It requires acknowledgement that these lands have economic goals too.

Give the lands devoted to sustainable timber production a name that matches their purpose such as Sustainable Timber Land Base

We are discussing the part of the land base suitable for timber production in Matrix/AMA less than 120 years of age—the nameless, leftovers outside of reserves and other withdrawals. The title does not highlight the land's purpose like "Late Successional Reserve." These lands should be called something like "Sustainable Timber Land Base"—a name that helps describe their purpose of providing sustainable timber production and is something people can rally around and defend. We will use that name here.

Recognize a specific Desired Condition for the Sustainable Timber Land Base

The objective stated for the Younger Forest Matrix/AMA is to use "ecological forestry methods to bolster timber production while also conserving and retaining older trees and achieving other desired conditions" (USFS 2024b, p. A1-19-20). Toward that end, it is vital that timber production through ecological forestry be highlighted as the primary purpose for the relatively small Sustainable Timber Land Base in the larger Matrix/AMA landscape (the area between major reserves), just as the primary purpose of Late Successional Reserves is to maintain and restore late successional conditions.

The Desired Condition for Younger Forest in Matrix/AMA is stated as: "Young forest stands support a predictable supply of timber, non-timber products, and other economic opportunities to support long-term sustainability of communities" (USFS 2024b, p. A1-19).

That should be augmented by a more specific Desired Condition for the portion of Matrix/AMA that is in the Sustainable Timber Land Base such as: *The Desired Condition for the Sustainable Timber Land Base is management for timber production using ecological forestry to provide a stable supply of wood products over time.*

Remove Survey and Manage requirements

Survey and Manage requirements were a late addition to the development of the NWFP. They were intended for species associated with old-growth forests about which there was considerable uncertainty as to whether the NWFP would provide sufficient habitat.

Most of these species were invertebrates and cryptogams, but a few were vertebrates (a number of salamander species and the red tree vole) and vascular plants. In general, these species were not known to be in trouble; rather too little was known about them to assess the adequacy of their protection under the NWFP. Therefore, scientists and resource specialists developed various kinds of surveys under the NWFP to develop a better understanding of them. One type of survey had to be done on timber harvest sites before ground-disturbing activities were undertaken and buffers implemented to protect the sought-after species when they were found. For species like the red tree vole, which could require a buffer of several acres for each red tree vole nest located, that requirement could greatly affect timber sale viability (Johnson et al. 2023, p. 224-230).

The Proposed Action in the DEIS generally continues the Survey and Manage Requirements as do the alternatives to it considered in the DEIS. This requirement should be discontinued (as recommended by Franklin et al. (2025) and, instead, require special attention where there is evidence that the NWFP as amended will not support particular species. Two different lines of thought support this recommendation.

First, the purpose of Survey and Manage was to help protect species associated with old-growth forests. Under the Proposed Action in the DEIS, old-growth forests will be protected; hence, Survey and Manage, which was focused on old-growth species, is no longer indicated. The default assumption should be that these species are protected under the amended NWFP unless sufficient evidence is developed that shows they are still at risk.

Second, the NWFP Amendment is being developed under the 2012 Planning Rule that guides interpretation of the National Forest Management Act and replaces the 1982 Planning Rule under which the NWFP was developed. The 2012 Rule takes a different approach to species protection than the 1982 Rule. It relies first on ecosystem measures (restore and maintain ecological integrity) and then turns to species-specific viability measures only when the responsible official finds that the ecosystem measures are inadequate (USDA 2012, 36 C.F.R. 219.9). In some sense, the burden of proof has shifted—in the 1982 Rule, the burden of proof about the adequacy of protection was on those who want to take action, while in the 2012 Rule it is on those who claim that more protection is needed.

Both lines of reasoning support the elimination of Survey and Manage and substituting the requirements in the 2012 Planning Rule.

Emphasize that management of the Sustainable Timber Land Base with ecological forestry is generally sufficient to meet ecosystem responsibilities

Part of the Matrix objective calls for "achieving other desired conditions" (USFS 2024b, p. A1-19-20). Those "other desired conditions" can hoist quite a load on the back of the small Sustainable Timber Land Base to the detriment of timber production.

Part of the problem is that the DEIS does not sufficiently acknowledge that the area to be managed for timber production under the Proposed Action is now a small dispersed area embedded in a Matrix/AMA landscape that is dominated by Older Forest and Riparian Reserves and a variety of other small reserves: the Sustainable Timber Land Base is only a minor portion of that landscape—perhaps 25-30%. Yet the DEIS continues to load a significant and somewhat undefined set of responsibilities on this relatively small and scattered area as if more is needed from it than the application of ecological forestry with retention standards.

Consider the first paragraph "Background" in the portion of the DEIS that covers desired conditions, objectives, standards, and guidelines for Moist Forest Matrix and our rewrite below (changes in italics):

> "Moist forest stands on Matrix lands can serve multiple purposes, with one emphasis being on the production of timber and other commodities. Forests in the Matrix function as connectivity between Late-Successional Reserves and provide habitat for a variety of organisms associated with both late-successional and younger forests. Plan direction for the Matrix is designed to provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees. The Matrix will also add ecological diversity by providing early-successional habitat." (USFS 2024b, p. A1-18).
>
> It should say:
>
> *The Matrix/AMA landscape, the area between large reserves, is covered primarily by Older Forest, Riparian Reserves, and other small reserves. The Sustainable Timber Land Base within that landscape, which has timber production as its primary purpose, covers only a small proportion of this landscape mostly in dispersed patches that were established after past harvest. Forests in the Matrix/AMA landscape, as a whole,* function as connectivity between Late-Successional Reserves and provide habitat for a variety of organisms associated with both late-successional and younger forests. *Plan direction for the Sustainable Timber Land Base, in particular,* is designed to provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees. This land base will also add ecological diversity by providing early-successional habitat. *The Sustainable Timber Land Base managed with ecological forestry , should be sufficient to provide its contribution to supporting these functions unless evidence is provided that shows that management is inadequate.*

Also “late successional” should be dropped from the phrase about providing for a variety of organisms as we have done here. Habitat for those organisms should be provided by the Older Forest and Riparian Reserves that dominate the Matrix/AMA landscape.

Greatly expand the description of the timber harvest projections in the Proposed Action

The DEIS describes those implications in a few paragraphs out of tens of thousands of words in the document, with the key phase being that the Proposed Action should result in between 5,900 and 13,500 MMBF sold per decade (USFS, 2024a, p. 2-23). This mightily important result appears like magic without any explanation of the assumptions underlying the estimated range in sales, the breakdown of Moist and Dry Forest contributions, and the different types of silviculture employed. How has the likelihood of high severity fire been dealt with? What causes such a wide range in projected timber sales? How is conservation of the northern spotted owl addressed? Is there dependence on regeneration harvest to maintain sustainable harvest levels in Moist Forests? What kinds of silviculture are relied upon for the projected timber sales in the first decade? Much more explanation is needed along with a description of how the analysis dealt with the overestimates of stand age (described earlier) to help ensure that the analysis does not inflate near-term projected sale levels.

Build on the Forest Service’s expertise and experience in project guidance for Moist Forest harvests

As we understand it, the NWFP Amendment will amend the Forest Plans and then move to project planning for implementation—as was done in 1993 in creation of the NWFP—while jumping over the forest-by-forest approach being used elsewhere in the national forest system. That is understandable given that none of the national forests within the NWFP area have successfully developed and implemented forest plans through the mandated forest planning process in the 50 years since passage of the National Forest Management Act.

The Forest Plans will guide project planning as follows (USFS 2024b, p. A1-16-17):

> “(FORSTW-ALL-GDL-03-B): Site-specific planning and implementation of forest stewardship activities should be ecologically appropriate for both the plant association (at a finer, stand scale) and vegetation zones and subzones (at broader scale) within which the project will occur. To promote ecological integrity and sustainability of forest ecosystems, and to determine what treatments might be appropriate for stands within the project area, considering the following factors as feasible:
>
> > Landscape context —the extent, size, shape, and configuration of patches of different stand seral stages, characteristic of the vegetation types at broad scale.
> >
> > Historical disturbance regimes and future disturbance regimes, framed by vegetation zones and subzones.
> >
> > Desired conditions at multiple scales, considering the context of stands within landscapes.
> >
> > Scientific information on ecological departure or fire-return interval departure at multiple scales, including Forest Service regional ecology program data products.

Co-stewardship agreements with Tribes and tribal cultural uses.

Indigenous Knowledge shared about the area.

Collaboration with scientists, interested Tribes, other agencies, and stakeholder groups.

Differences in how forests are expected to respond to treatments.

The presence of current or historical non-forested areas or unique forest and non-forest plant communities.

The historical presence of hardwood stands, such as madrone, aspen, and oak woodlands.

Rare or sensitive habitats, flora, and/or fauna including designated critical habitat for federally listed species.

History of land management, including stewardship by Indigenous communities."

This approach calls for full-scale landscape planning as if nothing has been decided and timber production is not of interest. *In Moist Forests this proposed process will largely defeat the goal of bolstering timber production on the Sustainable Timber Land Base in the foreseeable future through mandating a complicated new planning process—this time at the project level!*

With the Proposed Action, over 85% of Moist Forest on the Willamette National Forest and Moist Forests in general, would be in reserves and withdrawals, some separate from the Sustainable Timber Land Base and some interwoven with it. In addition, logical sale boundaries for most harvest units in that base are already determined as they are bounded by Riparian Reserves or Older Forest (Figure 14). Surely this is the most detailed landscape plan for the national forests ever completed. The die has been cast—it is time to get on with implementation with a project planning process for Moist Forests that recognizes all that has been decided.

In terms of the details of silvicultural prescriptions the Forest Service has much recent experience in developing project plans for Moist Forests under the NFMA, especially in the plantations that make up the vast majority of the Sustainable Timber Land Base (USFS 2020, 2025a, 2025b). They have shown an increasing emphasis on prescriptions that create resistant, resilient and adaptive forests through increasing species diversity and horizontal and vertical complexity and that approach should be continued.

Beyond that, the Amendment rightly highlights the need to recognize the rights, goals, and stewardship knowledge of Tribes in project decisions through co-stewardship. As two people who have represented the Natural Resource Department of the Klamath Tribes in numerous projects on the Fremont-Winema National Forest, we understand that success here for both the Forest Service and Tribes will take considerable learning and experimentation on the best way to proceed. Fundamentally, the Amendment calls for the Forest Service to share power in making decisions on the national forests without giving up its fundamental authority over management of these lands. That will take patience and understanding

on all sides. While we cannot totally foretell how that process may proceed, we are convinced that a complicated set of landscape planning requirements would not be helpful.

Recognize the critical role of variable retention harvest in maintaining sustainable timber production in Moist Forests[15]

The Proposed Action calls for management of the Sustainable Timber Land Base in Moist Forests under the principles of ecological forestry, an approach that manages forests for both ecological and economic benefits.

Variable retention harvest (VRH) is an ecological forestry practice that plays a crucial role in maintaining forest processes and also providing a sustained yield of timber over time. From an economic standpoint, VRH enables the harvest of more of the valuable trees in the stand and results in lower costs with higher volumes per acre than thinning. It also contributes to greater flexibility in timber harvest scheduling, which helps avoid timber supply bottlenecks. Finally, it helps ensure high levels of economic productivity over time.

From an ecological standpoint, VRH sustains many important functions of forest ecosystems called for in the Amendment such as: "dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees" (USFS 2024b, p. A1-18). VRH also creates openings in the forest where early successional species can thrive for a time and provide a variety of shrubs and forbs that produce flowers for pollinators and a multitude of fruits and nuts.

Dr. Jerry Franklin emphasizes the importance of creating openings in sustaining forests and their benefits:[16]

> "Creation of significant open areas is an essential element in sustainable management of the forest ecosystems of the Douglas-fir region. These are not clearcuts because significant structural elements are retained even in the harvested portions of a variable-retention harvest. These predominantly open areas are critical to allowing the development of early successional ecosystems, which are the most biodiverse of forest stages in the Douglas-fir region. The openings allow for the development of very food-rich communities of herbs and shrubs, which provide essential habitat to sustain a very large array of native animal species, from slugs to elk and butterflies to birds. The openings also provide for major additions of nitrogen to the soil and enrichment of the soil biota."
>
> "These predominantly open areas are essential to sustain the flora and fauna of our forest landscapes and are NOT provided by thinning regimes, even those that create gaps in the thinned stand. Small openings within predominantly tree-dominated forests do not provide the

[15] Under the 2012 Planning Rule, maintenance and restoration of ecological integrity is a foundational goal in national forest planning, with the range of natural variability being an important measure as to whether that goal has been met. The amount of VRH allowed could be limited by the ranges established if that measure is applied in implementing the amended NFWP.

[16] Personal communication from Jerry Franklin, March 30, 2026.

critical conditions in terms of time or spatial scale. An ecologically credible management regime must include these predominantly open areas."

"These areas also provide the environment we need for the successful regeneration of a new generation of Douglas-fir and other shade-intolerant species, such as the pines. This is critical to maintaining these species and providing a sustained flow of timber volume from their harvest. It is not credible to suggest that such species can be successfully sustained in the managed forests by planting them in thinned stands and certainly not as the primary strategy for sustaining critical crop species, such as Douglas-fir. The regenerated managed forests need to have a variety of conifer and hardwood species and this requires openings."

"In summary, significant openings are required to both sustain the early successional flora, fauna, and functional processes, such as nitrogen fixation and for regeneration of a new species-rich forest ecosystem. Retaining significant tree, snag, and log structures plays a critical part in creating these openings in order to provide essential habitat for the biota. A strategy based on thinning alone will not provide for either early successional biota and processes or establishment of a species-rich new forest."

Variable retention harvest as proposed by Dr. Jerry Franklin will replace simply structured, single-species plantations with forests that are structurally complex, biologically diverse, and managed for multiple values, including wood production. Variable retention harvest would retain many trees (often one-third of the forest) including riparian buffers and other reserves that occur within the harvest area (Figure 15).[17] (See Appendix A by Dr. Franklin for more detail).

[17] Such a level of retention could generally be achieved under Proposed Action without the need for additional retention beyond the 15% required in the NWFP.

Figure 15. Oblique and overhead views of a simulation of a generic variable-retention regeneration harvest (VRRH) proposed for Younger Forest. The prescription provides for approximately 1/3 of the forest, including riparian buffers within the harvest unit, to be retained in aggregates of various sizes distributed throughout the management unit and approximately 2/3 to be harvested with retention of scattered individual and clustered trees, snags, and logs. Replanting would be done with a mixture of species and without use of herbicides except to control invasive species. Through this process, simply structured, single-species plantations would be replaced with forests that are structurally complex, biologically diverse, and managed for wood production and other values. Such managed forests would have greater resistance and resilience to disturbances, such as fire, and be more adaptive to climate change. The selected retention would be permanent for the present rotation and reassessed at each harvest cycle. (Courtesy of Laura Hardin)

Unfortunately, recognition of the importance of variable retention harvest, the lynchpin of forest management in Moist Forests, is absent from the FACA recommendations and the DEIS. We could find only one mention of variable retention harvest in each document:

- "The committee expects that the Forest Service will retain any individual trees estimated to have established prior to the year 1905 that may be found in stands that originated between 1905 and the present day. For example, these retained trees would be used to meet green tree retention goals in variable retention harvests" (Federal Advisory Committee 2024, p. 38).
- "A number of ongoing questions require the implementation of long-term experiments, more geographic diversity, use of applicable ecological comparisons, and implementing harvest methods, timing, equipment, and variable retention harvesting that reduce negative efforts are needed" (USFS 2024a, p. 3-32).

In other words, the FACA Report discusses variable retention harvest only in terms of saving older trees if it is used, and the DEIS mentions it only in terms of needing long-term experiments to understand how to reduce its "negative effects," even though the section on Management Standards in the DEIS appendix

acknowledges that "Young stands are a priority for active management, including variable density thinning and variable retention harvesting" (USFS 2024b, p. A1-21). On the other hand, the importance of commercial thinning in these forests is highlighted throughout the documents. That imbalance is truly unfortunate.

Without a strong commitment to variable retention harvest (VRH) in providing a sustainable timber harvest, the goal of bolstering timber production in the Sustainable Timber Land Base cannot be met in Moist Forests. To overcome that problem in Moist Forests, the Proposed Action should:

1) Acknowledge that VRH is essential to bolstering timber production through time in Moist Forests and describe desired actions in the Sustainable Timber Land Base in terms of both variable retention thinning and VRH.
2) Describe the process and outcome of the harvest projection system used to project timber sale levels for the Proposed Action, including the role of VRH and assumed rates of VRH harvest.
3) Highlight the very small landscape disturbance rate of VRH per decade. Applying VRH to 1/8 of the Sustainable Timber Land Base on the Willamette National Forest per decade (the equivalent of an 80-year rotation) would result in about 22,000 acres of VRH per decade or about 3% of the Matrix/AMA landscape and 1.5% of the Willamette National Forest as a whole receiving a VRH *per decade*.
4) Recognize the critical role that opening creation, such as is accomplished through VRH, can have in providing foods and materials for Tribal communities and ecosystem diversity. As an example, on the forest lands owned and managed by the Confederated Tribes of Grand Ronde in western Oregon, regeneration harvests leave 6-12 trees/acre in a way that tries to mimic natural disturbances, site preparation relies on prescribed fire rather than herbicides, and culturally significant species are emphasized and/or restored in the openings with the help of the Tribes' Native Plant Materials Program (Natural Resource Department, Confederated Tribes of Grand Ronde, 2025).
5) Highlight the importance of management of the Sustainable Timber Land Base (including VRH) to illustrate an alternative way to manage Moist Forests for timber production as compared to classical plantation management.
6) Utilize VRH to help meet the new Congressional mandates for timber harvest (Appendix B). VRH provides a higher volume per acre than thinning and will make the mandates easier to meet.

The Forest Service has undertaken very little VRH over the last 20 years so its use will create somewhat of a shock to the social ecosystem in which it operates. To ease into this silvicultural practice, we recommend that VRH first be applied to stands in the Sustainable Timber Land Base that contain very little old growth. If individual old-growth trees are in the stand, it is important that they be clearly marked for retention, so they do not become a photo showing a group of well-meaning citizens surrounding a beautiful old-growth tree to protect it. The ecological effects of VRH are profoundly different from clearcutting, but they do share the idea of creating openings and their differences may seem subtle to some

people. That is another reason to try it first where people can see that irreplaceable old trees will not be lost.

Set quantitative treatment objectives for both commercial thinning and variable retention harvest

The Proposed Action sets an objective for the Sustainable Timber Land Base as follows: "Within 10 years of amendment approval, treat at least one tenth . . . of young stands (established after 1905) in moist forest Matrix lands across the Northwest Forest Plan area" (USFS 2024b, p. A1-19).

With a Sustainable Timber Land Base area (excluding Riparian Reserves) of approximately 176,000 acres on the Willamette National Forest, a treatment rate of 10% per decade would imply treating at least 17,600 acres/decade or 1760 acres/year. We assume that the "treatments" here would be plantation thinning as commercial thinning is the harvest highlighted in the DEIS. Utilizing a thinning harvest volume of 13-15 MBF/acre from the Lowell Country Project (USFS 2020), we estimate a total harvest volume of approximately 23-26 MMBF/year. That does not seem like "bolstering timber production" to us. The minimum treatment objective should be increased.

The treatment objective should set quantitative objectives for both commercial thinning and VRH. Further, we recommend that the forest established from 1905-1945 (the forest currently 80–120-years of age) be the location of the VRH. These recommendations are based on two considerations:

- Most plantations are now at a prime age for a commercial thinning.
- It is important to establish that VRH will be part of forest management in Moist Forests and also to provide high quality wood products to the forest industry.

Whatever timber harvest level is proposed, actions over the next few decades in Matrix/AMA should include a mixture of thinning and variable retention harvest, with the thinning concentrated in the plantations and variable retention harvest concentrated in the 80–120-year-old stands. This approach will provide a mixture of size and quality classes for the local sawmills and establish the pattern of growing stands until maturity and then conducting a variable retention harvest and moving on to the next rotation.

However, we must add that if the legal/political/social environment does not allow harvest in the forest established from 1905-1945, it will be hard to argue that the Proposed Action has successfully identified the forest that can be managed for timber production.

Revise or reinterpret the requirements for calculating the culmination of mean annual increment in setting minimum rotation age

The "culmination clause" in the NFMA sets the minimum age for regeneration harvest for certain stands as described in the 2012 Planning Rule (USDA 2012, §219.11 (d)(7)): "The regeneration harvest of even-aged stands of trees is limited to stands that generally have reached the culmination of mean annual increment (CMAI) of growth. This requirement would apply only to regeneration harvest of even-aged stands on lands identified as suited for timber production and where timber production is the primary purpose for the harvest."

Research studies have shown that commercial thinning (such as the thinning done by the Forest Service in its Younger Forest) can greatly lengthen time to reach CMAI (Curtis and Marshall (1993), Curtis (1995), Tappeiner et al. (2022)) and thus greatly lengthen rotation age. That can potentially create supply bottlenecks in the flow of harvest volume from the Younger Forest, delay desired opening creation, and prevent the grouping of forest patches to simulate the larger disturbances of the past (Figure 16).

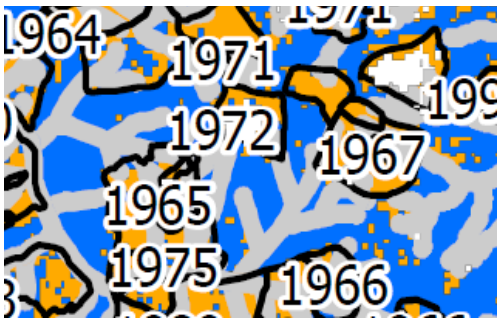

Figure 16. Matrix/AMA landscape north of the McKenzie River on the Willamette National Forest highlighting Younger Forest (golden) in the Sustainable Timber Land Base that might be grouped to make the footprint of a variable retention harvest more representative of past high-severity wildfires.

Enabling harvest at an age earlier than that of CMAI could be achieved in at least one of two ways:

1) Change the USFS Planning Directives (USFS 2015, p. 29) to enable calculation of CMAI for the unthined stand whether thinning occurs or not.

2) Utilize the clause in the 2012 Planning Rule that allows exceptions to the culmination requirement if such harvest is consistent with the other plan components of the land management plan (USDA 2012, §219.11 (d)(7)). Those exceptions are described as follows (USFS 2015, p. 30): "A plan may provide for exceptions to the culmination of mean annual increment requirement for expected situations where even-aged regeneration harvest at less than culmination of mean annual increment would contribute to the plan's desired conditions or objectives consistent with other plan components."

Focus older tree retention in the Sustainable Timber Land Base on large, old-growth trees

Younger Forest (established after 1905) occasionally contains old-growth trees, and it is important to retain them. However, retaining them must not interfere with the harvest of the Younger Forest. The Proposed Action sets a guideline for retaining older trees that states: "Within young stands that originated after 1905, individual trees established prior to this date should be retained to meet variable retention expectations, except for operational purposes and tribal co-stewardship and cultural use." (USFS 2024b, p. A1-20).

Unfortunately, that approach could interfere with the harvest of Younger Forest in the 80–120-year age class (established between 1905 and 1945) in the Sustainable Timber Land Base. While the acres in question are smaller than previously estimated in the Amendment, as noted above, they can still play an important role in timber harvest in the first few decades. These stands often contain a mixture of ages due to slight differences in establishment dates. Reliably distinguishing between a 115-year-old tree and

a 121-year-old tree based on visual characteristics is very difficult, making harvest of the upper age class of the Younger Forest problematic and a potential source of endless argument.

Rather, the Forest Service should follow the approach taken by BLM in its 2016 Plan that replaced the NWFP for its lands in which the agency set the establishment date (and diameter) so retention of large, old-growth trees does not interfere with harvest of the younger trees in a stand: Retain conifers established prior to 1850 and at least 36" in diameter and hardwoods established prior to 1850 and hardwoods at least 24 inches in diameter (Johnson et al. 2023, p. 318). Then large, old growth trees—the major source of scientific and social concern—will be retained and identification made relatively easy.

Provide policy guidance for wildfire salvage in Matrix/AMA that reflects the Desired Condition

As many have pointed out, the amount of high-severity fire will likely increase in Moist Forests in the future. Thus, it is important that clear guidance be established in the NWFP Amendment on what is permitted and desired in post-fire salvage. That is especially true, since as stated in the Federal Advisory Committee Report (2024, p. 40) "Post-fire salvage logging of burned forest when promptly implemented can help capture the economic value of dead trees and support local economies."

The Proposed Action allows salvage across the entire Matrix/AMA reflecting the recommendation in the Federal Advisory Committee Report (2024, p. 24) that allows "salvage logging in Matrix and available AMAs regardless of age class and forest type." General guidance on salvage in Moist Forests is given in the Proposed Action (USFS 2024b, p. A1-20):

> "In moist forest Matrix, post-disturbance salvage should contribute to achieving multiple desired conditions including timber harvest while retaining critical biological legacies. In post-disturbance settings, management activities in moist forest stands within Matrix should retain all live trees, as well as the largest, oldest dead trees as snags."

Further, the FACA recommended a "salvage with retention" approach (Federal Advisory Committee Report, p. 40):

> "The Committee recommends permitting salvage with retention of biological legacy features (e.g., large snags and down wood) within Matrix and AMA LUAs regardless of stand age. All live trees should be retained, as well as snags and the largest, oldest trees to meet retention requirements. Salvage should be designed to serve multiple objectives including timber production while retaining critical biological legacies ("salvage with retention")."

We take a "salvage with retention" approach in these recommendations.

<u>The Proposed Action should develop separate policy guidance on wildfire salvage for the Sustainable Timber Land Base and the rest of Matrix/AMA, reflecting their different Desired Conditions</u>.

As described in this report, we recommend that: *The Desired Condition for the Sustainable Timber Land Base is management for timber production using ecological forestry to provide a stable supply of wood products over time.* Under this Desired Condition, salvage after high-severity fire should be conducted much like a variable retention harvest. Here, though, all remaining live trees would be kept along with

large old-growth dead trees, with “large old-growth trees” defined in the same way as we recommended earlier for green Matrix/AMA harvest.

The rest of Matrix/AMA includes Younger Forest unsuitable for timber production and Older Forest. Younger Forest can be declared unsuitable for timber production for a variety of reasons including its allocation in national forest plans to uses incompatible with timber production. Thus, the issue of whether fire salvage, in one form or other, is compatible with their overall goals and Desired Condition will be quite specific to the lands in question.

The guidance on wildfire salvage in Older Forest is more complicated. The Proposed Action specifies that timber harvest in Older Forest established before 1825 (old-growth forest) shall occur only to provide for tribal co-stewardship and cultural use or to reduce wildfire risk to communities and infrastructure and that timber harvest in Older Forest established in 1825-1905 (mature forest) should occur only to maintain and restore ecological integrity including reducing risk of fire to adjacent forest stands; developing late-structurally complex late-habitat to support federally listed species or other species dependent on late-successional characteristics; or meeting tribal cultural use priorities (USFS 2024b, p. A1-20). We presume that wildfire salvage would have the same goals/Desired Conditions. However, developing guidance to achieve those goals and conditions is beyond our effort here.

Work with the US Fish and Wildlife Service to establish the rates and types of harvest that can occur within critical habitat

The establishment of scientifically credible conservation strategies for the northern spotted owl has dominated development and implementation of the NWFP up to the current day. The size and management of the Sustainable Timber Land Base for timber production that is compatible with meeting Endangered Species Act (ESA) responsibilities remains perhaps the biggest issue relative to the magnitude and stability of sustainable timber harvests.

The LSR/Matrix structure was based on the concepts developed by the Interagency Scientific Committee (Thomas et al. 1990) to conserve the habitat of the northern spotted owl: provide a network of reserves (LSRs) with each LSR large enough to allow a local population of spotted owls to persist and positioned close enough to each other so that owls could successfully move through the area (Matrix) between them (Figure 2). The Matrix/AMA would largely be managed for timber production, with rotation ages and practices that would enable successful movement of spotted owls between reserves (Johnson et al. 2023).

At the time of the NWFP’s adoption, the USFWS considered the NWFP to be the federal contribution to survival and recovery of the northern spotted owl and other listed species associated with old-growth forests throughout the spotted owl’s range. The agency concluded that the reserve system (centered on the LSRs) and Matrix/AMA practices, including VRH of Older Forest, were sufficient to enable survival and recovery of the owl (USFWS 1994). However, it did not immediately revise critical habitat to reflect that conclusion, which resulted in critical habitat covering some Matrix/AMA and limiting the logging of Older Forest there (Johnson et al. 2023, p. 273-274).

After President Obama's election in 2008, the USFWS revised the recovery plan and the critical habitat designation for the northern spotted owl in 2011 and 2012, respectively (USFWS 2011, USFWS 2012). In many ways, these two actions, and the analyses behind them, constituted the sixth science assessment of federal forest management that would be compatible with conservation of species and ecosystems in the owl's range. The USFWS's Portland office utilized staff scientists and professionals, a panel of outside owl experts, and sophisticated modeling algorithms in this effort (Johnson et al. 2023, p. 310-311).

With the owl's increasingly precarious status, the USFWS moved substantially beyond the NWFP in terms of recommendations and restrictions on federal forest management activities as well as the amount of forest considered important to owl recovery. The *Revised Recovery Plan* recommended, among other things, that the Forest Service and BLM conserve spotted owl activity centers and associated high-value spotted owl habitat, regardless of whether the sites were currently occupied by spotted owls (Recovery Action 10); conserve structurally complex, multilayered conifer forests across the landscape (Recovery Action 32); and conserve and restore large trees and snags after wildfire in LSRs (Recovery Action 12) (USFWS 2011).

A year later in 2012, the USFWS expanded the amount of critical habitat for the spotted owl and included significant amounts of Matrix/AMA after agency concluded that NWFP reserves and standards would not be sufficient to recover the owl. Conservation of more habitat would be needed (USFWS 2012). Based on the 2012 designation, critical habitat covers almost half of the Matrix/AMA landscape across Moist Forests and much of the Matrix/AMA landscape on the Willamette National Forest (Figure 17).

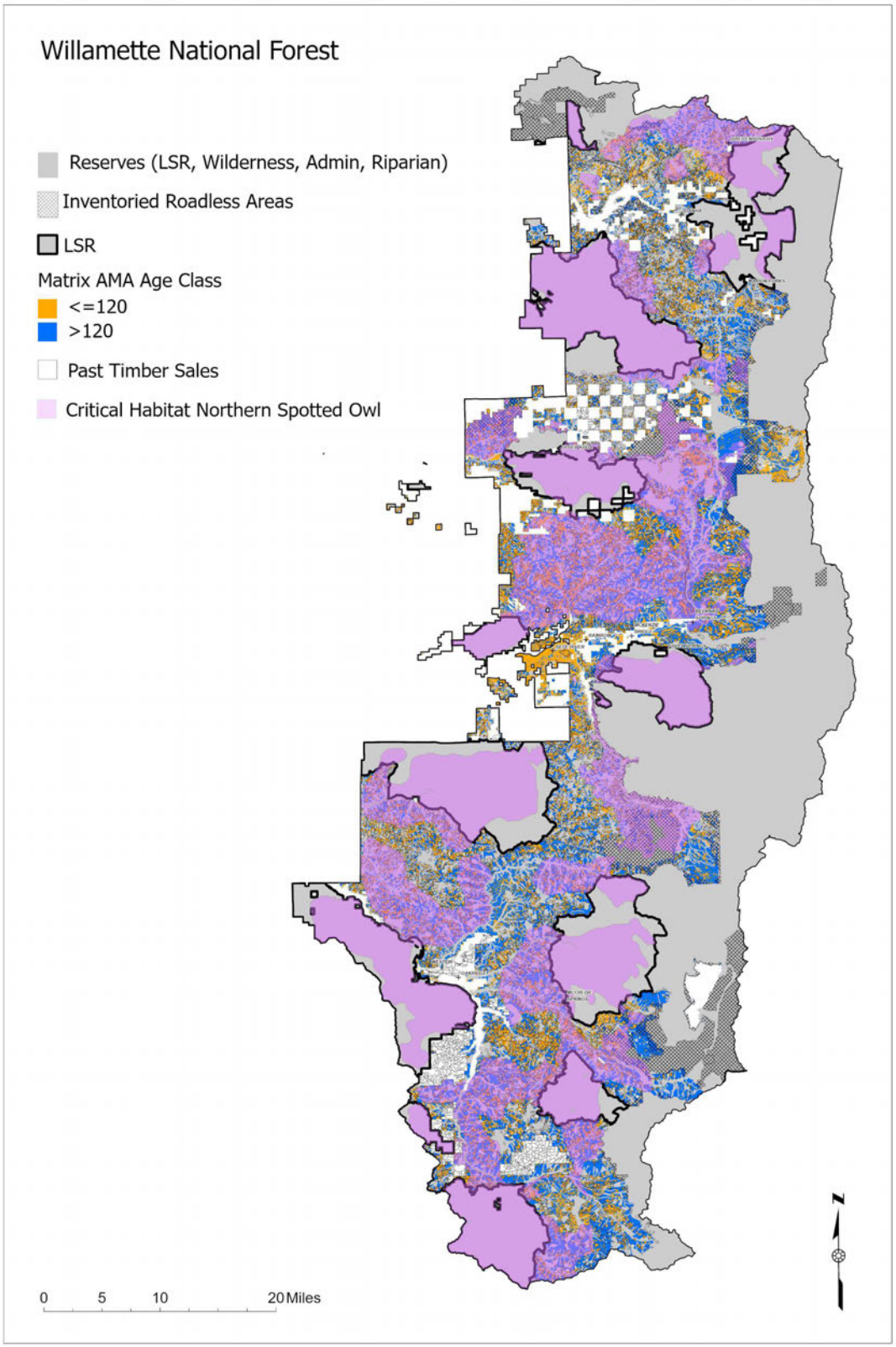

Figure 17. Critical habitat for the northern spotted owl on the Willamette National Forest.

Also, the Forest Service in 2012 adopted a Planning Rule in which it no longer develops conservation plans for threatened and endangered species to ensure habitat for viable populations as it did under the 1982 Planning Rule. Rather, the 2012 Planning Rule requires that the forest plan provides "ecological conditions [that] contribute to the recovery of federally listed threatened and endangered species" (USDA 2012, 36 C.F.R. 219.9). Toward that end, the DEIS calls for the Forest Service to "Work with the USFWS to promote long-term recovery of the northern spotted owl.) (USDA 2024b, p. A1-15)

The Forest Service should work with the USFWS to set maximum rates of VRH and thinning within critical habitat that would meet the agency's obligation for "ecological conditions [that] contribute to the recovery of federally listed threatened and endangered species." Relative to the use of VRH, setting a maximum rate could go a long way toward reassuring the agencies involved and the public that VRH would cover a very modest potion of critical habitat in a decade.

USFWS's modeling underlying its identification of critical habitat for the spotted owl also showed that more was needed than expanded habitat protection—barred owl control would be essential. While this conclusion was tentative given the limited amount of scientific work on interactions of the two owls by 2012 when the modeling was done, the analysis solidified USFWS understanding that competition between spotted owls and barred owls could sink any chance of recovery of the northern spotted owl. (USFWS 2012).

Not surprisingly, given those results, USFWS conducted experiments on barred owl control throughout the NWFP area over the last decade and concluded that such an approach did reduce barred owl numbers and, in some cases, enabled northern spotted owls to return (USFWS 2019). Then, the agency published a FEIS and Record of Decision that called for culling many barred owls in the NWFP area over the next 20 years (USFWS 2024).

How might these findings and actions by USFWS affect timber harvest in the Sustainable Timber Land Base? While the pathway through the spotted owl consultation process is not fully defined, we have some indication from the forest plan BLM developed for the O&C lands when it parted ways with the NWFP in 2016 (BLM 2016 p. 24):

> "In their biological opinion on the Proposed RMP, the US Fish and Wildlife Service concluded, 'In aggregate, the [Proposed RMP] provides for the net conservation and recovery of the spotted owl on BLM lands over the life of the plan by contributing to barred owl management and by minimizing adverse impacts associated with timber harvest and other activities. The positive contributions of barred owl management offset the adverse impacts of the [Proposed RMP] to spotted owls and enable long-term spotted owl recovery on BLM lands.'"

Contributing to barred owl management will most likely be needed in an amended NWFP to enable the Forest Service to bolster timber production in Moist Forests.

Part III. Recommendations for Broadening the Management of Plantations in LSRs and Riparian Reserves

In comments submitted on the DEIS (Franklin et al. 2025), we supported Dr. Jerry Franklin in calling for removal of Older Forest in Matrix/AMA from the Sustainable Timber Land Base but also argued for compensation in some way for the loss in the land base that will result. Thus, we joined Franklin in proposing the reassignment of some plantations in the LSRs to the Sustainable Timber Land Base as compensation for removing Older Forest from that land base. However, as we understand it, changes under the amendment process are limited to those that can be made within the existing land allocation boundaries, so as not to edge into a full-scale plan revision that could take a number of years more to complete. We have tried to honor that limitation in our recommendations here.

Make timber harvest a secondary purpose of plantations in the LSRs

The spotted owl management strategy first developed in 1989, assumed that the area between owl reserves (now LSRs) would generally be managed for timber production. With the Proposed Action, reserves and withdrawals will dominate the area between the LSRs too. Thus, there may be more flexibility in managing the LSRs themselves.

To help compensate for the removal of Older Forest from the Sustainable Timber Land Base, we suggest adding timber harvest as a secondary purpose of plantations in the LSRs, outside of Riparian Reserves (Figure 18). This should give added impetus to, and expectation for, the Forest Service to produce timber volume from these plantations consistent with the primary purpose of the LSRs.

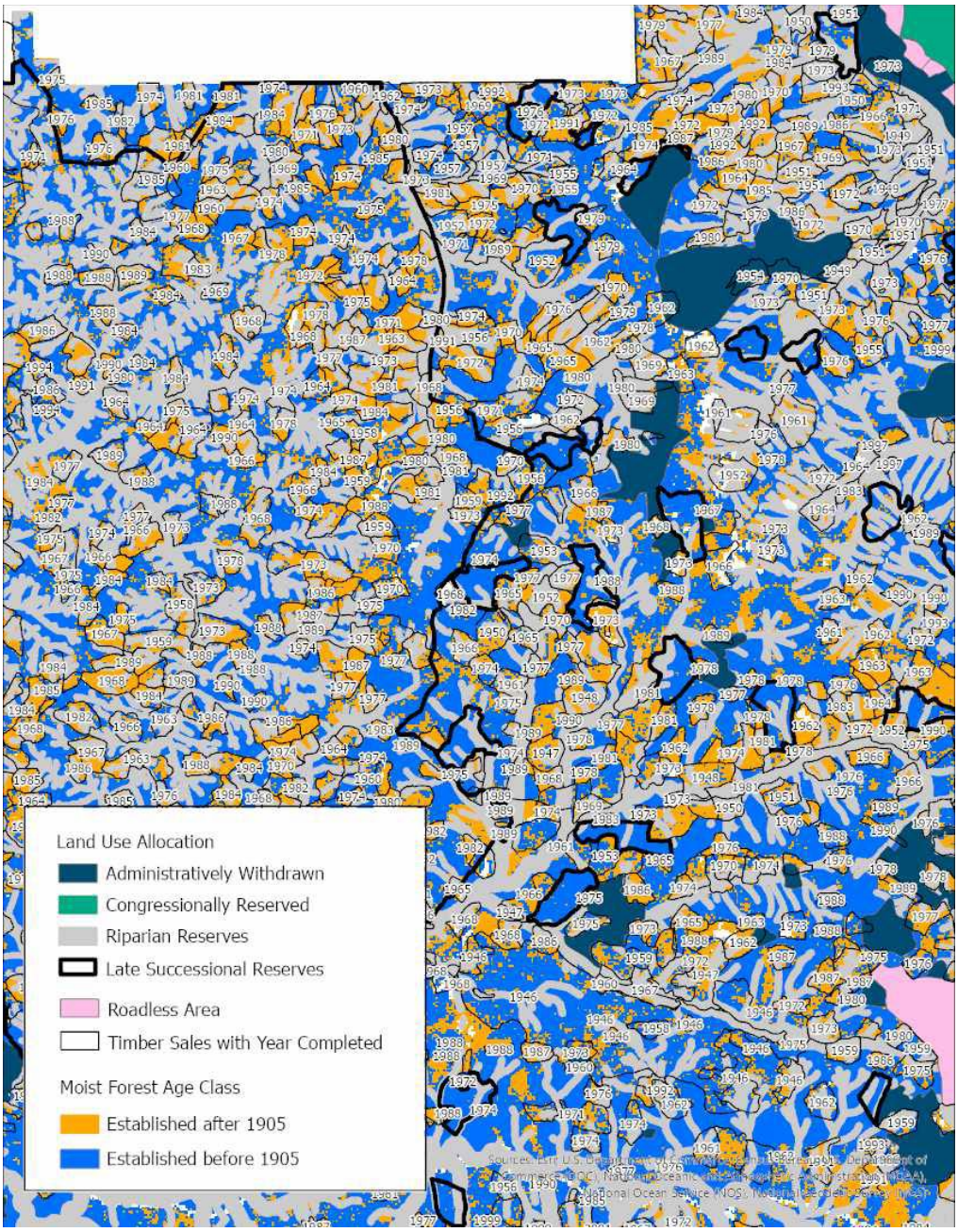

Figure 18. Land use allocation and clearcut location in the west-central area of the Willamette National Forest (Fall Creek Watershed). In Matrix/AMA (right side), the blue areas represent Older Forest, much of which would be suitable for timber production under the NWFP. Assigning a secondary purpose of timber production to the plantations in the LSRs (left side) could help compensate for that removal of that Older Forest from the suitable land base.

Make timber harvest a secondary purpose of plantations in Riparian Reserves

The NWFP implemented Riparian Reserves of two site-potential tree heights on fish-bearing streams and one site-potential tree height on non-fish-bearing streams, where the height of a site-potential tree in Moist Forest varied from 170-180 feet on the Willamette and Umpqua National Forests to 250 feet on the Siuslaw National Forest.

To help compensate for the removal of Older Forest, we suggest adding timber harvest as a secondary purpose of plantations in Riparian Reserves. This should give added impetus to, and expectation for, the Forest Service to produce timber volume from these plantations consistent with their primary purpose.

It is true that the Riparian Reserves are also used and valued for the many other species associated with Older Forest (Johnson et al. 2023, Chapter 8). However, this proposal is limited to plantations in the Riparian Reserves; the status of the Older Forest within the Riparian Reserves is unchanged.

Appendices

Appendix A. Restoration of Landscapes Dominated by Historical Coniferous Plantations (Jerry Franklin)[18]

We consider the conversion of the historical plantations to structurally complex and biologically diverse managed forests as restoration in its best sense; hence, we use that term as shorthand for what we propose. This restoration begins with consideration of an appropriate size for the new management units that are going to be created. Since these management units are going to be mosaics of different rather than uniform structural conditions, they do not meet the traditional definition of a stand. The management units also need to be of a larger size than historical harvest units on the federal forest lands. These traditional units, which were typically 25 to 60 acres, were ecologically inappropriate in the westside Douglas-fir—western hemlock forest. We propose defining larger management units to allow incorporation of diverse structural conditions (e.g., mature and recently harvested stands); complete small watersheds (e.g., 250 to 500 acres) can be ideal restoration projects. Emulating the historical pattern of harvested areas should not be the goal in restoring Moist Forest landscapes: a coarser landscape pattern with areas of diverse tree age and structure will generally be the goal.

Once the restoration management unit is defined the work of variable retention regeneration harvest begins. After management teams have developed basic familiarity with the resources within the harvest unit, an initial goal is to identify larger patches of forest that will be retained as intact forest aggregates through the next rotation. Approximately 1/3 of the harvest unit might be in forest aggregates, including stream buffers and other aquatic features. These aggregates will be of varied size and shape depending upon the features encountered. Generally, such aggregates are retained intact and without harvest entry through the current rotation; the location of aggregates can be reconsidered by managers at the next harvest cycle. Aggregates have multiple ecological roles including protecting areas of high ecological value (e.g., aquatic features) and providing closed forest habitat for perpetuating—on the harvest unit—flora and fauna that require closed forest canopies and their associated environmental conditions.

The remainder of the harvest unit (typically about 2/3) will undergo timber harvest with retention of individual and small groups of green trees as well as snags and down logs and other woody debris. We propose that this retention will amount to about 10 percent of the basal area of the harvested stand and include hardwoods as well as conifers, with potentially more retention in the previously harvested areas in the LSRs. The goal is to create a basically open environment but one that contains dispersed trees, snags, logs, and other residual vegetation to provide desirable structural complexity.

Traditional activities will follow the timber harvest. Slash burning will often be desirable on at least a portion of the harvested area for its beneficial effects on both fuels and biota stimulated by fire. Regeneration should depend on both natural seeding and planting. With the well-dispersed source of standing green trees and nearby forest aggregates, much natural regeneration should be expected, particularly of Douglas-fir. Tree species absent or poorly represented but desired as part of the managed

[18] Personal communication from Jerry Franklin, March 5, 2026.

stand (see below) can be planted. Common examples are pines and cedars. Restocking of tree species and development of a closed canopy forest is an eventual but not an immediate goal.

Allowing time for full development of the early successional ecosystem is one objective in ecological management of Moist Forests. This is the most biodiverse stage in forest succession in the Douglas-fir region and includes many species that are dependent on the open, food-rich conditions that are present during this stage. This is a period of great importance to many vertebrates, including game species, such as elk and deer. It is also a period where other important ecological functions, such as nitrogen fixation, occur. However, our goal in ecological forest management is to allow for significant development of the early successional ecosystem dominated by herbs and shrubs following logging.

A diverse regenerated forest is desirable including several species of conifer as well as hardwoods. Conifers in addition to Douglas-fir should include a species of pine (e.g., western white pine or sugar pine) for greater drought tolerance, a species of cedar (e.g., western redcedar or incense-cedar) for several values, including soil enrichment). An additional shade-tolerant species, such as western hemlock or a true fir (e.g., grand or Pacific silver fir) can round out the conifer diversity.

It is important to incorporate a significant hardwood component. Hardwoods provide important ecological values. These include providing additional habitat and food sources, conserving water relative to the conifers, and providing environmental patches that contrast with the conifers in both winter and summer. In addition, hardwoods provide immediate and substantial resilience following disturbances because of their ability to sprout from both stumps and roots. We do not know how much hardwood is needed to provide ecologically significant benefits, but we propose a minimal goal of 10%. We have much to learn about the most effective ways of incorporating hardwoods in mixed stands, such as dispersing or aggregating the hardwood component but we believe that incorporating significant hardwoods is critical.

Once established the young forest will be managed similarly to how other young forests have been managed. Precommercial and commercial thinning will be appropriate but with an emphasis on maintaining species diversity and irregularity in density (e.g., variable density thinning). An eventual rotational regeneration harvest is anticipated at 80 to 120 years at which time the current pattern of aggregated retention and harvest can be adjusted.

The result in one rotation will be the creation of a structurally complex (many different sizes and conditions of trees, substantial dead wood structures, and forest densities) and biologically diverse forest. Habitat will be provided for species requiring both early successional conditions and closed forest habitat, some of which will be of advanced forest age. These would be the forest in the aggregates that was allowed to grow and would, at the time of the second rotation, include large trees, snags and logs.

We would have achieved our goal of a biologically rich, structurally complex, more resistant and resilient forest and one offering many options for subsequent management.

Appendix B. Addressing the Challenge of New Legislation that Mandates Increased Timber Harvest on the National Forests.

Last summer, Congress (through the Senate Committee on Energy and Natural Resources) passed a new requirement for harvest scheduling on the national forests when it passed HR1, the "Big Beautiful Bill." That legislation contained a little-known but important provision that provides direction on timber sales in the "public domain forest reserves"—essentially national forests west of the Mississippi River. HR1 states:

> "(2) TIMBER SALES ON PUBLIC DOMAIN FOREST RESERVES.—
> (A) IN GENERAL.—For each of fiscal years 2026 through 2034, the Secretary shall sell timber annually on National Forest System land in a total quantity that is not less than 250,000,000 board-feet greater than the quantity of board-feet sold in the previous fiscal year.
> (B) LIMITATION.—The timber sales under subparagraph A) shall be subject to the maximum allowable sale quantity of timber or the projected timber sale quantity under the applicable date of enactment of this Act."

Thus the law calls for an increase of 250 million board feet a year on the national forests west of the Mississippi over the decade or 2.5 billion board feet in total by 2034, with the 2025 sale level in these forests of 1.8 billion board feet as the starting point (Table A1). Thus, the Forest Service would need to achieve a sales level of 4.3 billion board feet per year by 2034. That is capped, forest by forest, by the maximum allowable sale quantity of timber or projected timber sale quantity applicable in 2025.

Table A1. Timber sales on the national forests west of the Mississippi River in 2025 provide the base harvest level for calculating mandated increases in timber sales over time under HR1. Source: https://www.fs.usda.gov/managing-land/forest-management/products/cut-sold.

Region	2025 Sales MMBF
R1	420
R2	153
R3	212
R4	99
R5	274
R6	609
R10	
Total	1767

We can examine here how the HR1 requirement might play out in management of the national forests of western Oregon and western Washington over the decade. Five of the national forests (Gifford Pinchot, Mt. Hood, Rogue River-Siskiyou, Umpqua, and Willamette) have an aggregate gap of 207 million board feet between PSQ and 2025 timber sales (Table A2). The other three national forests in our study (Mt. Baker-Snoq., Olympic, and Siuslaw) sold more in their PSQ in 2025, with almost all that volume coming from reserves, and they lack pressure under HR1, as we understand it, to increase their sales level under this law.

Table A2. Moist Forest PSQ, 2025 sales and deficit. Source: PSQ: Ross 2019; Sales: https://www.fs.usda.gov/managing-land/forest-management/products/cut-sold.

	PSQ	2025 Sales		PSQ-sales
	MMBF	MMBF		MMBF
Gifford Pinchot	65	23		41
Mt Baker-Snob.	7	14		-7
Mt. Hood	65	11		54
Olympic	10	17		-7
Rogue River-Siskiyou	50	32		18
Siuslaw	11	47		-36
Umpqua	78	29		51
Willamette	116	77		43
Total	402	250	Potential increase	207

It must be added, though, that the provisions in HR1 leave It to the Forest Service to decide how to distribute the additional sales among Regions 1-6, and 10. Still, the five national forests highlighted here may be prime candidates for an immediate increase as nearby mills probably have the capacity to process that wood without much new construction. Other parts of the West lack that capacity.

Appendix C. Some Maps of the Willamette National Forest Used in our Analysis.

Higher resolution versions of these maps are available at:
https://drive.google.com/drive/folders/18XJm60bgji98aJwooodWDKOz1CpiVRFX?usp=sharing

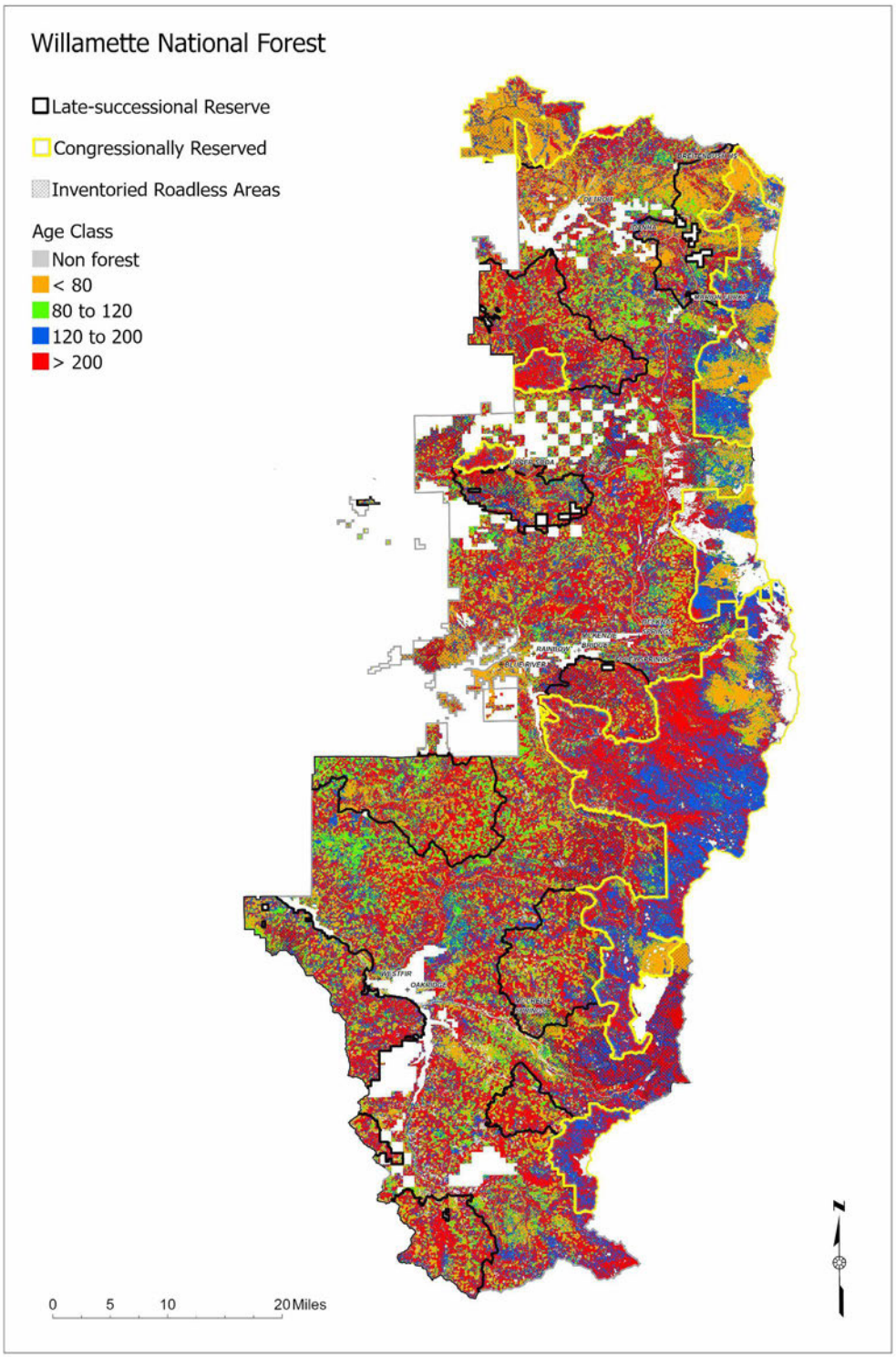

Figure 1.

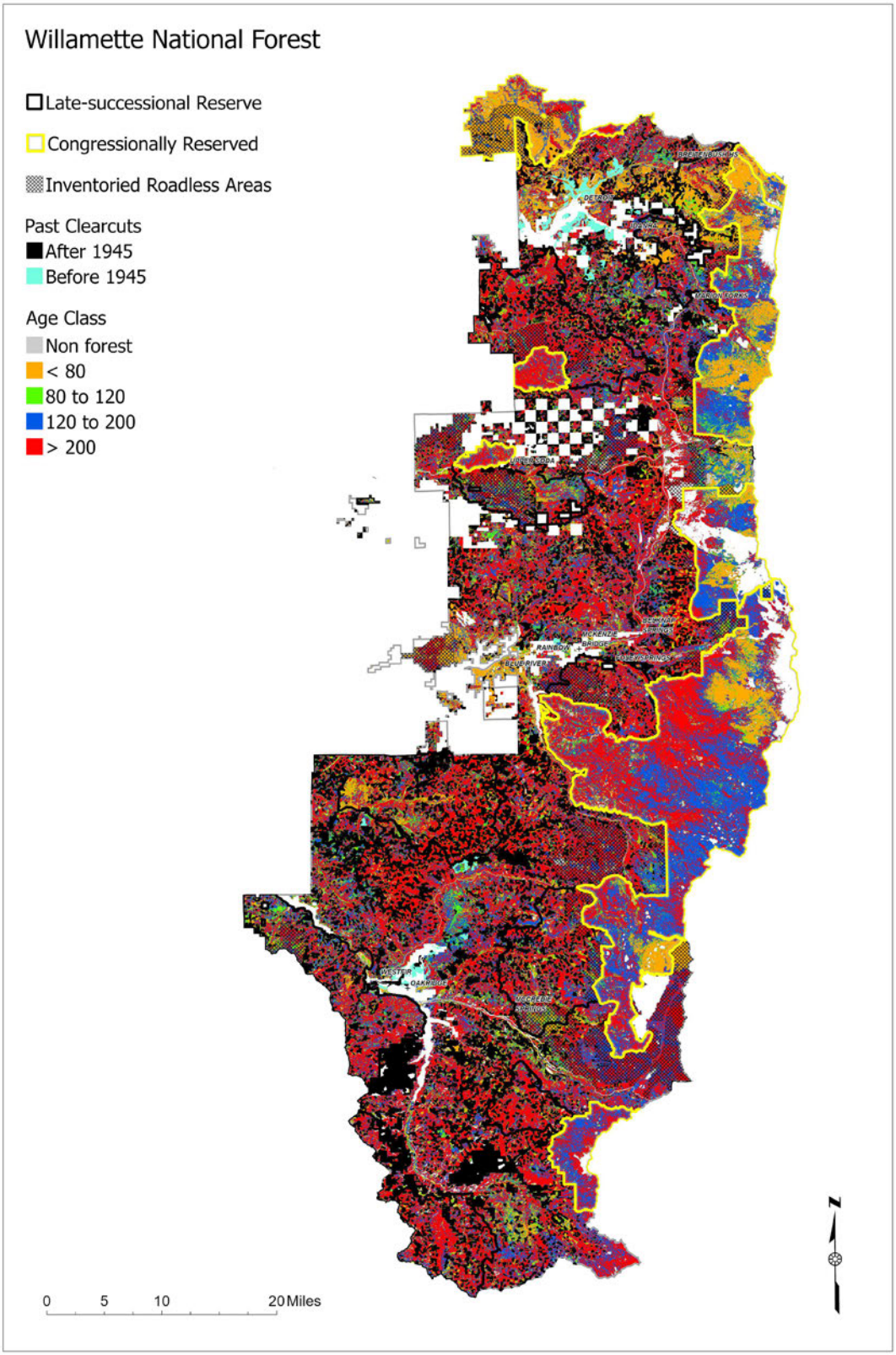
Willamette National Forest
Late-successional Reserve
Congressionally Reserved
Inventoried Roadless Areas
Past Clearcuts
After 1945
Before 1945
Age Class
Non forest
< 80
80 to 120
120 to 200
> 200
0
5
10
20 Miles
N

Figure 2.

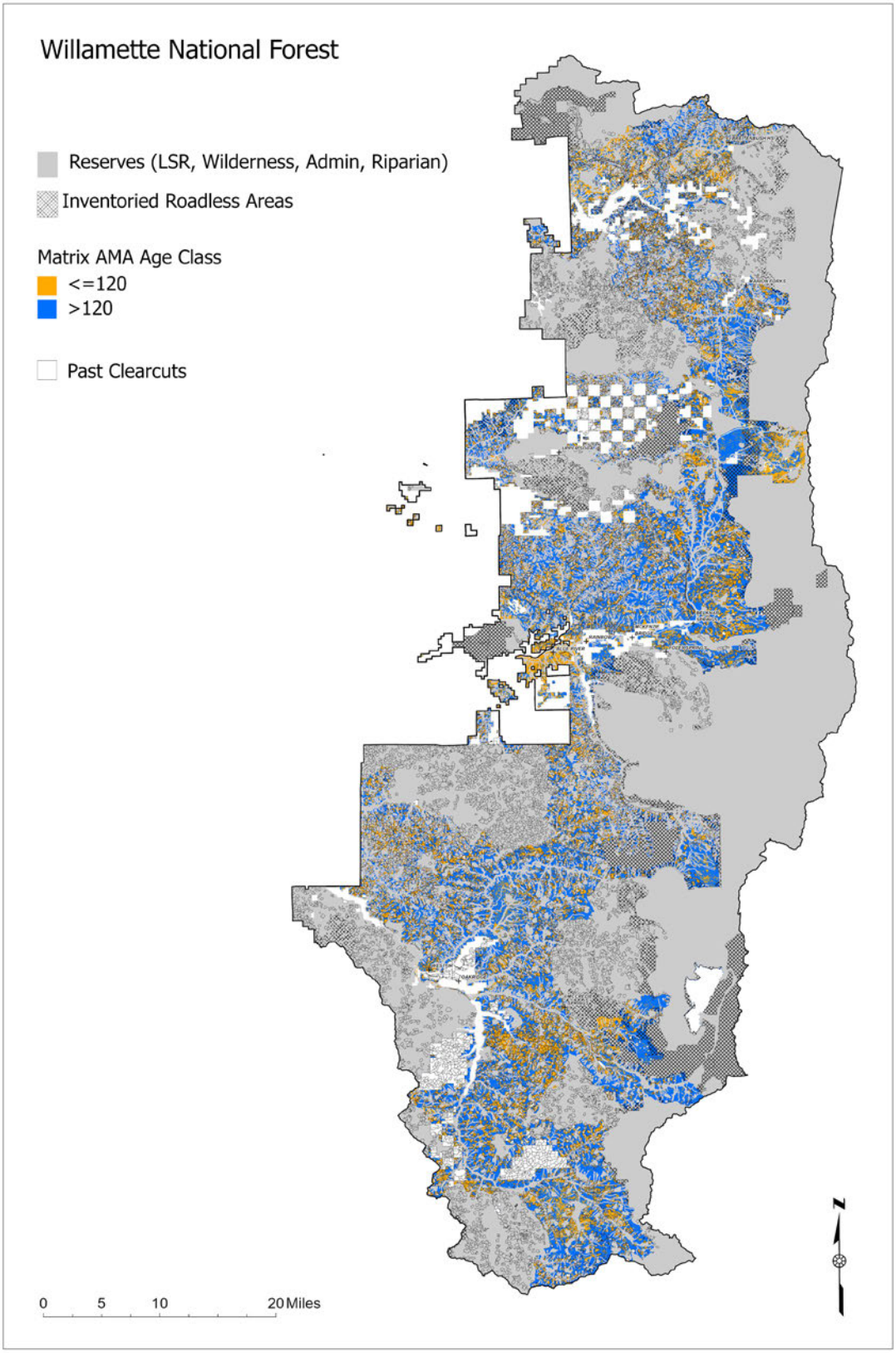
Willamette National Forest
Reserves (LSR, Wilderness, Admin, Riparian)
Inventoried Roadless Areas
Matrix AMA Age Class
<=120
>120
Past Clearcuts
0
5
10
20 Miles
N

Figure 3.

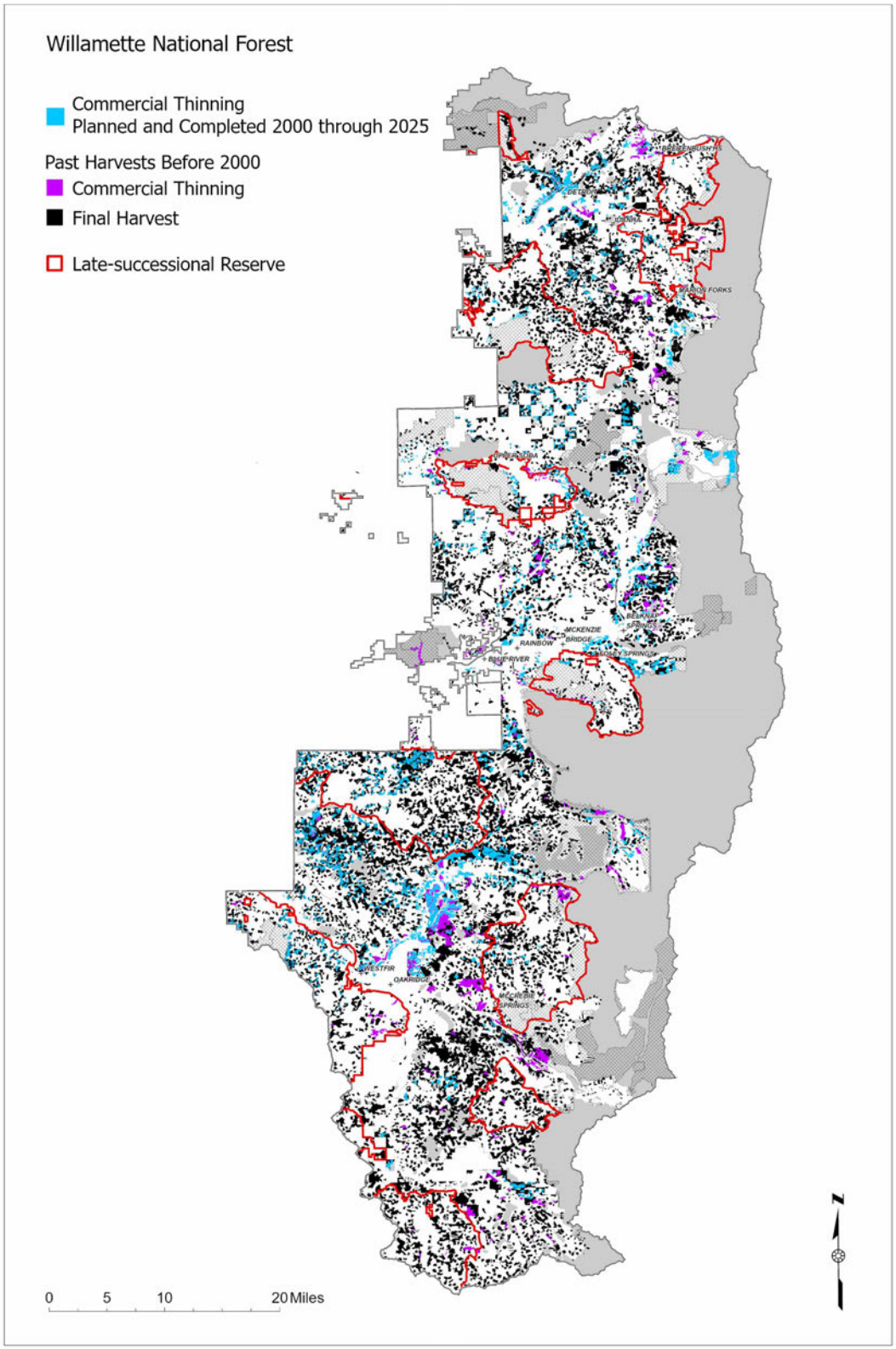
Willamette National Forest
Commercial Thinning
Planned and Completed 2000 through 2025
Past Harvests Before 2000
Commercial Thinning
Final Harvest
Late-successional Reserve
MARION FORKS
MCKENZIE BRIDGE
RAINBOW
BLUE RIVER
WESTFIR
OAKRIDGE
0 5 10 20 Miles
N

Figure 4.

Literature Cited

BLM (Bureau of Land Management). 2016. Northwestern and Coastal Oregon Record of Decision and Approved Resource Management Plan. "Resource Management Plans (RMPs) for Western Oregon." 2016. https://www.blm.gov/programs/planning-and-nepa/near-you/oregon-washington/rmps-westernoregon.

Curtis, R.O. 1995. *Extended rotations and culmination ages of coast Douglas-fir: Old studies speak to current issues.* USDA Forest Service, Research Paper PNW-RP-485, Pacific Northwest Research Station, Portland OR.

Curtis, R.O., and D.D. Marshall. 1993. "Douglas-fir rotations... time for reappraisal." *West. J. Appl. For.* 8:81–85.

Federal Advisory Committee. 2024. NWFP "Amendment. Federal Advisory Committee Recommendations." https://www.fs.usda.gov/sites/nfs/files/legacy-media/r06/NWFP%20FAC%20Rec%20Final%20July%202024.pdf accessed 6/29/2025.

Franklin, J. F. and K. N. Johnson. 2013. Ecologically Based Management: A Future for Federal Forestry in the Pacific Northwest. Journal of Forestry, 111(6): 429-432.

Franklin Jerry F., K. Norman Johnson, and Debora L. Johnson. 2018. *Ecological Forest Management*. Waveland Press.

Franklin Jerry F., K. Norman Johnson, and Debora L. Johnson. 2025. Comments on the Draft Environmental Impact Statement Northwest Forest Plan Amendment. https://cara.fs2c.usda.gov/Public/ReadingRoom?project=64745 (Filter on Jerry Franklin) Accessed 6/29/2025.

Johnson, K. Norman, S. Crim, K. Barber, M. Howell, and C. Cadwell. 1993. *Sustainable Harvest Levels and Short-Term Timber Sales for Options Considered in the FEMAT Report: Methods, Results, and Interpretations.* On file with K. Norman Johnson, norm@applegateforestry.com.

Johnson, K. Norman, Jerry F. Franklin, and Gordie H. Reeves. 2023. *The Making of the Northwest Forest Plan: The Wild Science of Saving Old Growth Ecosystems.* Oregon State University Press.

Lesmeister, Damon B. 2025. "The Looming Range Contraction of Northern Spotted Owls." Talk given at the joint annual state meeting of the Wildlife Society and the Society of American Foresters. Salem, OR. Dr. Lesmeister is Research Wildlife Biologist with USDA Forest Service's Pacific Northwest Research Station and Principal Investigator in monitoring the status of the northern spotted owl.

Mickey, Ross. 2019. The 2019 Ross Report: An Analysis of the USFS Region 6 Timber Sale Program. American Forest Resource Council. Portland, OR.

Natural Resource Department, Confederated Tribes of Grand Ronde. 2025. Talks given at the joint annual state meeting of the Wildlife Society and the Society of American Foresters. Salem, OR.

Palik, Brian J., Anthony W. D'Amato, Jerry F. Franklin, and K. Norman Johnson. 2021. *Ecological Silviculture: Foundations and Applications* Long Grove, IL: Waveland Press.

Rakestraw, Lawrence and Mary Rakestraw. 1991 History of the Willamette National Forest. USDA - Forest Service Pacific Northwest Region. https://archive.org/details/nfsl_2_297148.

Reeves, Gordon H., K. Norman Johnson, and Debora L. Johnson. 2025. Comments on the Draft Environmental Impact Statement Northwest Forest Plan Amendment. https://cara.fs2c.usda.gov/Public/ReadingRoom?project=64745 (Filter on Gordon Reeves). Accessed 6/29/2025.

Tappeiner, John, Darius Adams, Claire Montgomery, and Douglas Maguire. 2022. "Growth of managed older Douglas-fir stands: Implications of the Black Rock thinning trial in the Coast Range of Western Oregon." Journal of Forestry: 282-288.

Thomas, Jack Ward, Eric D. Forsman, Joseph B. Lint, E. Charles Meslow, Barry R. Noon, and Jared Verner. *A Conservation Strategy for the Northern Spotted Owl* US Government Printing Office, 1990. https://www.fws.gov//birds/nso/documents/

USDA April 9, 2012. 36 C.F.R. Part 219: National Forest System Land Management Planning. 77 (68) Fed. Reg. 21262–21276.

USDA and USDI. 1994. "Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl." https://www.fs.usda.gov/sites/nfs/files/r06/mbs/publication/NW%20Forest%20Plan%20-%20Standards%20%26%20Guidelines.pdf. Accessed 11/1/2025.

USFS. nd. Cut and Old Report. https://www.fs.usda.gov/managing-land/forest-management/products/cut-sold.

USFS. 2015. *Land Management Planning* Handbook. FSH 1909.12. Chapter 60. Washington, DC: US Forest Service, http://www.fs.usda.gov/detail/planningrule/home/?cid=stelprd3828310.

USFS. 2020. "Lowell Country Project." https://www.fs.usda.gov/project/?project=52868.

USFS. 2021. "Flat Country Project: Record of Decision," 36 C.F.R. 218 Objection Process. https://www.fs.usda.gov/nfs/11558/www/nepa/109274_FSPLT3_5578654.pdf.

USFS. 2024a. "Northwest Forest Plan Amendment Draft Environmental Impact Statement. Volume 1: Chapters 1-5." https://usfs-public.app.box.com/v/PinyonPublic/folder/293927886292. Accessed 6/29/2025.

USFS. 2024b. "Northwest Forest Plan Amendment Draft Environmental Impact Statement. Volume 2: Appendices." https://usfs-public.app.box.com/v/PinyonPublic/folder/293927886292. Accessed 6/29/2025.

USFS. 2025a. "East Fork Lewis Project," Gifford Pinchot National Forest https://www.fs.usda.gov/r06/giffordpinchot/projects/65884.

USFS. 2025b. “TIE Project.” McKenzie River Ranger District, Willamette National Forest. https://www.fs.usda.gov/r06/willamette/projects/68829.

USFWS. 1994.“Final Biological Opinion for the Preferred Alternative of the Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl.” Portland, OR: US Fish and Wildlife Service.

USFWS. 2011. *Revised Recovery Plan for the Northern Spotted Owl* (*Strix occidentalis caurina*). Portland, OR: US Fish and Wildlife Service, 2011.

USFWS. 2012. “Endangered and Threatened Wildlife and Plants: Revised Critical Habitat for the Northern Spotted Owl.” 77 (46) Fed. Reg. 14062–14165.

USFWS. 2019. “Barred Owl Study Update.” Portland, OR: US Fish and Wildlife Service, https://www.fws.gov/oregonfwo/articles.cfm?id=149489616.

USFWS. 2024. Final barred owl management strategy. https://www.fws.gov/sites/default/files/documents/2024-08/final-barred-owl-management-strategy-2024_508.pdf

US Government. March 6, 2025. Immediate Expansion of American Timber Production. Executive Order 14225 of March 1, 2025. Federal Register / Vol. 90, No. 43 / Presidential Documents.