Woodland Fish & Wildlife

Wildlife-Friendly Fuels Reduction in Dry Forests of the Pacific Northwest

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Reducing fuels, improving forest health and enhancing wildlife habitat are common management goals on our private dry forests. These goals don't have to contradict each other, if you follow some simple guidelines. The following publication will give you tips and ideas on how to make sure all of your goals are met.

Introduction

Forests in the Pacific Northwest were historically shaped by fire. Whereas large landscape scale fires impacted west side forests only every few centuries, our dry forest ecosystems experienced fire as frequently as every 5-25 years. These frequent fires occurred at varying intensities, completely torching some areas, lightly burning others, and even skipping some places altogether, creating a complex mosaic across the landscape (Figure 1).

Individual tree vigor was strong because fire reduced competition for water, sunlight, nutrients, and growing space. Historic stands contained large standing dead trees (snags) as well as some very large down logs that would not be consumed by low intensity fires. Regeneration was often patchy, resulting in numerous openings and areas of dense young trees that might flash out in the next fire. Many shrub species would either re-sprout in clumps, or sprout from seed in the soil after a fire, creating a vigorous grass, forb, and shrub understory.

Figures 1 and 2. *The figure on the left shows a historic forest that experienced regular low intensity fire. An individual tree here or there may have torched, but for the most part the fire stayed low. The figure on the right shows the same forest after decades of fire suppression. There is increased competition and reduced tree vigor, as well as increased risk for a high intensity fire. There is also reduced wildlife habitat value for some species in terms of forage and large healthy trees.*

Over the past 100 years we have become quite adept at suppressing wildfires. During this same time period, intensive logging occurred over much of the landscape, which resulted in the removal of large diameter, high value trees. This has created forest conditions of uncharacteristically high fuel loading, increased tree density (number of trees/acre), and increased risk of high intensity wildfire on both private and public forests (Figure 2). We have also, in some cases, seen a transition in our forests from fire and drought tolerant trees (ponderosa pine, Jeffrey pine, western white pine, sugar pine, and western larch) to fire and drought intolerant tree species (Douglas-fir, grand and white fir, subalpine fir).

As a result of this increased risk of high intensity fire or insect and disease outbreaks, many landowners and land managers are conducting fuels reduction treatments across their lands. These projects include thinning (pre-commercial and commercial) trees, mowing or masticating shrubs, pruning trees to remove ladder fuels, removing standing and down dead wood, and sometimes, slash pile burning and prescribed burning.

Unfortunately, some of these fuels reduction practices occur in a uniform and aggressive manner, which can result in wildlife habitat degradation. We can do such a good job "cleaning up" the forest that we inadvertently reduce ecosystem function (Figure 3a and 3b). The good news is that we don't have to choose one or the other. We don't have to sacrifice all wildlife habitat for the sake of fuels reduction, or vice versa.

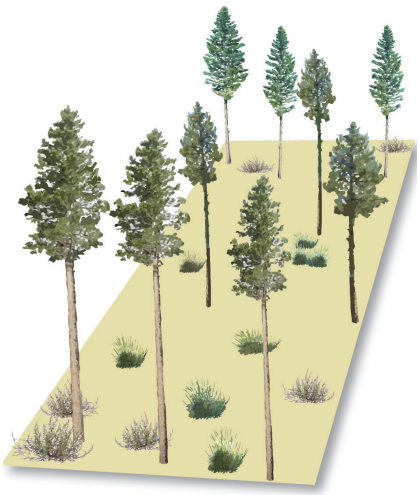

Figure 3a. *An over-simplified forest.*

Figure 3b. *This forest stand was evenly thinned and heavily mowed. Though it looks very tidy, it is now a very simple forest stand with limited wildlife habitat value.*

The objectives of reducing the risk of stand replacing, or highly destructive fire, while maintaining and enhancing wildlife habitat values are compatible with the implementation of a few simple techniques as a part of Fuels Reduction prescriptions.

The goal of this publication is to give you some ideas so that you may plan your fuels reduction projects in a way that benefits individual tree vigor, forest health, and wildlife habitat.

Maintaining Complexity

Widespread fuels reduction efforts that all do the same thing everywhere can reduce wildlife habitat diversity and complexity.

An evenly spaced stand, with much of the understory shrubs and small diameter trees removed, results in reduced cover and available forage. Habitat complexity elements in the mid to understory are critical for many forest wildlife species. For example, small clumps of trees provide a place for deer and elk to hide from predators, and provide shelter from inclement weather. Shrub clumps provide nesting and hiding cover for ground nesting birds and many small

You will see us refer to this mosaic as a "Gappy, Patchy, Clumpy" forest throughout this publication. Gappy, Patchy, Clumpy is often used by forest managers to describe the way trees and shrubs are arranged and distributed across dry forests.

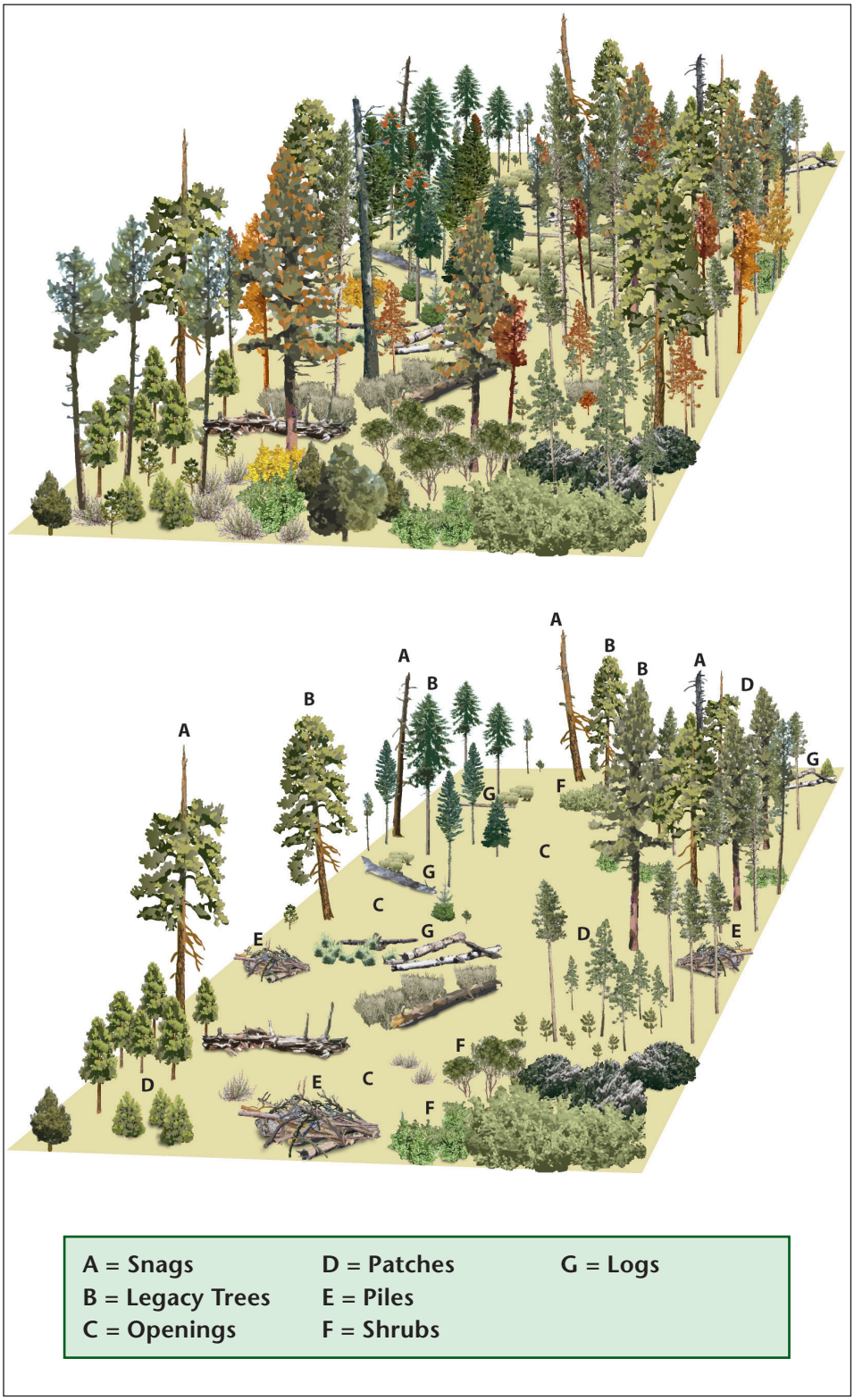

Figure 4 and Figure 5. *Top, a forest from which fire has been removed for many years and is in need of restoration. Bottom, a forest treated to reduce fire risk, be more resilient to insects and disease, and enhance wildlife habitat. Components retained in the treated stand include snags, legacy trees, openings and patches.*

Fuels Reduction Tip: Don't do the same thing everywhere. You want your forest to look different as you walk along your property (horizontal diversity) as well as when you look up and down (vertical diversity). Strive for a "Gappy, Patchy, Clumpy" forest.

mammals that rely on that shrub layer. Deer and elk forage routinely on these same shrubs and hide their fawns in dense shrub thickets.

Remember, you don't need to eradicate all fuels on your property to reduce your risk of high intensity fire; you do need to break up the continuity of fuels to create a suitable fuel break. These fuel breaks will reduce the chance of a fire spreading throughout your property. You can create a diverse landscape that is more resistant to high intensity fire, looks more natural, mimics historic fire patterns, increases individual tree vigor and forest health, and provides high quality wildlife habitat.

Prescription for Habitat Diversity and Fuels Reduction

You are going to manage very differently close to home if you live on your property (1-100 ft) vs further out (100 ft +) in your woodlands. This publication is focused on managing that ground which is further than 100 ft from a building or residence. We recommend visiting the Firewise website http://firewise.org/ for resources on creating defensible space around your home. Some of these habitat recommendations may apply closer to your home, but in fire prone areas be aware of fuel connectivity.

In order to best mimic the natural forest habitats being influenced by our mechanical thinning activities, the following can be applied across fuels reduction stands.

It is important to think about the slope and aspect of your property, as well as prevailing winds. North facing slopes tend to hold snowpack longer and retain more water, so keeping a high density of trees or shrubs on those aspects would probably be OK. The vegetation along creeks and draws holds more moisture and can be a place where you keep a more dense vegetative cover. Your South facing slopes get more sun exposure and tend to dry out more quickly, so careful thinning and fuels reduction will be important here. Think about where a fire is likely to start and where it is likely to go. Heavier fuels reduction in those areas will help keep a fire from traveling across your property. We recommend "A Land Manager's Guide for Creating Fire-Resistant Forests" by Stephen Fitzgerald and Max Bennett for more information on fire behavior and fuels reduction concepts (Full citation in Resources).

Snags

Some of the most important habitat features in any forest are made of dead wood; specifically standing dead trees (snags) and down logs. Live trees with dead portions of their stems and branches can also fill this role. Insects reside in dead and dying wood, often feeding on fungi and wood, resulting in a food source for a variety of bird species such as woodpeckers, nuthatches and chickadees. Cavities created by woodpeckers during regular nesting and courtship behavior can provide homes for secondary cavity species such as bluebirds or flying squirrels. Many of these species are voracious feeders on insects, including some forest pests, and thus can help keep the forest healthy if the habitat is provided and they can occupy territories. If snags do not present a safety hazard over a road, or near a house, we recommend leaving as many foraging snags (10" diameter and smaller) and cavity nesting snags (12" diameter and greater) as possible. Strive for at least 6 foraging snags/acre and 1-2 cavity nesting snags/acre. Remember that bigger snags will persist longer and provide habitat for more species. Many species (owls, pileated woodpeckers) need very large snags.

Tip: Take advantage of harvesting equipment to make some snags. Mechanical harvesters can top trees, leaving 8-20 foot stumps, especially important if you are currently lacking in snags. Climbers can top some trees (creating jagged tops) or girdle 2/3 of the way up to make snags.

Figure 6. *Snag tree.*

Logs

Logs provide ground level habitat complexity and cool, moist hiding cover for small mammals, amphibians and reptiles. They slowly release nutrients and water back into the soil and provide food in the form of insect larvae for woodpeckers and bears. They can also provide an important soil retention function on steep slopes, helping slow water runoff and reduce erosion. Maintain well dispersed down logs on the landscape. Remember, the bigger the snag or downed log, the better!

Legacy Trees

Large diameter trees are the backbone of wildlife habitat in dry forests ecosystems. More trunk surface results in rough bark for foraging by small birds such as nuthatches. More crown surface results in more cone production. These trees are naturally fire-tolerant, but are at increased risk if threatened by understory trees. Tall crowns provide perches for hawks and owls. Sometimes these trees are twisted, broken, gnarly veterans that should be retained in the stand. Consider keeping at least a few mistletoe trees if they are still large and vigorous. Removing all mistletoe trees will be detrimental to species that nest in the brooms (great gray owl, long-eared owl, great horned owl, northern goshawk, and more). Retaining defective trees with broken tops or twisted stems can also provide nesting platforms for raptors. Thinning around these trees (1.5 – 2x past the dripline of the tree) will help them be fire resilient and vigorous.

SLLOPPS: Snags, Logs, Legacy, Openings, Patches, Piles and Shrubs. An acronym that might help you remember these habitat complexity tools!

Openings (Gaps)

Openings can be areas where all, or nearly all, of the overstory trees are taken (or were naturally missing). These openings should be created, maintained or enhanced to allow for the development of shrubs and grasses for wildlife forage. Openings also provide an opportunity for the regeneration of shade intolerant tree species like ponderosa pine. These openings can be imbedded in the stands to allow big game animals, such as deer, elk, and other wildlife associated with edge habitats feeding opportunities in proximity to hiding cover. Openings usually happened in long sinuous (curved or wavy) irregular shapes (no more than 50-110' across) rather than circles, squares or strips.

Patches (Clumps)

Dense pockets of young conifers and shrubs provide quality habitat for many species, such as feeding or nesting habitat for songbirds. They also provide browse and cover for big game species. Patch retention in thinning units can provide this habitat, but requires forethought and follow through. Mark areas to be maintained in a denser state from 30-50 feet across, and at least the same in length, (preferably longer) to provide the "patchy and clumpy" mosaic pattern. These areas should be left un-thinned, (or thinned lightly), to maintain mid-level vegetation (shrubs and young trees) and provide sight distance cover for large mammals such as deer, elk and bear. Patches should be configured across the landscape to break long sight distances. Try to stagger patches at distances of 200-300 feet apart. Try to avoid more than 500' between clumps or patches. Retaining several patches or clumps will help deer and elk tremendously. Visual cover patches along roads and small ridge crests are extremely important.

Figure 7. *Habitat Piles.*

How Much in Openings? How Much in Patches?

If you have less than 10 acres of forest, creating any significant openings might not be practical. In this situation, consider what you see around you on the landscape and think about what you might offer that is different from your neighbors. If you have 10 acres or more of land, the recommendation is to leave approximately 10-20% of your land as clumps or patches, and 5-15% in openings. This might look like one or two openings of 0.2-1 acres in size for every 10 acres. The optimal proportion of clumps or patches to openings is about equal, so considering this guideline would place them across the whole landscape. Ultimately, however, determining fire risk on your property is up to you. If you live on a very steep slope, or are surrounded by dense forests, you might decide to incorporate less of the patch and clump components mentioned above.

Habitat Piles

Piles can be left as distinct habitat elements and act as surrogates for down wood. They provide cover for many species of wildlife, including squirrels, small mammals, lizards, snakes, rabbits, and numerous small birds such as juncos. California Valley Quail will use habitat piles for nesting and for night roosts, especially if piles are placed along edges between open areas and closed cover. Piles providing the most suitable wildlife habitat are constructed to retain interior open spaces via the use of larger pieces of wood. Landowners can place at least 3-5 layers of larger logs crisscrossed, or longwise in triangular 3s, to provide a core habitat with nesting and denning spaces. These piles are then covered with a few layers (about 2-3 feet deep) of fine branches. Habitat piles provide tremendous value, and can be used as a slash treatment option. If they did catch fire, they will burn hot only in that spot. Piles should be established well outside the dripline of overhanging trees and patches so they will not act as ladder fuel. Habitat piles should be provided at a rate of 1-3 per acre, preferably in clusters away from roads. In order to benefit wildlife, these piles should not be used as sources of firewood and should be marked for retention after the work is done and before the other "brush" or "slash" piles are burned. Usually there is plenty of fuel around to dispose of, and creating these piles should not cause a significant increase in fire risk if strategically placed across the

Bitterbrush is a very important understory plant in many of our dry forests, as are our native bunch grasses. Almost anything with "berry" in the name is a good choice for keeping or encouraging!

landscape. Note: Green ponderosa pine slash should only be used for piling between September and December to avoid creating a concentration of food that may attract Ips bark beetles.

Shrubs

Many native shrub species provide excellent fruit, insects and forage for wildlife. Clumps of shrubs also provide nesting and hiding cover for birds and small mammals such as vireos and chipmunks. The shrub species you have will vary greatly with your locale. We recommend checking with your watershed council, Soil and Water Conservation District, Cooperative Extension office, or other local technical service provider for advice on which native shrub species you should encourage on your property. These agencies can also suggest sources for native shrub species for planting if these species are lacking on your property. It is also important to remember that heavy mastication can result in removal of high value shrubs, or an undesired transition of understory species.

Timing

If you have the flexibility to do all of your operations in the fall or winter, you will reduce the chance of disturbing or destroying bird nests or small mammal dens. In ponderosa pine stands, thinning in the spring or summer that creates green slash can result in an Ips beetle outbreak that can result in inadvertent damage to desired residual trees.

Pruning

Pruning some trees helps reduce the ability of a fire to climb up from the ground to the canopy of your trees. Pruning in situations with dead in the lower portion of the tree can significantly reduce ladder fuels. You do not have to prune every tree to achieve this goal. In some situations, if you have a very old tree with large branches, your strategy might be to remove all the vegetation around that tree, or make a small "clump". Many species of birds and small mammals use those branches to move up and down the trees. Consider leaving 5-10% of the trees un-pruned or lightly pruned to provide some low branch habitat. When you do prune, remove lower branches up to eight feet off the ground, making sure 1/3rd or more of a tree's total branches are retained. This will ensure your tree's vigor.

This soft snag provides great habitat for small cavity nesting birds. Note the shrub patch in the back. Photo by Ken Bevis

Burning

Most burning done on small-scale fuels reduction projects will be pile burning in the fall or winter. Make sure you only burn piles determined to be excess fuels and not those constructed as habitat piles. Broadcast prescribed burning can be a very effective fuels reduction tool, but is often cost and logistically prohibitive. If you want to burn, be sure to check with your local fire districts and state forestry organizations for burn permits, timing restrictions, and requirements. You should also consider reducing some of your surface fuels mechanically before burning to prevent the fire from getting too hot and killing more trees than you desire. If you choose to use prescribed fire, carefully plan the timing to avoid a burn that is too hot that can reduce the vigor of shrubs or grasses you care about.

Seeding

Using a seed mix dominated by native plants, with an element of legumes such as clovers, will occupy disturbed

soils and help keep weeds at bay. The legumes will provide good forage for wildlife such as deer and quail. Seed mix recommendations are available from local farm supply stores, or your local technical service provider (NRCS or Extension Service). Be sure your seed mix is certified weed free.

Conclusion

Ultimately, you need to evaluate your personal risk, evaluate the trade-offs of different practices, and create a management plan for your property that meets your goals, your resources, and the scale of your property. We feel confident that the recommendations here will help anyone implementing a fuels reduction project on their property. We can provide improved wildlife habitat, forest health, and aesthetics. qualities.

Small clumps left in this stand do not pose a hazard to remaining trees and provide important hiding cover. Photo by Ken Bevis

Summary of Recommendations:

Snags and Logs: Strive for 6 foraging snags/acre and 1 - 2 cavity nesting snags/acre. Strive for snags and logs greater than 15 ft. long/tall and greater than 12" in diameter.

Legacy: Keep any old growth trees, including defective trees. Strive for 2 - 3 per acre.

Openings: Openings can vary from 1/10 to 5 acres in size. They can comprise 5 - 15% of the landscape and aim for irregular shapes.

Patches: Patches can be 30 - 50 ft. across and preferably 100 - 300 ft. in length. Aim for 10 - 20% of the landscape.

Piles: Build habitat piles of 5 layers with larger material on bottom. Piles should be 20 ft. in diameter, 6 ft. high and 1 - 3 per acre.

Shrubs: Maintain the best species on the site, keep them in clumps, and beyond any adjacent tree's overhanging limbs (dripline).

Timing: Fall is best time for work to avoid wildlife nesting and denning, and insect outbreaks.

Pruning: Leave 5-10% of your trees un-pruned. When pruning, retain 1/3 of tree's total live branches for tree vigor. Only prune when trees are dormant (October-March) to avoid insect infestation.

Seeding: On disturbed soils or areas of burned soil, use native and certified weed free seed mixes.

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Making sure you properly dispose of slash from fuels reduction treatments is critical to reduce the chance of a beetle outbreak. Photo by Ken Bevis

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About the Woodland Fish and Wildlife Group

The Woodland Fish and Wildlife Group is a consortium of public agencies, universities, and private organizations which collaborates to produce educational publications about fish and wildlife species, and habitat management, for use by small woodland owners in the Pacific Northwest.

Currently available publications can be viewed and downloaded, free of charge, at the organization's website:

www.woodlandfishandwildlife.com

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