Winter 2011

Identifying and Managing for Wildlife Damage During Stand Initiation

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By JIMMY TAYLOR

Trees in the Pacific Northwest (PNW) are susceptible to wildlife damage throughout their life cycles, and many industrial and nonindustrial forest landowners spend a good deal of money attempting to prevent or lessen this damage. Several species of animals affect forest regeneration and their damage can generally be broken into categories based on when damage occurs. During stand initiation, damage is seen with seeds, seedlings, and saplings. While some animals may cause damage only at one particular time, others damage trees at various intervals and in different ways. Methods of lethal and non-lethal control to reduce wildlife damage have been around for a long time and can be placed into five general categories: physical barriers, repellents, toxicants, hunting/trapping, and habitat manipulation. Unfortunately, there is no single tool or technique that works for all species in all situations, thus management can be complex and may require multiple techniques. Furthermore, some tools that appear to work may do so for only a short period of time.

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Elk will often pull seedlings from the ground while foraging, as shown in the photo on the left. In the photo on the right, an elk uprooted a seedling by pulling on the Vexar tubing around it.

Despite landowners' best attempts to manage for their own values and objectives, they are potentially at risk from things outside their control, such as when adjacent landowners have very different objectives (e.g., a small tree farm adjacent to a large national park). Correctly identifying the source of damage, understanding the biology of the offending species, and knowing the pros and cons of management tools will help develop effective integrated management plans aimed to reduce damage affecting forest regeneration.

Damage to plantation seedlings

In even-aged conifer plantations of the PNW, most reports of tree damage by wildlife occur in the first five years of stand development. The major culprits include deer, elk, mountain beavers, pocket gophers, and voles. These species bark, clip, girdle, or browse the roots, stems, and/or branches. In some cases, as with clipping, initial damage causes direct loss of a seedling. Barking and girdling generally causes delayed mortality or severely reduced growth. Browsing often leads to seedling mortality; however, repeated browsing causes stunted, bushy growth in conifers.

Deer and Elk. Ungulates such as deer and elk browse the terminal and lateral shoots of young seedlings. Clipping of lateral shoots may resemble that of hares and rabbits; however, signs of chewing or upward pulling on the main stem are characteristic of ungulates. Uprooted but uneaten seedlings are indicative of elk browsing. Elk also trample and break seedlings by running through

TAYLOR, J. 2011. Identifying and managing for wildlife damage during stand initiation. Northwest Woodlands Winter 2011:16-17, 29.

and bedding in young plantations. Antler rubbing to remove velvet and mark territory is destructive to seedlings, but is more common in saplings and larger trees.

Several commercial repellents are sold to deter deer browse. They generally act on one or more modes of action including neophobia, irritation, conditioned aversion, and flavor modification. Research conducted at the National Wildlife Research Center (NWRC) has shown that habituation to odor limits the effectiveness of repellents that are not applied directly to food sources, while topically applied irritants and animal-based products produce significant avoidance. While repellents may provide temporary relief in some situations, they are not a long-term solution to deer browse. The durability and effectiveness of repellents can be affected by environmental factors such as air temperature, rain, snow, and wind.

Physical barriers range from protection of individual trees with devices such as tubing to exclusion of large areas with fencing. Fencing is an option for excluding deer and elk, but is usually avoided because of cost. Research has shown that not just any fence will exclude deer and elk; they must be sturdy enough to withstand break-through by running ungulates, and at least eight feet tall to prevent jumping.

Mountain Beavers. Mountain beavers are rodents found only in parts of the PNW, ranging from southern British Columbia along the Pacific Coast to northern California and east to the Cascades and Sierras. Their presence can be detected by their burrows, which are generally near seepages or drainages, as they require constant moisture (mainly from the plants they eat). They clip conifer seedlings along the main stem at approximately a 45 degree angle. Seedlings are generally taken back into their burrow system.

Rigid tree tubing may provide some relief against mountain beaver clipping; however, as with all damage

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Pocket gophers often clip the roots and peel the bark from seedlings.

management, one must weigh the cost versus potential savings. Trapping is the most common management practice for mountain beaver management in regenerating conifer forests; however, research has shown that vacated mountain beaver burrows are quickly reoccupied by reinvading individuals. Since 2006, Rozol® (active ingredient chlorophacinone) has been approved for use in Oregon and Washington under special local needs labels. For maximum effect, Rozol should be part of an integrated management plan along with trapping. In a study conducted at the NWRC, there was little difference in cost between a trap-then-bait program versus a bait-then-trap program.

Pocket Gophers. Like mountain beavers, pocket gophers are burrowing rodents that spend most of their lives underground. Pocket gophers damage seedlings by clipping roots and stems, and girdling larger stems. Signs of root clipping and impending tree loss may go unnoticed for several months, until tree foliage turns brown. Zinc phosphide and strychnine are below-ground toxicants used to control pocket gopher damage, along with trapping.

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This clean angled clipping made by a mountain beaver could be confused with a snowshoe hare where the species overlap. Use other features such as scat identification to determine the culprit.

Voles. Voles clip the terminal leader and lateral shoots from small seedlings, leaving rougher cuts than mountain beavers. They also debark and girdle larger seedlings. Small, thin, scratch-like grooves are indicative of vole damage. The most identifiable sign of most voles is their extensive surface runway system with several burrow openings. Voles are generally found in grassy habitat; therefore, habitat modification is an effective management tool.

Controlling for low grass height with mowing, herbicide, burning, or scarification will prevent high population densities. Zinc phosphide broadcasted or placed into burrows is the most widely used toxicant for vole control; however, care should be exercised to reduce non-target uptake. Due to their high reproductive rate and potential large population sizes, trapping is generally ineffective for voles.

Other wildlife damage. Several other wildlife species damage plantation seedlings, but their damage is not as widespread as that caused by the species mentioned above. Snowshoe hares and rabbits take terminal shoots from seedling stems at angles similar to mountain beavers. They also take lateral shoots that can easily be confused with deer browse where both species occur. Presence of hare/rabbit pellets should be an indication to look for presence of damage. Management techniques for hares/rabbits are few, although hunting and tree tubing have been suggested to reduce damage. Removing escape cover will likely

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reduce attractiveness of an area for hares and rabbits.

American pikas are found near talus slopes and their clipping of terminal and lateral shoots of small seedlings is similar to hares/rabbits. Damage generally is localized and of little significance.

Ground squirrels clip small seedlings in ways similar to vole damage. Like pikas, their damage is small scale and localized.

Forest grouse have been documented removing buds and needles from Douglas-fir seedlings. Bud removal can easily be misidentified as deer browse although no bark is removed by grouse. Grouse damage is more prominent in the spring and can be reduced by planting larger seedlings.

Seed predation

Although currently not as common as planting seedlings, direct seeding has long been used as a method to regenerate conifer forests following wildfire or harvest. Deer mice, chipmunks, and voles are common seed predators in the PNW. Detection of seed loss is difficult because there may be little to no sign left behind when seeds are taken.

Poisons have been used to control seed loss by rodents; however, they have generally been ineffective due to rodents' high reproductive potential and their ability to rapidly reinvade from adjacent non-treated areas. Seed repellents also proved ineffective because they reduced seed germination and were negatively affected by weather conditions. Use of diversionary foods (e.g., sunflower seeds and oats) has been shown to reduce loss of conifer seeds in short-term experimental studies; however, this has not been evaluated at an operational level.

Summary

As a general rule of thumb, the best approach to reducing wildlife damage during stand establishment is to get the terminal leaders of seedlings out of browse range as quickly as possible. One way to promote this is to plant big seedlings. This is often effective in getting trees taller faster. However, the more investment put into nursery stock, the more it costs to plant.

Another component of adaptive forest management is using herbicide treatments to enhance early conifer growth rates. Spraying could remove preferred forage of certain wildlife, altering the feeding behavior of a herd, but leaving seedlings as one of the few remaining food sources within an animal's home range.

Forest managers face many challenges in designing and implementing adaptive management plans for regenerating forests. One must accept that some level of wildlife damage is very likely going to occur and should weigh the cost and benefits of planned management activities over the rotation length of the stand. ■

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