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Rehabilitation
SILVICULTURE

You can read about forestry in books, or great magazines, or even go to a forestry college. Eventually, you will walk into a forest that does not fit the textbook. Actually, that happens frequently. Many of our natural forests do not fit the typical classifications of "even aged," "uneven aged," or other labels we use to determine appropriate practices.

Many forests have had a tough time. Previous high-grading has impacted a vast majority of forests here in the Northeast, and elsewhere. In fact, much of what we called "improvement cutting" 30 years ago was merely modified high-grading. We would cut some of the best and some of the worst, and think we were doing a swell job. Storm damage from wind, ice, and other factors, along with damage from insects, diseases, and past agricultural abandonment, leaves many areas with a heterogeneous mix of species and age classes that are in poor condition overall.

What can we do with these areas? We can walk through and see good and bad sections of overstory or understory, scattered trees that might be good growing stock or suitable seed trees. We have some idea what to do with each group, but we don't have a language to describe it, especially in areas where forest management is scrutinized by regulators or auditors.

One approach can be described as rehabilitation silviculture. The overall strategy is to improve the productivity of the area by removing mature or unacceptable growing stock, releasing acceptable growing stock or regeneration, and creating regeneration where acceptable growing stock (AGS) is sparse or absent. Each small area is treated with normal silvicultural practices, but in a mosaic of treatments with no concern for overall stocking or meeting goals for all-aged structure. Each acre, or group of acres, presents a different challenge. Granted, implementing this requires a good market for low-quality wood as pulp, firewood, or chips, along with a cooperative contractor.

These small areas can be called microstands, and there are six essential types:

1) Mature or unacceptable overstory
2) Immature acceptable overstory
3) Partial overstory with acceptable understory
4) Partial overstory with unacceptable understory
5) Regeneration patches with acceptable regeneration
6) Regeneration patches with unacceptable or non-commercial regeneration

Of course, there are sub-options like 1, 3, and 4 above with different percents of immature AGS in the overstory, or percents of acceptable regeneration in 5 and 6.

A separate prescription is applied by the forester, or

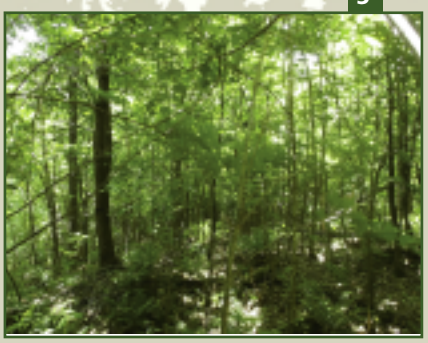
1

Mature or unacceptable overstory

2

immature or acceptable overstory after treatment

3



Partial overstory with acceptable understory

Partial overstorywith unacceptable understory after treatment

Regeneration patches with acceptable regeneration

Regeneration patches with unacceptable or non-commercial regeneration

logging contractor with oversight and feedback. Each microstand is treated with the goal of improving species composition, quality potential, and productivity in either overstory or understory strata, as available. So, each "microtype" is being treated in a normal way to improve it, and the problem of mapping tiny stands from heterogeneous types is solved.

For example, with a mature or UGS overstory (#1), it is time to regenerate that section. This could be a simple "group-patch cut" or could be done as a shelterwood group if more shade-tolerant regeneration is desired and acceptable leave trees are present. In sections fitting the #2 description, these areas can simply be left to grow, or released around the sides, if stocking levels are acceptable. If it is overstocked, then thinning is appropriate. Thinning may be a chance to influence species composition or select crop trees to release.

If the overstory is partial and an understory is established, it gets more complicated. If the overstory is primarily AGS with adequate stocking, then the understory may be insignificant, and it can simply be left. If the overstory is poor, or poorly stocked, then the regeneration is more important. With desired regeneration, overstory removal is appropriate. If the understory is poor quality, then a heavy cut is appropriate to scarify the site, destroy the understory, and hopefully establish desired regeneration. Deciding to leave scattered overstory trees, or shelterwood densities, is another option. Local conditions will determine what is prudent. We find that beech and striped maple can dominate a shaded understory in parts of the Northeast, so full daylight might be the antidote. Other areas have a chance to establish pine, spruce, or desired hardwoods with some shade.

With regeneration patches, you need to be able to look into the future. Usually there is a mix of desired and poor regeneration, so it is not as simple as "acceptable" or not. If there is a reasonable percent of acceptable trees through the patch, and they are vigorous with a good chance to overtop or outlast undesired species, then we consider this acceptable. For example: birch, oak, or maple seedlings can be expected to outgrow beech in bright sunlight if they are equal in height, but not if they are shorter, or still within reach of deer or moose in high-browse areas. Pin cherry may be overtopping desired hardwoods or spruce, but tends to drop out at about 30 years, just as the crop trees need to have some room. Aspen or poplar on the other hand may last 60 years and severely stunt the more desired species. If we find the mix and structure of this regeneration to be unacceptable for further growth, then this should be destroyed and replaced. Scarifying the ground to expose and mix subsoil and topsoil will generally give new seedlings of desired species a chance to get started.

Implementing this is complicated, and marking out each tree or group is expensive. This is best done with specific instructions for a top-notch logging contractor with constant feedback and perhaps marking of sample areas or exceptional leave trees. We use this technique in northern hardwoods, mixed woods, and pine-oak types, but it should work as well in other types with adjustments for local conditions and species requirements.

This method employs a diversity of silvicultural practices, both even- and uneven-aged in a group/patch fashion. The result is purposely not uniform, but will have a fairly low stocking overall. The stocking may fit guidelines for low-density shelterwood, but more than two age classes normally make up the residual stand. It departs from uneven-aged management in that no attempt is made at balancing age class distribution, or meeting area regulation or residual stocking goals. As such, deploying this method may face regulatory hurdles, since our Forestry Departments like to have crisp guidelines to evaluate success or compliance. We use an inventory method that discerns acceptable growing stock (AGS) from unacceptable growing stock (UGS), but also mature AGS from immature growing stock. If we can expect most of the mature AGS and UGS to be harvested, this gives a reasonable projection of residual stocking. It is important to note which immature AGS is likely to be retained in the inventory. For example, marginal-quality red maple that barely meets AGS standards should be subtracted from residual expectations.

Balancing economic and ecological considerations is the key to implementing rehabilitation silviculture. Since we are starting with a low-value, poor-quality stand, this kind of treatment may have little income,

or the costs may exceed income. Administration costs are high, but this is essentially an improvement cut for investing in future growth and value. Markets for fiber or chips are essential, unless this is done with herbicides or by girdling or felling cull trees. Personally, I would reserve girdling for infrequent use on particular wildlife snags. Identifying and reserving quality immature AGS will be part of appropriate treatments for each "microtype." This will vary with ownership goals, site quality, markets, and other factors. We find different species to be appropriate on certain soils, so this will be part of the decision process.

Other techniques can be added to intensive management with this approach. Early spacing of sapling and small pole sections, which we commonly call "crop tree release," may be warranted in some patches. Particularly if high-value trees such as sugar maple or red oak are overtopped or crowded by low-value trees, this should be considered. It is important that they are tall enough to have developed suitable clear boles. This should be done after the commercial treatment. Planting trees may be considered in gaps and regeneration groups if natural regeneration will not likely provide desired species. These are usually considered to be supplemental to the natural regrowth. In our area, red oak is often added to the mix, and 20–50 trees per acre can be significant. Planting softwoods like pine or spruce is another option. Herbicide treatment of undesired regeneration such as beech or invasive species can also be useful. Generally, we prefer to do the herbicide treatment before the harvest, since directly after, the desired new seedlings may be established, and damaged by spraying.

The rehabilitation silviculture approach is an excellent wildlife habitat improvement. It maintains structural diversity, with variable patches of overstory retention, and a large component of seedling/sapling regeneration. As such, it is an excellent technique for dealing with high levels of deer or moose browse, and wildlife that benefit from early successional forest with a multistoried canopy element. This benefits the full range of game species as long as suitable mature forest habitat is nearby. It also benefits a wide range of nongame species, predators, and migratory birds. Retention of occasional large-diameter trees, even culls, can provide cavity trees for wildlife and eventual coarse wood for the forest floor.

The next time you walk into a forest and say, "Oh my, what can we do here? What do we even call this?" consider rehabilitation silviculture. ■

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