

# CLEAR-CUT: THEME AND VARIATION

*This article discusses the issues associated with clear-cuts and other heavy-cut systems. First, we will consider why and where these cuts will be appropriate. We will look at a range of heavy cuts and what we call them, and then how to actually implement these choices. Finally, we will go over some of the real and perceived problems and various solutions with clear-cutting and its variants.*

*by Robbo Holleran*

**R**emember debate class? That was where you learned how to present your argument, how to carefully listen for the substance of the opposing argument, and provide concise and constructive rebuttal. And logic class was where you learned to use deductive and inductive reasoning, and how to discern fallacies. I never took those classes myself, and if I had, would have found them boring and unnecessary. Actually, these classes have been uncommon for a couple generations, and our lack shows up in public discourse. Do you ever sense that the information you get is one-sided, seriously biased, sensational, or just lacks the ring of truth? Many journalists see themselves as activists. We are bombarded by propaganda techniques that we would learn to recognize in “Logic 101.”

“Clear-cutting causes erosion.” “Clear-cutting destroys biodiversity.” “Clear-cutting destroys wildlife habitat.” Our attention span seems to be as long as a bumper sticker. Each of these factoids takes a tiny seed of truth and grows it into a hideous monster of a lie. Can clear-cutting cause erosion? Sure it can. Are all the negative risks outweighed by the positive benefits? What are the real risks and real benefits of clear-cutting and other heavy cuts? How can the negative risks be mitigated? Now we are getting to the real types of questions we should be asking.

## Why Do a Heavy Cut?

In a basic sense, clear-cutting is done to replace an existing forest with young forest of all one age. It is a reliable technique for regenerating trees that need full sunlight, such as birches, poplar, and some pines. Clear-cutting and its variants can be used to regenerate a wide range of species and is recommended for almost all forest types. It is usually applied to forests that are mature, overmature, or low quality, and often to replace the current forest type with “shade intolerant” species.

The post-pasture forests of New England are coming to maturity. Many were abandoned more than 100 years ago, and some were impacted by previous poor management, ice and other storm events, insects, or diseases. In stands with a high percent of mature or low-quality trees, clear-cutting is a reliable way to regenerate intolerant and mid-tolerant species.

Most of the clear-cutting that I do on private land in northern New England is done to improve

**Photo left:** Forests that are mature or low quality are good candidates to regenerate with clearcutting and its variants.



wildlife habitat, diversity of species, and forest structure. I’m not talking about clear-cutting whole townships, but stand-level regeneration cuts that fit into a forest management plan for an ownership. We don’t do it for the immediate “brown stage” result, but the “green stage” that occurs as new trees and plants get started in the full-daylight and disturbed soils. Something like 80% of all our wildlife species make use of these young-forest habitats, which are now rare in many areas. All the game species and many of the songbirds and prey species (and therefore predators) find food and cover in these areas. Wildlife management guidelines suggest that 5% to 15% of a landscape should provide this 0 to 10-year age class for habitat. Most of New England has less than 2%.

Deer and moose can take a heavy toll by browsing on desired tree seedlings. When regeneration is limited to small patches or dense

**Above top:** The new growth of trees, raspberries and plants just two years after cutting provides food and cover for birds and game species. **Below:** After 15 years of growth, a new stand of high-quality northern hardwoods is well established.

shelterwoods, browse damage can significantly alter tree species and leave undesired regeneration. Larger and heavier cuts produce an abundance of new seedlings providing ample forage for large mammals, and usually have enough left over for us to grow a new forest.

Tree species diversity is certainly affected by clear-cutting, but is this negative? In the Northeast, we see a continual rise in late-successional species such as beech, hemlock, and maple. Many of the declining species make use of full sunlight to regrow, such as birch, poplar, butternut, and pine. Clear-cutting often is a solution to maintaining diversity of tree species, along with age-class and structural forest diversity.

The economic benefits of heavy cuts are worth a mention. Obviously, this maximizes the harvest volume. But it also minimizes administrative time. Marking individual trees or small groups is an expense that has to be considered for each harvest, and this is especially significant with light cuts. In clear-cuts, only the boundaries need to be marked, and perhaps reserve trees or areas as mentioned below. Heavy cutting also allows for very efficient harvest which makes it more economical to harvest smaller and low-quality trees. Loggers will almost never do a clear-cut if given “free reign.” They will harvest the valuable trees and leave the culls. A true clear-cut is done when a forester (or landowner) decides that it is time to harvest the mature wood and get rid of the weeds.

### Clear-cuts and Variations

True silvicultural clear-cuts are easy to describe. All the trees are cut down, usually 1-inch or 2-inches DBH and larger. This is a drastic change, but the point is that we have determined the forest is ready for change. In some cases, only trees 6 inches or 8 inches and larger are harvested, and this is probably a big mistake, unless the forest has a desirable understory of small trees that we want to grow. We would call this an overstory removal. In this case, it is important to limit the damage to these understory trees by careful felling and skidding of timber. With small seedlings, it is best to do this with snow cover for protection. But with a poor understory, leaving the small trees is called a “commercial clear-cut” and is not recommended.

Some variations on simple clear-cutting involve leaving certain trees standing. A “seed tree” cut will leave particular trees for a seed source. Birches, pines, and oaks are typical choices. In most cases, there are millions of dormant seeds on the ground already, so seed trees

may not be needed. But a few trees left standing is still called a seed-tree cut or perhaps “clear-cut with reserves.” Other than seed trees, we might leave specific crop trees, wildlife trees, or giant old trees for cavity dwellers. Standing dead snags or unusual trees for species diversity can also be left. This is usually about 2 to 20 trees per acre.

Another aspect of “clear-cut with reserves” would be called “clear-cut with reserve areas.” In this case, specific areas are left uncut. These may be wet areas, stream buffers, younger patches, visual buffers, or particular species. This may be a better technique to apply to larger clear-cuts, as it breaks up the visual and ecological impact and provides more structural diversity. This would normally leave less than 10% as reserve areas.

If about 10% to 25% of the canopy is retained as scattered seed trees or reserved areas, we consider this a low-density shelterwood. Reserve trees and areas will have an impact on regeneration species, partially due to shade and also by limiting scarification around leave trees. These will tend to have a lower percent of pioneer species, and more mid-tolerant species like yellow birch. This creates a two-aged forest with maximum number of species of breeding birds since there is both overhead cover and brushy understory.

“Variable retention” is a more vague term that involves clear-cutting and heavy cutting on a large percent of the area, but includes a significant portion of reserve areas and reserve trees in an irregular pattern—10% to 40% might be reserved. This provides some benefits of clear-cutting, but with more structural diversity in the new stand.

### How Do We Do This?

The first aspect is size. Small patches of 1 to 5 acres might be considered part of uneven-aged management in larger stands, but all the same principles apply on a smaller scale. We usually think of

clear-cuts and their variants as a whole stand. This might be five or a hundred acres or more. Especially in fire-prone ecosystems like lodgepole pine, a thousand acres might be appropriate. In my experience, I have seen areas of over 1000 acres clear-cut in northern hardwoods that have regrown into healthy, productive, and high-quality forests. There is some indication that these larger cuts provide habitat for maximum numbers of breeding birds and large areas of unbroken canopy (which benefits interior species) in subsequent decades while the stand develops.

This should all be part of a carefully constructed forest plan that takes into account timber, wildlife, aesthetic, and ecological considerations. This is specific to your particular forest in the context of the surrounding landscape. If you have the only deer wintering area for miles around, then clear-cutting this will have broad effects. Also, any habitat for rare species should be protected. These are often noted on state Natural Heritage websites. Each state has its own rules for stream protection buffers, wetlands, and permit requirements for larger heavy cuts.

Once a stand has been selected for a regeneration cut, we choose the best system. A small stand with nearby wildlife trees and diverse habitat may warrant a complete clear-cut. If a desirable understory exists, we treat this as an overstory removal to protect existing regeneration. With undesirable understory, scarification (destruction of the ground cover and exposing bare soil for a new seedbed) is important to start new trees. If there is a component of immature growing stock or certain trees to be retained for future crop trees, seed source, or wildlife habitat, then these are selected as reserve trees or reserve areas. This will be more important with larger harvest units.

Boundaries of the cut area need to be clearly marked with paint on perimeter trees so that contractors

are well aware of the limits. We often give contractors a GPS with the limits, so that from the inside of a felling machine they know if they are close to the edge. Reserve trees and areas need to be clearly marked or clearly understood by the person in charge of felling. Paint is better than ribbons, because felling can often knock off the ribbons of a nearby tree. It is discouraging to find the ribbons on the ground by a stump.

Any logging system will get the job done, but some are better suited to heavy cutting. Proper application of this silviculture involves removal of small and cull trees, so hand-felling may not be practical if there is a high percent of this. Mechanized harvesting is well-suited to heavier cuts and clear-cuts. Either whole-tree or cut-to-length systems work well. The problems of wider trails and residual tree damage with large equipment are not issues with these heavy cuts. The efficiency is notable.

Mechanized harvesting is also better at either protecting the understory or scarifying the site. Have you ever watched a field of feed corn being cut? Imagine if that kind of productivity could be used in forest management. With clear-cuts, it can be.

Contract specifications need to include all the particulars of your unit. We often have the contractor supply the labor and machinery for landing construction, with the landowner paying for cash costs like gravel and culverts. Special attention has to be paid to trail construction, maintenance, and final close-out to protect against erosion. Every state has “best management practices” (BMP) that need to be followed closely on heavy cuts and around streams. Erosion from clear-cutting in New England is primarily associated with poor trail construction, and significant erosion is actually rare. It is not the lack of tree cover that causes erosion, since roots are retained and re-vegetation

occurs rapidly.

Scarification of the site or protecting young seedlings by keeping the felling and skidding on distinct corridors should be clear. Whether the harvest is directed at all trees over 2-inches DBH, or complete removal, should be part of your agreement. The time of year might be important. Frozen ground, or snow-free, might be specified in certain cases. Reserve trees and areas should be specified. Frequent inspection may be justified to ensure contract compliance.

### Problems/Solutions

Erosion is the first problem that comes to mind when the subject of clear-cutting comes up. There are unstable soils where this is a major issue. But in most areas, proper application of drainage with BMPs will minimize erosion.

Invasive species and noncommercial trees can be a problem with heavy cuts. In some cases, complete clear-cutting with scarifi-

cation might be the antidote, though. Many of our invasive shrubs do well with partial cutting. Yes, they can multiply in the newly disturbed area after clear-cutting, but if new trees can grow through these weeds and occupy the site, then these shrubs are relegated to an understory condition and the site remains productive. Noncommercial species like striped maple and hop hornbeam are easily overcome with this method. Beech is more problematic with its ability to sprout from roots, though. Pin cherry and gray birch can be prolific after a heavy cut, but if desirable trees are mixed in, these will eventually grow through the canopy. Pin cherry and gray birch tend to drop out after 30 years or so, after the crop trees have developed a straight, clean stem, and need some room to grow.

Public perception is another issue. People just don't like heavy cuts. There are two ways to deal with this: hide it, or show it off. An uncut buffer 100 feet wide might

keep a heavy cut out of view and is required in some areas. A large cut might be visible from across the valley, and a buffer across the middle or at the ridge-line can break up the view considerably. Harvesting in natural shapes, based on forest and soil types, will be less noticeable than square blocks that follow ownership boundaries. Another option is whether you have a "hard" or "soft" edge. A distinct edge between cut and uncut areas may look best. But feathering the edge with partial cutting is sometimes appropriate. A bolder approach is to put up signs that explain the forest management process and why this area received a drastic treatment. I do this on visible jobs and visitors are appeased to see that the result is part of a thoughtful process.

Finally, planting trees is a consideration. In many parts of the world, harvesting trees means planting trees. By careful application of silviculture, we can usually avoid the time and expense of tree planting.

Regenerating a forest is a purposeful decision. We balance the amount of light and shade, disturbance to the soil like scarification, or protection of seedlings, and sometimes plan a harvest to coincide with seed production in desired species like pine or oak. Sometimes planting trees will be warranted to get exactly what we want. This might be filling in spruce or pine to get a complete softwood stand, or adding diversity into a hardwood stand with oaks, chestnut, or walnut. It is hard to make economic sense when the final harvest is 100 years away, but we don't regenerate forests for ourselves—we do it for our grandchildren. ●

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