

# Talkin' Bout

# Regeneration

BY JOHN DONOUGHE  
AND MIKE WOLF

**Competing Vegetation, Deer,  
and Light – CDL – the three factors with the  
greatest impact on forest regeneration.  
For deer managers, those three  
letters spell **Future Food and Cover.****

## “You plant corn, you get corn.”

Every deer manager who has planted food plots knows the literal application of this old farmer's adage is just as apt today as centuries ago. The constant battle with weeds aside, you get what you sow. Simply put, the land manager, with planning, effort, and some help from Mother Nature, has the final say in what grows where.

This applies to a deer manager's food plots as well as a farmer's croplands. Yet food plots typically account for just a small percentage of a manager's deer and wildlife habitat. Forested land is our more abundant, staple resource. Can landowners exercise control of the tree and shrub species that will provide food and cover for decades or generations? The answer is yes, but it involves more than a dose of luck and a friendly nod from Mother Nature. Landowner understanding, planning and effort are the key to the quality of the forest that will grace our senior years and be passed

on to the next generation of whitetail hunters. And though forest growth is a slow process, results can be seen in as little as the first few growing seasons.

Different landowners have different objectives in mind when deciding upon management strategies, but readers of *Quality Whitetails* will agree on this: we want our forests to produce tree and shrub communities that provide ample food and cover for deer and wildlife, and we want a forest that has the potential to provide sustainable income from responsible timber harvests. We want quality trees in all stages of development. We want our best trees to regenerate. We want great deer habitat. None of this is news. The news is the degree to which we can steer the development of the next forest and enjoy watching it develop.

CDL, which stands for Competing Vegetation, Deer and Light, is an excellent starting point both for landowners who are new to forest management as well as to professional land manag-





The CDL system takes the art and science of regenerating forests and reduces it to its three most basic components. Joe Harding teaches CDL to Penn State Forestry students as well as private landowners and quality deer managers.

ers who want to efficiently convey the most important aspects of forest management to their clients and to the public.

Joe Harding is the Director of Forestlands for Penn State University's 8,000-acre forest. Joe is not only a "boots on the ground" forest manager, he also assists with teaching, research and demonstration at Penn State's Stone Valley Forest where forest sustainability is a big concern and tempers all management decisions. Joe originated the concept of "CDL" after giving several tours and talks on the subject of regeneration.

"The main subject areas of competition, deer and overstory continually surfaced, and since, in my opinion, the sequence and timing is critical to success, the acronym CDL naturally emerged," said Joe. "CDL provides a simple, easy-to-remember framework for landowners and managers when they are contemplating a regeneration treatment."

Why would QDM'ers be interested in a "regeneration treatment" in hardwood forests? The answer is simple and it takes us back to what we all want: food and cover! In forests nationwide, proper harvesting can produce quick growth on the forest floor. This ground growth, due to added light, can produce both food and great cover at the same time. Alternatively, if you ignore Joe Harding's CDL guidance, added light has the potential to create added costs and added nightmares to your forest management.

"Recognizing the impacts of competition, deer and light (manipulation of the overstory) and adequately addressing these concerns in the proper sequence can make the difference between success and failure," said Joe. "Failure or partial failure to obtain adequate and desirable regeneration may be prohibitively expensive to correct, which could result in the loss of habitat and loss of productive forestland."

Joe's CDL message gained traction and has become a major theme in the education of Pennsylvania's forest landowners. Dave Jackson is a forest resources educator with Penn State Cooperative Extension. Dave creates educational programs that help forest landowners make wise forest management decisions. In 2002,

Dave and Mike Wolf were introduced to Joe Harding's CDL concept. The potential was obvious. Dave and Mike took the message to thousands of landowners across the state and turned the CDL message into a Forest Stewardship Publication (you can download it at: <http://pubs.cas.psu.edu/FreePubs/pdfs/uh181.pdf>).

## C is for COMPETING VEGETATION

Weeds are the bane of the farmer and the food plot manager, and yes, the forest manager. A weed is simply an undesirable plant, one that will sap water, soil nutrients, and sunlight from the plants we hope to grow, harvest, or use to attract wildlife. Some weeds, like pigweed, thistle, and dock are ubiquitous and notorious destroyers of food plots. Other weeds may actually come from desirable stock, but are in the wrong place at the wrong time. For example, a volunteer corn plant is considered a weed in an emerging soybean field.

Forest managers decide which trees and shrubs are desirable and which are "weeds" based upon the landowner's goals for the property. If we are trying to establish both food and cover in the forest, and if we list things like potential timber value and sustainability as additional goals, we can begin to create a list of desirable plants and a list of undesirable plants. For instance, many properties are inundated with noxious plants like non-native multiflora rose. Multiflora rose can easily be looked at as a positive if your only goal is thick cover. However, if a landowner's objectives include deer food, timber value, and forest sustainability, multiflora rose gets relegated to the "weed" list. The point is, you have to know what you have, what you want, and how to get there from here. These are things you'll probably have to discuss with your professional forester.

How do landowners know if competing plants are a problem? A simple assessment begins with a look at the ground. What plants dominate the forest floor and understorey? Project their growth forward. Will these plants produce the forest that will meet your management objectives? If not, consider taking steps to control or limit their growth. Your forester

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### WHAT IS REGENERATION?

"Regeneration" is a term used to broadly describe the next forest. It can refer to the actual seedlings on the ground, or it can also refer to a process by which forest managers attempt to regrow forests. For example, we can say that ample regeneration (seedlings) is an important factor in the successful regeneration (future harvest opportunities) of a site.



Removing undesirable plant species before a regeneration cut is critical to producing quality deer cover and food. The yellowing trees in this photo are ironwood which have recently been selectively sprayed. Ironwood can form a dense understorey that aggressively competes for sunlight with seedlings, so it was deemed "undesirable" on this property.

may recommend using herbicides to control competing plants. Also, there are other control options available such as prescribed burning and mechanical removal. The bottom line is, if competing plants dominate your forest floor, don't increase light! The tragic results would be increased competing plants rather than an increase in the species that you've listed as desirable.

Take Joe Harding's advice and spend some time observing the conditions of your forest floor.

"A window into the future response of the forest may be obtained by observing natural openings in the stand due to blow-down or single tree death or by observing the results of an adjacent harvest with similar pre-harvest conditions," he said. "This information may be invaluable in helping to determine which competing plant may become established or increase its hold if nothing is done to correct a problem."

## D is for DEER

Most of us have a myriad of reasons that we spend time in the woods, but deer and deer hunting are central. We enjoy watching deer, hunting deer, and creating habitat that meets their needs. Deer are the reason for working food plots, and a big part of the reason we learn to identify trees, plants, and cover types in the woods we hunt. But deer can be their own worst enemy. Given the chance to reach their reproductive potential, deer can foil our efforts to create their ideal habitat. They can suppress or eliminate the regeneration of the best species of timber from a forest and eliminate plants that support other game and wildlife.

The ecological principle that we're describing is carrying

capacity, commonly defined as the number of individuals that the habitat can support without damage to the health of either the individuals or the habitat. Carrying capacity can be illustrated with a simple analogy.

A horse pasture can support only so many hungry horses. Let's say that under given conditions the carrying capacity of a pasture is one horse per acre. You own five acres of pasture and turn three horses into the field. With proper moisture and other growth conditions, grass growth stays ahead of grazing and all goes well. In fact, since the horse population is well below carrying capacity, there is a cushion in the event of drought or other unforeseen setbacks to grass growth. Add two horses to the field and grazing catches up to growth, but under stable conditions an equilibrium is reached. Adding a sixth or seventh horse won't cause an immediate collapse of the horse/pasture system. The field won't turn instantly brown and the horses won't immediately starve. Instead, we would expect the most palatable grasses to diminish as thorny weeds take their place. The change will be gradual but inexorable. Add three or four more horses and the change will be rapid and unmistakable. Horse forage will disappear.

The analogy may be a bit oversimplified, but its applicability to deer and deer habitat is clear. However, there is an additional point many hunters miss. If the pasture was overgrazed by nine horses, it now has a new carrying capacity that is closer to zero horses than the original five. The land needs a rest, and a little help, to recover.

The question for deer and forest managers is, where does

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### About This Article

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my land fall on the deer carrying capacity curve? Is the current deer density well below the carrying capacity of the habitat? If so, deer may have little significant impact upon forest regeneration. If the deer density is slightly higher than current carrying capacity, the deer may prevent the most desirable browse species from regenerating while the competing plants increase in dominance. If the deer population has been too high for too long, drastic reductions of deer numbers may be necessary before the best hardwoods and deer browse return to your land.

Managing deer begins with assessing current population densities and habitat conditions. We use annual deer density and browse impact surveys to establish baseline data and to monitor trends. They are easy to do

(Refer to our previous articles in *Quality Whitetails*, “Happiness is a Large Pellet Pile,” February 2007, and “Over the Limit?” December 2007). Methods such as trail-camera surveys can yield good results as well, but they don’t tell you how the deer population is affecting forest regeneration. QDM is first and foremost



Admitting sunlight before competing plant species have been addressed is a bad idea. In this photo, admitting sunlight is only going to produce a dense stand of ferns that will shade out desirable species.

about balancing deer populations with their habitat, and QDMA has scads of literature that describes proper management of deer populations. One recent example is Kip Adams’ *Whitetail Wisdom* column “What’s the Best Deer Density?” in the August/September issue of *Quality Whitetails*.

## **L** is for LIGHT

Light may be the most straightforward of the three factors to address. It doesn’t run away or pop up in unexpected places. First, consider what species you’d like to regenerate in a particular stand of timber. Trees can be roughly divided into three categories that are determined by the species’ sunlight requirements. Shade intolerant trees need full sunlight to meet their potential. These include aspens, tulip poplar, and most species of cherry. Intermediates do well in a variety of conditions including partial shade. They can germinate under a forest canopy, but will thrive if later released from shade by the removal of the overstory. Oaks, red maple and hickories are examples. Shade tolerant species can germinate and develop in the filtered light of a closed or nearly-closed canopy. Though growth may be slow, they can develop in the shadows for decades. Shade tolerant species include hemlock, American beech, and sugar maple.

What tree species would you like to encourage in your neck of the woods? Get to know the common species in your region and their category of shade tolerance, then begin to evaluate your property. Match the light conditions to the light requirements of the desired species. For instance, in northerly regions, aspens are prolific root sprouters and love light. If you’d like to increase the aspen component of your property, a clearcut is your best bet. If you’re targeting oak regeneration, get them established before tackling the canopy. Oaks are slow-growing and can lose the battle for sunlight once the overstory has been removed. Give them a head start before bringing in the sun.

Matching harvest and thinning strategies to your site con-

ditions is extremely important, and the advice of one or more experts should be sought.

### **Putting it All Together**

The three components of CDL shouldn't be addressed in isolation. Time and money will be wasted treating competing plants if an overpopulation of deer is the root of the problem. Likewise, opening the overstory to sunlight can be futile if the forest floor is already covered in competing plants such as grasses or ferns. If you are planning to create food and cover in your woodlot, before you cut any trees, you must look at what is currently growing on your forest floor. A comprehensive management plan accounts for all three factors.

Do you have an abundance of desirable seedlings? Is the forest floor bare? Is there a layer of competing plants? In your mind, imagine what harvesting trees, which increases light, will do to your current situation. In many cases, it is best to put the brakes on! Seek professional help and a complete understanding of what will result from your plans before harvesting timber.

If you do have a competing plant problem, try to figure out why. Building a small deer enclosure may help your understanding. In most cases, when competing plants exist and native seedlings do not, the culprit is of the four-legged kind. A small enclosure will likely provide enough evidence over a few years for any juror's guilty sentence. Deer have feeding preferences – meaning, they like to eat some plants and ignore other plants. We've found that an abundance of competing plants and an absence of desirable seedlings most often indicates too many deer.

For many years, folks considered light to be the key element

to regenerating forests. However, in reality, light is last in line. Remember, the simple acronym is CDL. Light is really the last thing to think about. In other words, until you have the competing plants under control and the deer herd under control, don't add light to the already unhealthy system. Hold off on cutting.

### **CDL in the Real World**

Readers of our previous articles in *Quality Whitetails* may remember the Brush Mountain Sportsmen's Association (BMSA), where John is a member and Mike is the consulting forester. The BMSA, located in central Pennsylvania, holds over 600 acres of maturing forest on the western flank of Brush Mountain. For decades, the organizations' hunters recognized a need to manage the land's resources to optimize income as well as deer and wildlife habitat. The problems, however, were legion. First, there was no advanced regeneration – none! Annual browse surveys revealed that not a single seedling of desirable hardwood species was surviving beyond a single growing season.

Second, invasive species were established on the property, primarily along forest edges and openings. Tree of heaven and Japanese barberry were the most prominent offenders, and the barberry was beginning to make inroads to the forest interior. Third, while there were few or no seedlings of desirable tree species, there was an abundance of competing plants. There was a substantial understory of black birch, a tree of low value for wildlife and timber, and hay-scented fern formed a dense carpet on the forest floor over large sections of the property.

The situation was bleak. Club members wanted to improve

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habitat and harvest timber, but doing so under the existing circumstances would have very likely released more competing plant species while removing mast trees and the seed stock for future tree growth.

How had this situation evolved?

Deer overabundance was at the root of the problem. In the 1970s through the 1990s, and possibly long before, deer numbers had been permitted to exceed the carrying capacity of the habitat. This wasn't exclusive to the BMSA – much of the state experienced the same problem. At the BMSA, preferred browse was hit hard and eventually

disappeared entirely. The only plants that survived beyond a single year would have been the least preferred, like black birch, and unpalatable plants such as fern. Fern is a tenacious competitor, forming a knee-high mat so dense that very little light can reach a sprouting tree seedling. It became a vicious cycle in which all desirable regeneration was suppressed by competing vegetation, deer, and lack of sunlight all at the same time.

Any remedy would need to address CDL. Mike wrote a 10-year forest management plan that divided the 600 acres into nine forest stands, each with its own prescribed management strategy geared to meet the Club's goals of sustainable timber income and



## THE EDUCATIONAL VALUE OF SMALL ENCLOSURES

The Brush Mountain Sportsmen's Association set up several small fences to help them diagnose their regeneration problems. Here, Randy Geiner, president, and John Donoughe examine the results.

First, club members clearcut an area less than 1/10th an acre. The ground in the photo, both inside and outside the fence, was then treated with herbicide to kill competing plants. Club members used scrap materials to erect the fence. The difference was phenomenal and educational. In the first growing season, seedlings emerged both inside and outside the fence.

On the outside, the seedlings were browsed to the ground within weeks of sprouting. By the second growing season, competing ferns and grasses again blanketed the outside, but a new, healthy forest was taking hold within the protection. Shown here in the fourth growing season, the fenced areas are dominated by aspens, but also have red and white oak, red maple, tulip poplar, black locust, wild grapes, blackberries and raspberries, among others. Discovering the degree to which deer overabundance impacted regeneration on club grounds was critical to helping to establish a comprehensive management plan. The full 10-year plan can be seen on the web at:

<http://sites.google.com/a/brushmountain.org/habitat/>

Select "Forest Management Plan" in the Navigation menu.



improved deer habitat. One 80-acre stand, known as Management Unit 4, contains the club's best timber. Money from timber sales from that stand alone could help to finance habitat improvement and club operations for years, but without regeneration, a timber harvest would be "one and done," and without the mast trees, deer carrying capacity would have been slashed even further.

Mike's plan called for dividing those 80 acres into four sub-units, each with the same prescription, but implemented on a rotating basis over time. Additionally, the forest management plan set a course for each of the nine forest stands that would, together, improve wildlife habitat over the whole 600-acre forest and pro-

vide monetary resources for the club.

In September 2009 the plan was put into action on the first 20-acre subunit of Management Unit 4. Birches, ferns, and other competing plants were treated with herbicide from backpack sprayers. A subcontractor was hired to fence the stand with 8-foot woven wire. The goal of the herbicide and the fence is to allow natural regeneration of oaks, hickories, tulip poplar, ash, and maple to get a jump on any competing plant species that might repopulate the stand.

At the same time the BMSA has been aggressive in attempting to bring the whitetail population down to more reasonable levels. The club participates in the Pennsylvania Game Commission's Deer Management Assistance Program, which grants qualifying landowners additional antlerless tags based upon acreage and deer management goals. The club's own efforts are combined with a statewide deer management strategy that is more in line with the principles of QDM than had been followed in previous decades.

Inside the fence, we are monitoring the levels of advanced regeneration, which is defined as seedlings present in advance of a harvest. When seedlings of desirable species have been established in sufficient densities, we'll bathe them in sunlight by conducting a regeneration harvest. A percentage of overstory trees will be removed, which will increase sunlight to the seedlings. The uncut timber will remain standing to provide an additional seed source. The residual trees, which will be well-spaced across the site, will also "shelter" young seedlings. While lots of sunlight is good, extreme heat and the dry soil conditions it creates can be detrimental.

The residual trees will remain for a period of time until the growing seedlings are able to exceed the height of a browsing deer. That's when the residual trees can be carefully harvested and the woven wire fence can be removed. The BMSA will have generated revenues to fund future management goals, and just as importantly will have ensured that the harvest of timber creates a stand of young trees that will improve deer habitat and deer hunting. If you're interested in seeing BMSA's complete forest management plan, it's available on our Club's website:

<http://sites.google.com/a/brushmountain.org/habitat/>

### Conclusion

Just as readers of *Quality Whitetails* are familiar with the cornerstones of QDM, land managers and hunters can use CDL as the cornerstone of forest regeneration. QDMA members often view their land as their legacy. Providing healthy forests for the next generation of deer hunters and working to meet those goals can be a rewarding part of our enjoyment of quality deer habitat.



**About the Authors:** *John Donoughe of Pennsylvania is a past president of the Brush Mountain Sportsmen's Association, where he currently serves on the Habitat Committee. He teaches Environmental Science courses at the high school level and frequently writes for outdoor publications.*

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