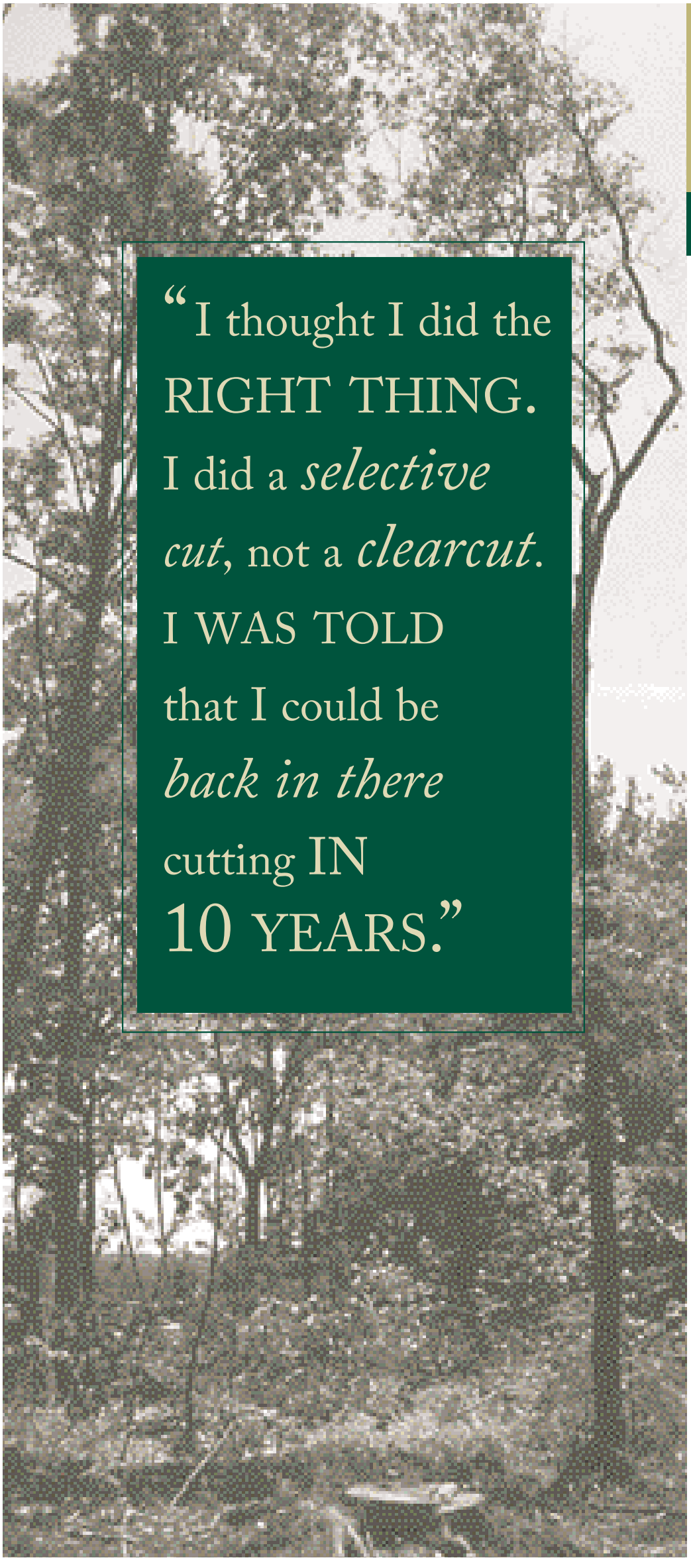
High Grade Harvesting

Understand the impacts, know your options.

Paul Catanzaro
University of Massachusetts Amherst

Anthony D'Amato
University of Massachusetts Amherst



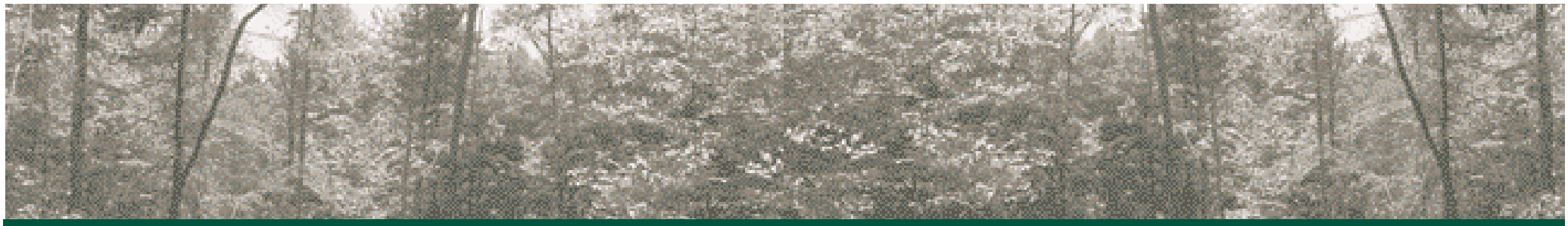
Introduction

As a landowner, you may be approached by a logger or forester to have a “high grade” harvest of your woods, which they typically call “selective cutting.” Selective cutting refers to a harvest that does not cut all of the trees.

However, *there are many forms of selective cutting.* While high grading does leave trees after the harvest, the critical issues to consider are whether the harvest will meet your immediate goals and if the remaining trees will best meet your future goals.

All woodlands do not provide equal benefits. The number, size, type, and quality of the trees left after harvesting all affect what your woods will become in the future and, as a direct result, what benefits your woods will provide to you and those that follow. **High grading generally takes the best trees and leaves the rest, and may not meet your needs.**

This pamphlet will help you make informed decisions about the sale of timber from your land by providing information on high grading and forest management using silviculture. It also gives you information on resources and professional foresters who can help you.



SILVICULTURE

Silviculture - The art and science of controlling the establishment, growth, composition, health, and quality of forests to meet the diverse needs and values of landowners and society on a sustainable basis.

Managing a woodlot using silviculture will promote tree species, sizes, and qualities in the woods to meet your interests. This is accomplished by concentrating growth on the most vigorous trees of the most valuable species by removing competing trees which are slow growing and of poorer quality. Forest management using silviculture improves the overall quality and value of the woods. Silviculture also plans ahead by creating conditions which favor seedlings of trees species that will satisfy your landowner objectives in the future.

Forest management using silviculture is required for any property enrolled in Chapter 61, the current use tax program, and when forest management is implemented on land in the Forest Stewardship program.

HIGH GRADE AND RELATED TERMS

High grade - A harvest that removes the trees of commercial value, leaving small trees, as well as large ones of poor quality and of low-value species.

Diameter-limit cut - A timber harvest that removes all trees larger than a specified diameter (e.g., 12" and larger). Diameter-limit cuts often result in high grading.

Selective cutting - Any cut that leaves a substantial number of trees; the term can be used for harvests that meet good silvicultural standards, but it is often used for high grade harvests, implying that the best trees are selectively cut.

High grading liquidates the value of the woods by:

1. Removing the largest, most valuable trees and,
2. Increasing the composition of the poorer quality and traditionally low-value species (e.g., red maple, beech, hemlock) *(see Figure 1)*.

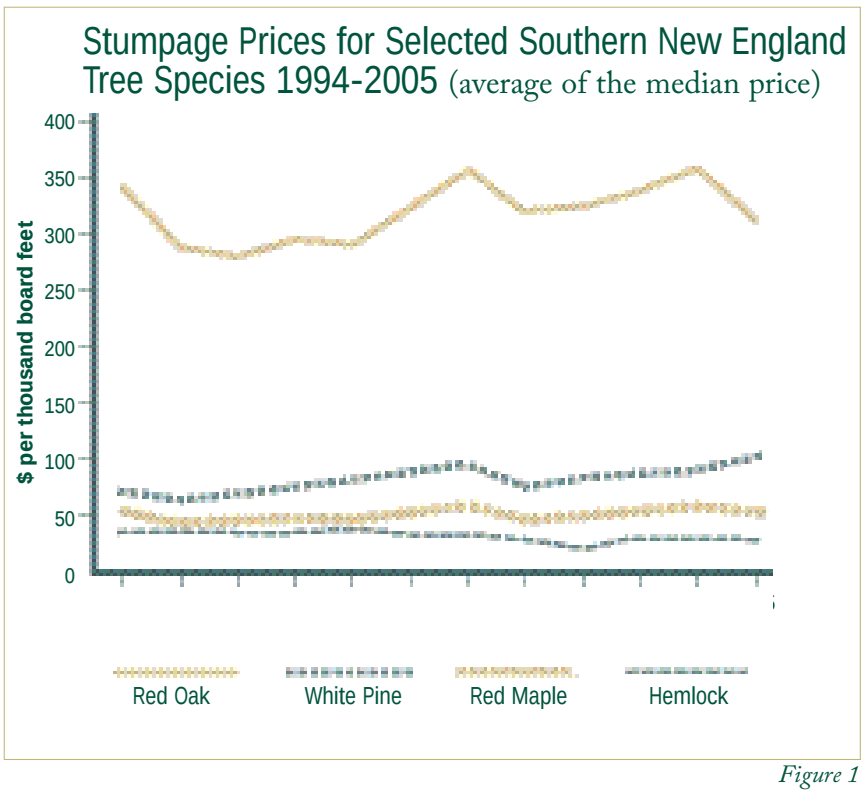


Figure 1

Since trees in many woodlots are the same age, **cutting the biggest trees does not leave young ones to grow.** Rather, these cuttings take out the fastest growing trees, leaving the woods with slow growing, less vigorous trees of the same age as those removed. Even when the smaller trees are left in the open, they still will grow much slower than the trees removed in the high grade *(see Figures 2 and 3)*.

In addition, this opportunistic approach does not optimize the growing condition of the woods through proper spacing of the trees. Instead, it usually leaves trees irregularly distributed in the woods (because many trees were harvested in some places and none in others). This irregular cutting produces poor growing conditions in the crowded areas of the woods and also often promotes tree seedlings of lower economic value such as red maple and beech.

Comparison of Silviculture and High Grade Harvesting

Figure 2a

Woodlot before harvest

Figure 2b

Woodlot shown in Figure 2a (above) after harvest using silvicultural principles: well spaced, primarily codominant trees are left to grow.

Figure 2c

Woodlot shown in Figure 2a (above) after a highgrade harvest: irregularly spaced, poorly formed codominant, intermediate, and overtopped trees are left to grow

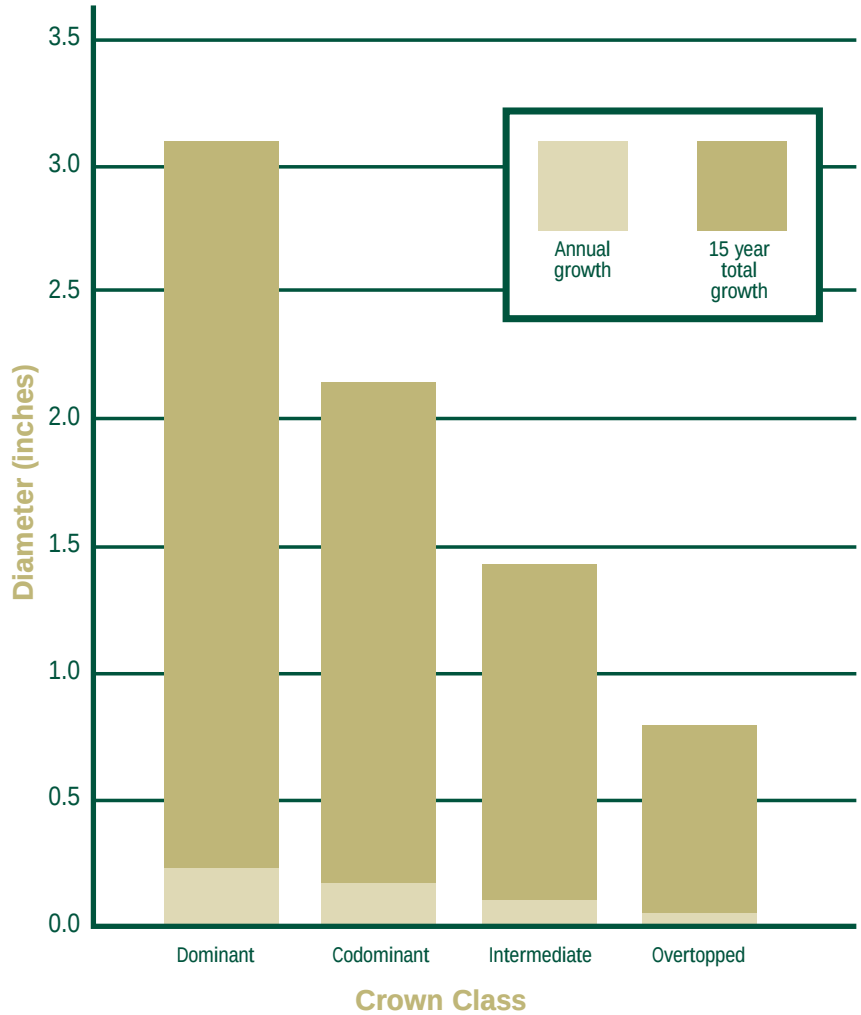
(credit) Illustrations by Nancy Haver

High Grading

It is important to note that **there is a wide range of variability to high grading.** The impacts that result from high grading will depend upon how much of the value is harvested from the woods and how much, if any, of the poor quality trees are cut as well.

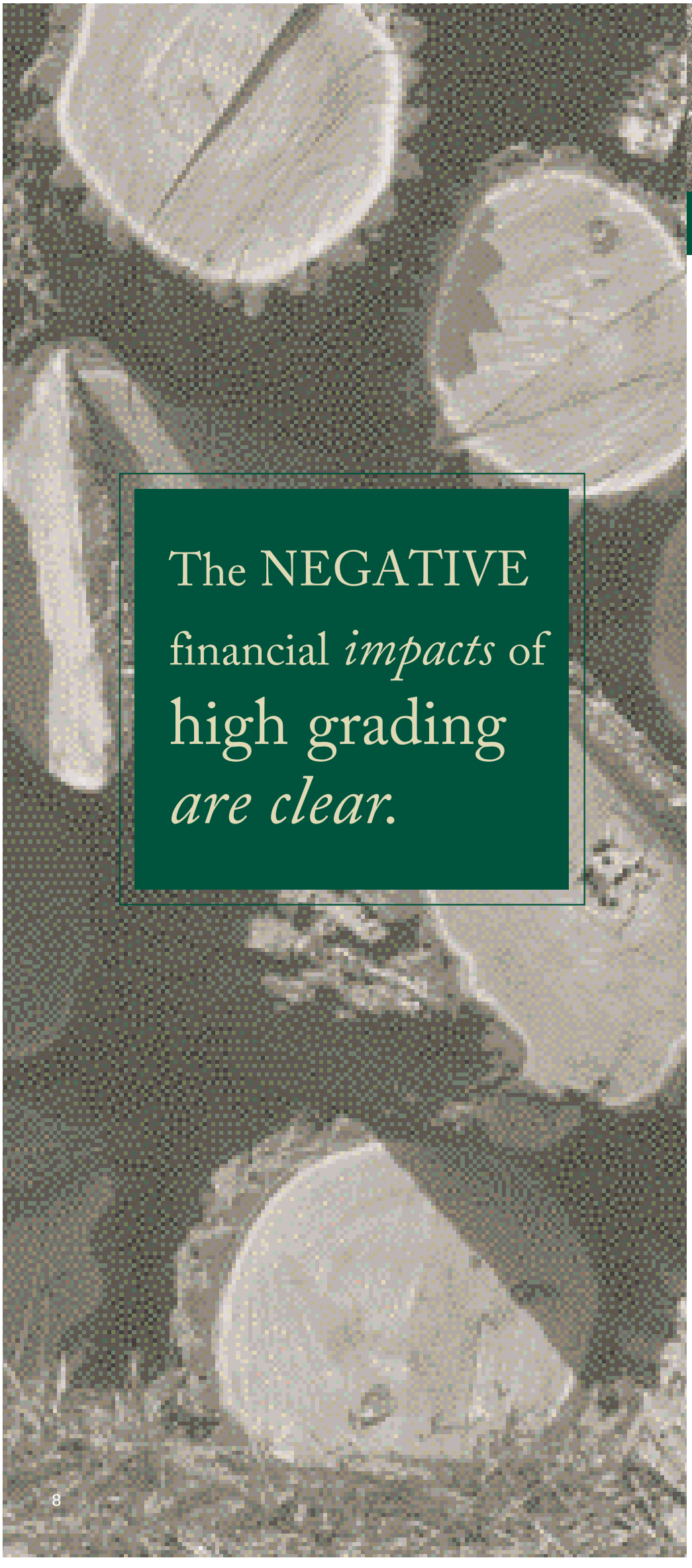
Figure 3

Growth of sugar maple trees in different crown positions after release from competion with other trees



Dominant	– A crown above the canopy
Codominant	– A crown in the main canopy
Intermediate	– A crown in the lower portion of the main canopy
Overtopped	– A crown below the main canopy

Figure 3 based on research by Dr. Ralph Nyland, SUNY ESF



The NEGATIVE financial *impacts* of high grading *are clear.*

Financial Impacts

The negative financial impacts of high grading are clear. In most cases, high grading results in a greater harvest volume and value from the first cutting, compared to forests managed using silvicultural principles. However, **neither the harvest volume or timber quality is sustained over the long run by high grading.** After the first high grade harvest, the woods will provide:

1. Less total volume because of slow growing trees and irregular spacing between them.
2. Less volume from large trees of the more valuable size classes (16"+ veneer).
3. More volume from poor quality trees and low value species (i.e., red maple, hemlock) *(see Figure 1).*
4. Less frequent opportunities to return for another harvest.

The net effect is less money to landowners over time. In short, it means that **if you want predictable levels of periodic income and maximum long-term financial benefits from your woods, do not high grade** *(see Table 1).*

Although high grading produces the greatest volume of valuable timber in the first harvest, high grading does not necessarily provide you with the most money. Ultimately, the price paid for the timber is dependent on many factors including how you sell it. *(see "Selling Timber" pages 10-11).*

Table 1

Total Timber Value per Acre*

(Including the value of timber harvested and timber growing in the woods)

HARVEST METHOD	1974	1989	2004	2019
Silviculture	$3,000	$7,600	$13,100	$18,800
Cut trees 12" and larger	$3,000	$5,300	$7,700	$8,800
DIFFERENCE	**$0**	**$2,300**	**$5,400**	**$9,200**

** All years adjusted to 1998 dollars*

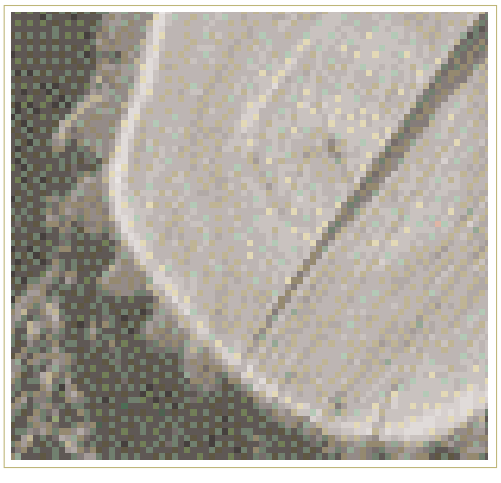
This table summarizes the findings from a study documenting the long-term cumulative effects of diameter-limit cutting and silviculture on timber volume and value.

Table 1 adapted from Dr. Ralph Nyland, SUNY ESF

Selling Timber

It is common for landowners to wonder if the price being offered for their timber is fair. As a landowner, you may only sell timber a few times in your life. It is, therefore, understandable that you might not be familiar with considerations like the value of timber and your options for selling it.

Simply agreeing to remove only the biggest and best trees does not necessarily guarantee maximum immediate financial return. How you sell your timber will also have a major influence on the money that you will receive. Many factors affect the value of your timber, including tree species, size, and quality. Factors such as terrain, skidding distance, and the presence of streams and wetlands in your woods affect the difficulty of the logging job and therefore the price that a timber harvester may offer. Most importantly, you must have an accurate estimate of the volume and the quality of the timber to make an informed decision about its value.



Generally there are two ways the selling price of your timber is determined:

1 Negotiated Price

A price is negotiated for the value of your timber. The price can be negotiated by you or by someone with a greater knowledge of timber prices representing your interests, such as a consulting forester. The money can be paid as a lump sum (i.e., a single payment in advance for all of the timber offered for sale) or based on mill tally (i.e., your trees are cut, brought to the mill, and you are paid based on their measurement of the delivered log volume).

Negotiated prices are most frequently used when timber harvesters, timber buyers, or industrial foresters buy timber directly from landowners. Consulting foresters will also use negotiated sales for timber of marginal value or when particular equipment or expertise is needed.

2 Competitive Bid

The trees to be cut are marked in the woods with paint and their volume and value is estimated. A "timber showing" is organized so multiple bidders can visit your property, assess the timber, evaluate the difficulty of the logging job, and make bids on your timber. Competitive bids are used primarily by consulting foresters.

A study done in Massachusetts showed that on average, the highest bid is more than twice as much as the lowest. A competitive bid will determine the value of your timber in the open market and can give you the most money, especially for high quality timber.

For more information on selling timber and to find a Massachusetts licensed forester working in your town, see: www.masswoods.net

Management Options

While the first high grade cutting in a woodlot provides the greatest volume of valuable wood to sell, **high grading will reduce your future management options because of the lower economic value of the remaining woods.** Given time, the trees in a high graded woodlot will grow somewhat larger and new ones will regenerate in the open places. This condition will afford some options for a second harvest; however, they will be more limited than before. After a woodlot is high graded for the second time, landowners have few choices and little opportunity to make another harvest for a very long time. At that point, a landowner must regenerate the entire woods (i.e., cut all of the poor quality trees to start a new group of trees with a better species mix and quality) and/or wait decades until the trees grow to harvestable size again.

Reducing your management options means less opportunity to realize the benefits of owning woodlands. It also means less opportunity to react to unexpected changes in your woods (e.g., insects or disease) and your life (e.g., need to sell timber for financial reasons).

Meeting the Requirements for the Massachusetts Forest Cutting Practices Act

The Massachusetts Forest Cutting Practices Act (MA FCPA) applies to all timber harvests producing more than 25,000 board feet or 50 cords (or a combination which is more than 25,000 board feet) on land which will stay in forest use. No matter which type of harvest you choose, you, as the landowner, will be responsible for meeting the requirements of the MA FCPA. Be sure that you understand what the law requires and work with someone who will protect your interests. For information on the MA FCPA, contact the service forester working in your town.

Water Quality

The MA FCPA mandates the protection of water resources during a timber harvest. A well-planned harvest operation that minimizes water crossings and limits soil compaction and soil erosion by using best management practices (BMPs) should satisfy the regulations while maintaining the productivity of your woods.

Endangered Species Protection

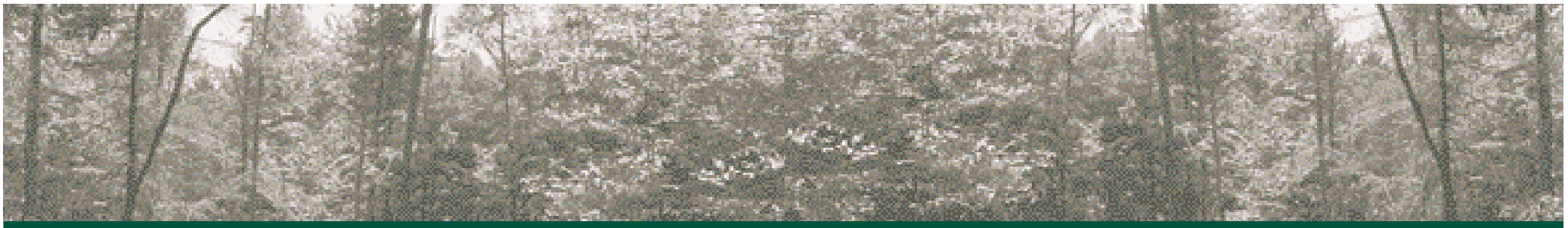
Protection of endangered species also is required under the Forest Cutting Practices regulation. Approximately 10% of cutting plans fall within the habitat of an endangered species. Harvests in a known habitat for endangered species may include measures to avoid negative impacts, such as limiting the time of year in which the harvest can take place.

species of special concern: 4-toed salamander

Cutting standards

The MA FCPA establishes cutting standards for harvesting. Contact the service forester working in your town for details.

For contact information of the service forester working in your town see: **www.masswoods.net**



Importance of Planning

"Your woodlot is, in fact, an historical document which faithfully records your personal philosophy."

Aldo Leopold

In contrast to the financial impacts of high grading, it is difficult to determine the exact impact of high grading on other values because of: 1) the variability of high grade harvests and 2) the differences between landowner goals. However, it is clear that high grading leaves woods in a generally haphazard condition as trees are cut based primarily on their financial value. This unplanned condition may or may not match with your goals. Forest regulations provide a baseline standard to protect the public benefits that your land provides, but do not ensure your specific goals will be met. Deliberate planning based on your specific objectives is a critical component to meeting your landowner goals.

Wildlife

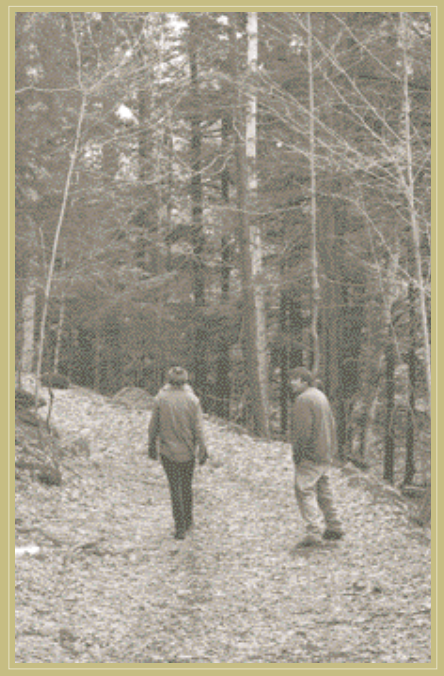
Every action you take in your woods is good for some wildlife and bad for others. Wildlife species are drawn to the "structure" of your woods – size of trees, number and density of trees, and the layers of vegetation or cover. Any type of harvest will change the structure of your woods. If wildlife is a priority objective, it will be

important to plan a harvest to create conditions which favor your wildlife species of interest.

High grading focuses on tree species of high timber value, such as red oak and black cherry. These are also valuable food sources for many species of wildlife (e.g., songbirds, turkeys, deer, squirrels, bear, etc.). Therefore, harvests that leave fewer mast (fruit and nut) producing trees and trees with small, sparse crowns will reduce the amount of mast produced in the woods, leaving less available to wildlife. Silviculture can increase the proportion of valuable mast producing tree species in your woods and can also reduce crowding in the woods, leading to trees with larger crowns, faster growth, and better fruit and seed production.

Aesthetics

Aesthetic values are highly personal, yet most landowners seem to enjoy seeing big trees with well formed crowns in their woods. Depending on their quality, these big trees can be cut during a high grading harvest. Logging also leaves the branches and other unused parts of a tree (called logging slash). Logging slash is often considered aesthetically displeasing by landowners. Slash is a part of all harvests. It may be reduced by special measures, but at a cost. The timber sale contract is an excellent place to define how slash will be left at the end of the harvest.



Recreation

If recreation is an important objective for you, take time to decide what features of your land you enjoy and may be enhanced to improve the recreational value. Then work with someone, such as a licensed professional forester, who can design a harvest that meets your needs. Issues such as skid road location and stabilization of the skid road after harvest should be clearly addressed in the timber sale contract to ensure they are left as a recreational resource.

Legacy

As a landowner, you should not assume that you are making the first management decision about your woods. The average ownership period in Massachusetts is approximately 20 years. It is common for a landowner to acquire land that has been high graded during another ownership or even right before the sale of the land, causing you to be faced with management options based on a previous owner's decision about how to harvest the woods. The decisions you make will not only affect your benefits, but the benefits of those landowners that follow. If you plan to pass your land on to family members, your decisions will help determine the benefits that your family will share for years to come.

Growing high value timber takes time. The differences between high grading and silviculture become increasingly apparent over a several decade period *(see Table 1, page 9).* Therefore, combining silviculture with estate planning and land protection tools helps ensure that the full benefits of silviculture are realized by current and future land-owners.

For information on estate planning and land protection see www.masswoods.net

The DECISIONS *you make* WILL NOT only affect *your benefits,* BUT the benefits *of those* landowners *that follow.*

Conclusions

- **Your goals** for your family and your land should dictate the type of harvest implemented in your woods. All harvests do not provide the same benefits.

- **Know your options** and their likely outcomes. Working with a licensed professional forester is an excellent way to evaluate your options and plan an approach that will fit both your immediate and long-term goals.

> *"I just want to do the right thing."*

- **A carefully planned timber** harvest will address your financial, wildlife, aesthetic and recreational goals, while meeting your regulatory responsibilities.

- **Don't rush into a harvest.** Move forward only after you have enough information to make a decision that is right for you and your family. A decision to postpone a harvest or to not cut timber at all will only maintain your management options into the future. A high grade will limit your future management options.

For more information:

UMass Extension – Forest Conservation Program

MassWoods: **www.masswoods.net**

- Service forester, licensed foresters and land trusts working in your town
- Selling timber, including the important elements of a contract
- Planning the future of your land (estate planning and land protection)
- Forestry Programs: Forest Cutting Practices Act (Ch. 132), Current Use Forest Tax Law (Ch. 61), Forest Stewardship Program, and Wildlife Management

MA DCR - Bureau of Forestry – Service Forestry Program

www.mass.gov/dcr/stewardship/forestry/service/index.htm

- Forestry Programs: Forest Cutting Practices Act (Ch. 132), Current Use Forest Tax Law (Ch. 61) and Forest Stewardship Program

"Call Before You Cut" **1-800-783-2311**
Leave a message for the service forester working in your town

Additional resource:

Diameter Limit Cutting and Silviculture in Northeastern Forests
A Primer for Landowners, Practitioners and Policy Makers,
Laura Kenefic and Ralph Nyland:
www.masswoods.net/pdf/DiameterLimitCutting.pdf

Several individuals have provided extensive feedback and suggestions on drafts of this pamphlet. We thank them for their efforts: David Kittredge (UMass Amherst); Matthew Kelty (UMass Amherst); Ralph Nyland (SUNY ESF); Paul Barten (UMass Amherst); Susan Campbell (MA Woodlands Cooperative); Richard DeGraaf (USFS); James Soper (MA DCR); Jennifer Fish (MA DCR), and Andrew Finton (TNC).

This pamplet was sponspored by the MA Department of Conservation and Recreation, Bureau of Forestry and the MA Rural Development Council.

THE HISTORY OF HIGH GRADING

High grading is not a recent phenomenon in Massachusetts and was a common practice during the colonial period in New England as early settlers and prospectors selectively harvested the largest white pines and oaks for shipbuilding and other construction materials. By the mid-1800s, the development of industries such as pulp and paper, industrial charcoal, and boxboards, shifted the focus of timber harvesting activities from the selective harvest of large, high quality trees to large-scale clearcutting. This became a common harvesting practice that continued to be widely used in Massachusetts through the early 1900s. The wholesale clearing of the forests caused widespread public concern and interest in finding an alternative that did not result in soil erosion, poor water quality, and aesthetically displeasing landscapes.

One alternative that was recommended was diameter-limit cutting, where only trees larger than a specified diameter were cut. It was thought that the small trees left behind would benefit from being released and quickly grow larger. For decades, diameter-limit cutting, and a variation of this method called “high grading,” were thought to be the solutions. In general, these practices did reduce soil loss and water pollution while addressing some aesthetic concerns. However, unlike what people saw after the wholesale clearing of the early days, the negative effects of diameter-limit cutting and high grading were not as obvious. Research has shown the drawbacks to these harvesting methods.