

# A FARMER'S GUIDE TO WOODLAND MANAGEMENT

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10 TIPS FOR WOODLOT  
PROFITS AND ENJOYMENT

WRITTEN  
BY

DICK  
HALL

NATIONAL EDITION

# 1 RECOGNIZE THE VALUE OF YOUR WOODLOT

The most profitable acreage on the farm may not be the best corn ground. It's often the farm woodlot. That's especially true if the woodlot is growing saw timber or veneer-quality red oak, black cherry, black walnut or sugar maple. Other tree species and forest products are also profitable to grow. It will usually pay to work with the mix of trees already growing on an existing woodlot. The trees that are best suited to the site are generally the most profitable ones to grow in that woodlot. And a variety of trees helps protect the woods from being destroyed by a specific disease or insect.

With care and planning some hardwood stands can be managed to grow \$200 or more in timber value per acre each year. Properly tended, some pine plantations on good soils can grow one cord of wood per acre for every year after planting. The first harvests can be taken at 20 to 25 years and products of increasing value harvested at seven- to ten-year intervals thereafter.

Most farm woodlots are neglected because they don't provide cash flow as frequently as corn or soybeans or milk. Paychecks from wood come only periodically, sometimes only once in a lifetime. Farm woodlots are often viewed as a source of cash in an emergency and a place to hunt deer. They are seldom considered in the total farm economic plan.

That need not be the case. Most woodlots have the potential to produce more harvestable wood than they do. Most can be harvested more often than they are, even as often as every five years, depending on the amount of acreage and the kinds of trees growing there.

Farmers may be better positioned to cash in on the benefits of woodlot management than any other woodland owner group. They live and work on the land. They are outdoors oriented. They recognize trees and other living organisms as being part of the growing cycle, and they often have the equipment, knowledge, and time to do the ongoing chores that return increased profits and personal satisfaction.

Remember that trees aren't the only marketable product growing in your woodlot. You may have maple syrup, mushrooms, wild ginseng, herbs, boughs, nuts and other specialty forest products. Also keep in mind that unusual pieces of wood – burls, crotches, wood with attractive grains, and other characteristics might be of interest to woodworkers and woodcrafters.

The advantages of considering the woodlot as part of the total farm plan pays off in added income, increased land value over time, increased wildlife and recreational value, and increased pride of ownership that strengthens the bond between generations.

Practical farm forestry is based on common sense knowledge that comes naturally to farmers. The fine points are easy to learn. Help is readily available. A good place to begin is by contacting your state forestry office, state forestry extension office or local consulting foresters for assistance. **See the contact information presented on the back cover of this Guide.**

Keeping records about woodland activities is an important but often neglected task. The best approach is to keep a woodlot logbook. Any spiral or loose-leaf binder will do. Record every activity by time and date regardless of how trivial it may seem. Just describe what took place in as much detail as you can. Include numbers whenever they are appropriate. Require all family members to make entries of any activity. The logbook is a simple approach to recordkeeping and becomes more valuable over time as it accumulates useful information for future management.

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## TAKE AN INVENTORY OF WOODLAND RESOURCES

It's crucial to know what kinds of trees are growing on your woodlot, how much wood they contain, and what they are worth before any management decisions can be made. This information is obtained through a field inventory called a timber cruise. There are several ways to obtain timber inventory data.

A forester may be hired to perform the inventory. The woodlot is divided into stands containing different timber types, much like the other fields on the farm. Individual stands may contain various sizes of trees, including new plantations. They may also vary by species composition, or management techniques. Most stands are easily distinguished from others. Some woodlots are uniform throughout and may be managed as one stand.

The forester locates sample plots in each stand and then identifies and measures all trees on each plot. Volume by species is estimated for the trees in the plot. Your forester will make management recommendations based on many factors in your woodlot including size, health, species composition, soils, geology,

tree species, etc. An inventory completed by a forester may cost from \$500 to several thousand dollars, depending on the number of acres inventoried. The inventory should include written recommendations.

If you get an inventory and appraisal soon after buying your property, it can also be useful to establish your basis for future income tax calculations.

Some farmers may want to do their own forest inventory. Learning to cruise timber requires attention to detail, but it can be learned and can be a pleasant experience for the entire family. Contact your state forestry extension office for more information, including specific publications regarding the measurement of trees and estimating their volume. **Telephone numbers for each state office are presented on the back cover of this Guide.**

An internet search for forest inventory software will also reveal a number of free or low cost products to calculate timber volumes. Some programs can even project future growth.



# 2



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## LEARN TO TEND THE FOREST

Most woodlots require adjustments in stocking levels if they are to produce maximum harvests and profits. Stocking refers to the number of trees growing per acre. Each tree species and combination of species has an optimum stocking level. Woodlots with less than optimum stocking are not making full use of the growing capacity of the soil. Trees are too widely spaced and contain too many large limbs to produce high value logs.

Stands with above optimum stocking levels tend to be crowded and nutrient resources of the soil are spread over more trees than needed. Mortality is high, growth is slow, and timber yields are reduced due to high competition among individual trees. Most woodlots that have not been grazed in the past, or have developed from natural regeneration, and that have not been recently harvested tend to be overstocked.

The best way to determine the stocking level in your woodlot is to measure the basal area. This is the number of square feet of stem cross section per acre when measured at 4.5 feet above ground. It's an easy concept to understand and easy to measure. You can make a simple gauge to measure basal area in the field or one may be purchased from forestry supply catalogs. A penny held at 25 inches from the eye will give a rough estimate once you know how. Contact your state forestry extension office for more information, including specific publications regarding how to estimate stocking conditions in your timber stand. **Telephone numbers for each state office are presented on the back cover of this Guide.**

Once basal area is known, it becomes easy to adjust the stocking in your woodlot with thinnings or improvement cuttings. It's much like weeding the garden. Trees of low vigor, poor health, poor form, undesirable species, or crowded spacing are marked for removal. Enough are cut so as to reduce the basal area to normal stocking levels as determined from the charts provided in the previously mentioned publication. The trees of best form and most valuable species remain to grow and thrive. Trees removed may be marketed for pulpwood, firewood, saw logs, or veneer logs.

Maintaining proper stocking increases growth rate and steadily improves the quality and value of products harvested. It's also a way to constantly improve conditions for wildlife and enhance the natural scene. Improvements in stocking may be do-it-yourself projects that can be done during off-seasons on the farm. They often pay big dividends in future harvests and enjoyment.

Contact your state forestry extension office for more information, including specific publications regarding intermediate thinnings.



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# 4 KNOW WHEN TO HIRE A FORESTER

The men and women who are qualified foresters have spent years training to learn their profession. There are times when every woodland owner will profit from their depth of knowledge.

In many states, there are three categories of foresters available to offer management advice to farmers: consulting foresters, industrial foresters and foresters employed by the state.

Private consulting foresters are self-employed. They contract with farmers and other woodland owners to write management plans, do timber inventories, perform management practices, and conduct timber harvests. They work for a prearranged fee or a percentage of timber sales. They represent the woodland owner in all contractual arrangements with loggers.

Industrial foresters work for a paper mill or saw mill. They offer management planning and other forestry services to farmers, often at no cost, but usually reserve the right of first refusal when woodland owners have timber stumpage for sale. They are mostly well-qualified foresters whose salaries are paid by the companies they represent.

Some states also have private land foresters who work for the state. A list of public and private foresters can be obtained from your state forestry extension office, state forestry office, or consulting forester association. **See the back cover for contact information.**

It's best to use the services of a forester when the management practice needed requires a high level of technical knowledge. Thinning or harvesting overstocked stands of mixed species is a good example. Trees interact with each other in complex ways depending on species, age, soil conditions, and light requirements. A forester will help avoid mistakes in selecting trees for cutting. This will pay big dividends over the long-term.

Hiring a forester to administer a harvest is usually a good investment. Make sure to have a contract between you and the forester. The forester will mark trees to be harvested, determine volume by species, offer the sale to qualified loggers, advise you on which bid to accept for your timber, and make sure the logger abides by the conditions of the timber sale contract. This will assure highest return on your timber and best management for the future.

The backgrounds and experience of foresters vary greatly. Select the one best suited to the needs of your timber stand and your personal goals. Ask for references and proof of liability insurance. Contact those persons he/she has provided services for and become aware of the level of satisfaction in the work completed.

Expect to pay a consulting forester \$30 to \$70 per hour for conducting inventories, marking stand improvements or thinnings or writing management plans. The charge for conducting a timber harvest is usually 10% to 15% of the total receipts for the timber or it can be an hourly charge or by the acre. A good forester will make money for you far above the cost of services.



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# 5 PROFIT FROM DO-IT-YOURSELF LOGGING

Most farmers own equipment suitable for small-scale logging. A 40 to 80 horsepower utility tractor with a three-point hitch makes a good low impact woods machine. A simple draw bar and logging chain can be rigged to lift the small end of logs and skid them easily from most woodlots. Front-end tractor loaders work well for decking logs and pulpwood. Tractors should be equipped with roll bars and protection from falling objects.

Where woods work is an ongoing farm activity, it pays to invest in a skidding winch for the tractor. They are equipped with cable and chokers which allow you to pull logs easily from tight places and work safely on slopes. The cost is about \$3,000.

It also pays to invest in a high-performance chain saw. Expect to pay \$500 or more. Keep a cheaper one on hand in case of "pinching" or other problems. Don't operate a chain saw without wearing safety chaps and a hard hat with hearing and eye protection. Because chain saw work is the most dangerous work in the woods, consider enrolling in a one-day chain saw operation and safety class. Even experienced chain saw users find they learn things that make their jobs easier and safer.

Contact the **Game of Logging (GOL)**, a timber harvesting training program offered to professional loggers, foresters, forest landowners, and anyone interested in learning any of the safety techniques. They can be reached at 800-252-2502 or [www.gameoflogging.com](http://www.gameoflogging.com).

Do-it-yourself logging can increase your return from a timber harvest by \$75 to \$100 per thousand board feet. The return is least from low-grade timber and is greatest from high-grade logs of valuable species, provided you are knowledgeable about proper felling techniques and bucking to grade. Log buyers will bid for your logs on the landing if they are accurately cut to their specifications.

Do-it-yourself logging keeps you active in managing your woodlot, lets you efficiently use equipment during winter, and lets you take control of logging to minimize damage and to time harvests to benefit wildlife and scenic values.

There are downsides to do-it-yourself logging as well, including the risk of injury previously mentioned. Other risks include damaging standing trees, the forest floor or stream beds when building trails, operating equipment and removing logs. It's also important to be aware of property boundaries. It's a good idea to talk with neighbors when considering thinning or commercial harvests.

Request log grade specifications from potential buyers before beginning a do-it-yourself harvest. A misplaced saw cut can lower the value of a veneer log by hundreds of dollars. Learn to sort round wood products into veneer and saw logs, saw bolts, and pulp wood. Establish a working relationship with a trusted trucker or logger who will pick up and deliver your products to the mill when you have about 4,500 board feet of sawlogs or a 12 cord load of another product available. Make sure you have a written contract.

If you're considering the do-it-yourself approach, **Conducting a Successful Timber Sale: A primer for landowners** would be a useful resource. It's available by calling 608-267-7494 or on line at <http://cecommerce.uwex.edu/pdfs/GWQ036.pdf>.



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# 6 KNOW HOW TO SELL STUMPAGE

Most woodland owners are at a disadvantage when selling standing timber, so the best way to conduct a sale is through the services of a forester. Be sure to have a written contract with the forester. He or she will mark the trees or designate trees or areas to be harvested, total the volume by species, write an offer for sale giving complete details, and request bids from a number of loggers actively seeking stumps. The forester will help you determine which bid, if any, to accept and which logger to select.

It's best to solicit several bids. They will vary widely depending on the needs of the logger, the kind of timber you have for sale, the ease or difficulty of logging, and the distance from mills buying the products. It's not unusual for the high bid to be more than twice the amount of the low bid.

Once you have selected a logger, your forester will negotiate a written contract with the logger and will spell out the terms of the sale and the conditions to be met in the woods. The forester will visit the harvest to make sure the logger meets all provisions of the contract, collect payments for the timber, subtract their fees and then disperse the rest to you. Foresters can also testify on your behalf in case of a dispute.

Or you can conduct a timber sale on your own and save the fees charged by a forester. On a large sale this is a considerable amount of money. If you are confident you can perform each step in the sale as a forester would, you should do so.

Consider how cut logs will be measured for payment. In lump sum sales, a total value is paid up front for all the timber in the harvest. Lump sum sales depend upon accurate estimates of the volume to be harvested, but the buyer carries the risks or benefits of underruns or overruns. Another option is

scaled sales where individual sawlogs or piles of pulpwood are measured either in the field or at a mill. In scaled sales, the logger pays for the timber removed. Be sure your contract is clear about the value per unit, who will do the scaling and any conversion factors such as pounds per cord if pulpwood is scaled by weight.

A list of loggers active in your county should be available from your state or county forestry office. Ask at least five loggers to bid on your marked timber. Walk your woods with each when they come to inspect the trees marked for cutting. Ask each for at least one name of a nearby farmer from whom they have purchased stumps. Set a deadline, including a time, for submitting a bid.

Consider all bids the day after the deadline. It's unethical to consider late bids. You may either reject all bids or select any one of those offered. You need not select the highest bid, especially if a logger with a lower bid is better suited to fulfill operational considerations important to you. Ask the logger to agree to a written contract for conditions of the sale. Require payment before the harvest begins. Require the logger to supply proof of insurance and set a deadline for completion of the harvest. Don't overlook any details on the contract form. Contact your state forestry extension office for a sample timber sale contract. The forestry extension office should also be able to provide information on tax issues related to timber sales. **See the back cover for contact information.**

Some states have logger certification programs. Many logger associations also have a code of ethics/standards that their members follow. For more information, contact the **American Loggers Council** at [americanlogger@aol.com](mailto:americanlogger@aol.com), call 409-625-0206 or visit their website at <http://www.americanloggers.org>.



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# 7 KEEP AN EYE ON YOUR LOGGER

The most critical time in the harvest cycle of your woodlot is when the logger is actively removing products. If you've hired a forester, he/she should visit often to make sure the logger is doing a proper job. It's your responsibility to check on the logger if you haven't hired a forester.

Either way, it calls for constant vigilance during the short period when thousands of dollars worth of wood are being removed each day from your woodlot. Carelessness, mistakes, or fraudulent acts could rob you of hundreds of dollars immediately or in future timber growth and value.

Modern loggers are mostly skilled, competent, and honest. They would not stay in business long if that were not true. They have large investments in equipment, trained operators and insurance (request proof of insurance from your logger). Logging is a competitive business and high levels of productivity are necessary to pay expenses and make a profit. It's sometimes tempting to take short cuts or easy to become careless.

Visit an active logging site in your woodlot every day, even if you have hired a consulting forester. Be aware of all elements of the logging contract and make sure none are being violated.

Look for excessive rutting caused by felling machines and skidders if working on unfrozen ground. If you have soft ground, ask loggers ahead of time what will be done to protect it. Soil compaction and damage to roots is unsightly and harmful to trees remaining after the harvest. Do not tolerate high levels of physical damage to standing trees and broken saplings and poles. Make sure slash is pulled free of valuable standing trees.

Do not sign off on a timber sale contract until all logs and pulpwood have been paid for and removed from the property and all terms of the contract are met. That should include landings and skid trails free of debris and leveled and seeded to erosion controlling grasses. It should not be apparent that a logging job ever took place by the second summer.



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# MAKE A PLACE FOR WILDLIFE, RECREATION, AND NATURAL BEAUTY

Farmers are in an enviable position. They can hunt, bird watch, hike, ski, snowmobile, or enjoy other recreational activities in their woodlots without leaving home. Other small woodland owners must travel to enjoy these benefits. Likewise, wildlife habitat and favored outdoor recreational activities can be enhanced through normal woodlot management practices, often without added cost. Timber stand improvement cuttings, harvests, and plantings can be altered slightly to increase favorite wildlife species and to enhance nature's scenery as well as to increase recreational opportunities.

The same trail system providing easy access for logging also attracts wildlife. It should be planted to native grasses and mowed each year in August to discourage shrubs and renew the grasses for fall grazing by deer and other plant eaters. Fertilizing makes grasses more attractive to deer. Mowed trails are ideal for walking on a grouse hunt or traveling with an ATV or snowmobile.

Landings, where logs are piled prior to hauling, can be constructed for use as a wildlife food plot or opening after the logging is completed. You could also plant it to conifers to provide cover for a variety of wildlife. In heavy agricultural areas, lack of cover is one of the most critical wildlife issues.

Retaining conifers, rather than harvesting them, can provide many wildlife benefits including thermal cover, cover from winged predators, nesting habitat, etc. Planting conifers along borders or in small openings can often provide the same type of benefits where residual conifers are lacking.

Think of harvesting and timber stand improvement as ways to improve hunting and wildlife values. Reducing the tree stocking level allows more room for improved growth of remaining trees. Oaks respond by producing more acorns. Deer, turkeys, and squirrels benefit. Other trees increase seed production, too. Songbirds and other wildlife benefit.

Reducing stocking levels lets more sunlight into the forest. Native shrubs and forest floor plants grow more profusely. The entire food chain from insects, birds, small mammals, foxes and predatory birds all increase in richness and diversity.

Build a few brush piles after logging near trails and woodland edges and you may be rewarded with a rabbit for dinner. Other small mammals and birds use brush piles to escape predators. Allow cull logs and slash to remain on the forest floor and recycle by natural decay. They will become homes for unique insects and reptiles. The biologically-rich woodlot does not look like a park. It's a diverse place full of niches that provide food and shelter in great abundance.

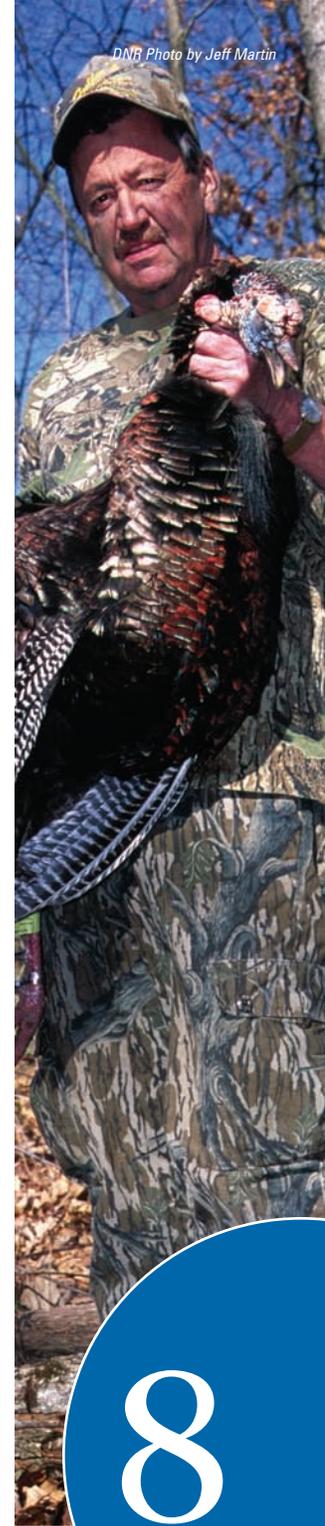
Locate individual white oaks, black walnuts, black cherries, and hickories known to produce frequent crops of nuts and fruits and spread a balanced fertilizer beneath their crowns periodically to enhance nut production. Scatter a little in your favorite blackberry thicket and you will reap the rewards along with the birds.

Leaving trees with existing dens or cavities when harvesting timber will help to maintain the habitat of certain species. Also, large trees that are unmerchantable because of rot or other defects have the potential to cause significant damage to other high quality trees when felled, so leaving them can help you realize multiple benefits.

Constructing artificial nesting boxes for birds and mammals is a matter of individual choice. They will increase nesting bird populations in some instances. However, they are not part of the natural scene, and if you find them unattractive, you can provide increased nesting opportunities for birds through cuttings, plantings, or other natural means based on knowledge of the requirements of individual species.

Woodland borders are natural attractants to wildlife. They contain a great variety of food and shelter. Leaving den trees and dead snags uncut enhances their value. Planting food patches in nearby cropland is a bonus for many wildlife species.

The farm woodlot can provide enjoyment for the entire family in all seasons whether used for quiet hikes, hunting, or motorized sports. Recreational use is a bonus in the well-managed and productive woodlot. Contact your state forestry extension office for more information, including specific publications regarding forest management guidelines. **See the back cover for contact information.**



# KNOW WHEN AND WHERE TO PLANT TREES

Planting a tree is the act of an optimist. It represents faith in the future and a hope for generations yet unborn. It also represents a commitment to the land. It bodes well for rural America that millions of trees are planted each year.

Yet, planting trees to regenerate a forest represents a last ditch effort. It's better to practice forestry that naturally grows new trees. It's also less expensive. Existing woodlots will provide all the new trees needed if properly managed.

There are circumstances where planting new trees is necessary to establish or regenerate a forest. Past grazing practices usually destroy an existing forest. Forest herbs, shrubs, and young trees are quickly destroyed by grazing. Soil compaction and damage to roots by cattle hoofs eventually kill large trees. Grasses and thorny shrubs are often the only eventual survivors. Planting new trees is an effective means of restoring a grazed out woodlot. Disking and exposing the mineral soil will loosen the soil and provide a seed bed for neighboring trees to reseed the area. Another option would be to obtain seed and direct seed this area after disking.

Other candidates for tree planting on the farm are odd areas, old lanes, abandoned fields and stream corridors. Planting along streams has multiple benefits – it creates cover for wildlife forming a natural movement corridor along the stream bank; it provides shade to keep stream temperatures low; it stabilizes the stream bank to reduce erosion; and it provides a source of woody debris to fall into streams, which will provide both a food source and cover for many aquatic dwellers. Sometimes it's necessary to replant trees on areas destroyed by fire or to convert an area to a different tree species. Each site has distinct soil and water characteristics that dictate what trees to plant.

Consult a soil survey for your county to determine which species of trees to plant. In most counties, copies may be available from your Soil and Water Conservation District (SWCD) or from the Natural Resources Conservation Service Office.

The soil survey will list the tree species that grow best on the soils on your farm. Planting trees on the wrong soil type is a mistake that could last for a hundred years.

Consult a private lands agency forester (State or SWCD), consulting forester, or industrial forester for help with species selection, information on ordering nursery grown planting stock, and possible cost-sharing programs to offset planting and site preparation costs. There is no charge for these services. Do this beginning in the fall before spring planting season. The best selection of trees is in early October when order forms are made available.

Tree planting often fails due to poor planning. Be ready to plant when your trees arrive. Be sure the site is properly prepared and planting stock is kept cool and moist. Do not put the seedlings in a bucket of water. The water will cause the tiny root hairs to swell and die. It's better to sprinkle some water on them and keep them covered and out of the sun. Dried roots spell poor survival. The cost of planting trees often exceeds \$200 an acre. The quicker the job is completed the better will be your results. Contract tree planters are also available to do all of this for you if you do not have the time or equipment to do it yourself.

Also, be prepared to follow up with weed control, fire protection, and insect and disease damage control in the first years of your new planting. High deer numbers can cause high losses in new tree plantings. Nursery stock that has been fertilized is highly nutritious and sought out by deer. The best way to protect your trees against deer damage is control deer through hunting. Take your share of venison each fall and allow others to hunt to protect your woodlot investment.

Tree planting is a long-term investment that pays off in personal satisfaction, family enjoyment and monetary profits. Look for a guide to planting and maintaining trees to establish a forest in your specific state by contacting your state forestry extension office for more information and for any specific publications or guidelines that may be available. **See the back cover for contact information.**

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# GAIN FROM INVOLVEMENT WITH OTHER WOODLAND OWNERS

Like the individual farm, the woodlot does not exist in isolation. It's part of the natural community and part of the farming community. There are advantages in all members working together for mutual benefit.

A special advantage of working together involves the fight against invasive plants. Invasive buckthorn can choke out a woods and prevent new trees from getting established. Invasive plants are not stopped by fence lines. Your efforts to control them are rewarded if your neighbor is controlling his.

Because most farm woodlots are small, there are advantages to combining efforts with others in the neighborhood when contracting for forestry services or offering stumpage for sale. This economy of scale can result in lower costs for professional services and higher returns for products sold. Foresters and logging contractors may find this arrangement attractive.

Discuss woodlot management with neighboring farmers. Find out who has hired a consulting

forester and interest him or her in talking with other neighbors about managing their woodlands and combining their acreages for a group harvest. Where this has been done, everyone involved has benefited with better management and higher prices for stumpage. In some cases woodlots too small to otherwise interest loggers have provided timber income.

There may be state or local woodland owner organizations in your state that you might consider contacting or joining. You can get information on these organizations from **WoodWorks** ([www.woodworks.coop](http://www.woodworks.coop), 202-383-5474) or the **National Woodland Owners Association** ([info@woodlandowners.org](mailto:info@woodlandowners.org), [www.woodlandowners.org](http://www.woodlandowners.org), 800-476-8733).

There are also local forestry cooperatives and farm supply cooperatives interested in working with farmers and other local woodland owners. Contact E.G. Nadeau at Cooperative Development Services (CDS) for information on co-ops serving your area (608-258-4393 or [egnadeau@inxpress.net](mailto:egnadeau@inxpress.net)).

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**To order copies of this publication, please contact WoodWorks. It's also available online at [www.woodworks.coop](http://www.woodworks.coop).**

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Dick Hall is an award winning outdoor writer and retired teacher who practices forestry on 160 acres near Poynette, Wisconsin called The Buckridge. He developed a new forest inventory software called Wisconsin TIGER (Timber, Inventory, Growth and Economic Review). He has also written a book titled, *The Buckridge Chronicles: Sketches from Oak Ridges and Glacial Valleys*. For more information, visit [www.wistiger.com](http://www.wistiger.com).

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Minnesota	651-296-4495	*
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Missouri	573-522-4115 (Ext. 3300)	573-882-4444
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Oregon	503-945-7211	*
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South Dakota	605-773-3623	*
Tennessee	615-837-5411	865-974-7346
Texas	979-458-6606	*
Utah	801-538-5530	435-797-4056
Vermont	802-241-3678	*
Virgin Islands	340-778-0991	340-693-1083
Virginia	434-977-6555	804-524-5962
Washington	360-902-1603	*
West Virginia	304-558-3446	*
Wisconsin	608-264-9224	608-262-0134
Wyoming	307-777-7586	*

\* Please contact Eric Norland at USDA for forestry extension phone numbers in these states. Call 202-401-5971.