Forest Stewardship

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Issue Highlights:

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Stewardship News

Crop Tree Demonstration at Marsh-Billings-Rockefeller National Historical Park

Good news from Vermont on the crop tree demonstration project at the Marsh-Billings-Rockefeller National Historical Park (Forest Stewardship Information Exchange, volume 2 issue 1). This project is a joint effort with the park, the Vermont Department of Forests, Parks and Recreation, and the USDA Forest Service, State and Private Forestry, Durham Field Office. In July 1999, a public workshop was held at the 4-acre site to explain crop tree management and give attendees an opportunity to practice techniques in the field. Forestry expert Arlyn Perkey of the Forest Service presented a slide program on crop tree management. Following a demonstration of chain-saw safety, several crop trees were released.

In late September 1999, final crop tree selection was made for timber growth, wildlife, and aesthetic objectives. Release of these additional crop trees was completed in early November 1999 by employees of the Vermont Department of Forests, Parks and Recreation.

Completion of the crop tree release work does not mean the end of this project. A total of 83 crop trees were marked and measured prior to release, and the growth responses of these trees will be followed in subsequent years. In addition, an interpretive trail will be developed illustrating the use of the crop tree method in small woodlots. We sincerely hope that every one of our readers will get the opportunity to visit this beautiful park and the ongoing stewardship activities.

Releasing a crop tree. Photo by Kyle Jones.

A crop tree released. Photo by Kyle Jones.

Forest Stewardship Program in Connecticut

The State of Connecticut has modified its implementation of the Forest Stewardship Program in response to the elimination of funding for the Stewardship Incentive Program (SIP) by Congress in FY 1999 and FY 2000. At a series of meetings commencing October 27, 1999, the Connecticut forest stewardship staff explained changes to professional foresters (plan preparers) and the forest stewardship committee. In a nutshell, the loss of SIP (and thus the loss of financial incentives for landowners to apply practices approved in their forest stewardship plans) could influence the number of landowners interested in developing stewardship plans for their woodlands. Connecticut, in conjunction with the USDA Forest Service, State and Private Forestry, establishes goals for the number of new stewardship plans and acres added each year. These goals are required under the Forest Stewardship Program, authorized by the Forest Stewardship Act of 1990 (16 U.S.C. 2101 et seq.). Connecticut is taking several steps to ensure that the goals for stewardship plans and acres within the state are met each year, despite the loss of SIP. Some of these steps include the following.

1. Connecticut is working in conjunction with the 20 Northeastern Area states and the Forest Service to improve the quality of stewardship plans by adopting additional forest stewardship plan standards (see Forest Stewardship Information Exchange, volume 2 issue 2). It is hoped that by adopting these additional standards, landowners will have an incentive to get higher quality stewardship plans for their properties, and thus would be encouraged to enroll in the Forest Stewardship Program.

2. Connecticut is changing the role of public sector foresters in preparing forest stewardship plans. Upon request by the landowner or consultant forester, public foresters may now provide public sector input to the plan preparation process. Input can range from assisting with the application process and conducting initial interviews with landowners, to writing or assisting with preparing specific portions of the plans, such as providing information on cultural resources, threatened and endangered species, soils and water quality, descriptions of the property and habitat, and GIS-based mapping and stand visualization systems. Consultant foresters may continue to write all components of stewardship plans if requested by landowners.

3. Connecticut has produced a new application packet for forest landowners who wish to enroll in the Forest Stewardship Program. Among other things, this packet contains a stewardship landowner questionnaire and provides the landowner with an opportunity to directly request assistance from the state's public sector foresters. Connecticut has also developed a content checklist for stewardship plans, including the new standards, which can be used by plan preparers in the field or office.

The Forest Stewardship Program in Connecticut is utilized extensively for outreach and education and is an integral part of other special focus programs such as watershed projects, landowner short courses, and the Coverts Program.

USDA Forest Service Web Site

http://www.fs.fed.us

Nature Sleuthing in New England Forest Woodlots

Perhaps you have recently purchased a small woodlot and you want to know more about the forest ecology of your new property. You need to become a nature detective, and Tom Wessels' 1997 publication *Reading the Forested Landscape: A Natural History of New England* will help you do so. He offers many fascinating tidbits; some of my interpretations include the following.

- By observing the size and condition of your trees, you can assess whether past disturbances such as fire, blowdown, logging, or some other defoliating factor have influenced the growth and development of the forest. For example, if there are small trees and large trees, but no medium-sized trees on your property, you might conclude that some disturbance caused this condition. Determination of the disturbance requires searching out clues such as condition of downed trees, whether stump sprouts are present, or if basal scars on trees are apparent.

- Basal scars on trees are caused by fire damage or some form of collision such as log skidding. Basal scars caused by fire damage are often found on the uphill side of a tree trunk because fuel pockets composed of dead leaves and sticks gather on the uphill side due to the effects of gravity. This material is pulled downslope and is trapped by upright objects such as tree trunks.

- Stone walls were not used to mark boundaries, but rather to keep livestock in or out of the landscapes they enclosed. Thus, stone walls on your property indicate it was likely grazed in the

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Nature Sleuthing

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30-year period between 1810 and 1840 when the bulk of stone fences were built. By 1840, sheep farms were being abandoned whole scale in New England.

- "Weird apples" are apple trees with a gnarled appearance with the lower portion of the contorted trunks supporting a dense cluster of dead branches. They are caused by repeated browsing during their youth and indicate past grazing activity, but certainly more recent activity than indicated by stone walls.

- The study of stumps of rot-resistant hardwoods (oak, locust, American chestnut), rot-prone hardwoods (birches, maples, beeches), and conifers (hemlock, pine, spruce) can provide excellent information on how logging has affected your woodlot. With practice, these stumps can be identified and approximately aged. Identification of stumps is made easier by knowing several facts.

  - Conifer stumps rot from the outside in because their heartwood is more resistant to decay than their outer sapwood.
  - Rot-resistant hardwood trees rot from the inside out because their outer sapwood is more resistant to decay than their heartwoods.
  - Rot-prone hardwoods rot uniformly throughout and decay completely within 25–30 years.

Tom Wessels offers many other insights to reading the forest landscape. His book is both an informative and entertaining read.

Non-Timber Forest Products

Woodland owners may be interested in increasing their income from non-timber forest products (NTPF's). A recent study by Marla Emery titled "Invisible Livelihoods: Non-Timber Forest Products in Michigan's Upper Peninsula" (Ph.D. dissertation, Rutgers University, 1998) is an excellent resource. Marla discovered that over 138 products are gathered in the Upper Peninsula (see list). Their functional uses were categorized as ceremonial/cultural, edible, floral/nursery/craft, and medicinal. These products contributed to household livelihoods through personal consumption, barter or gift giving, sale in a raw form, and sale in a processed form, with nonmarket uses constituting over 60 percent. According to Emery, buying activities can be thought of as a series or chain of material transformations, whereby NTPF's are harvested and flow through time and space to their point of consumption. Commodity chains for these products are national and international in scope, and profits increase geometrically from supplier to final market.

An example of a commodity chain for NTPF's is princess pine, which is used in floral displays. Princess pine is bulk picked by harvesters in the Upper Peninsula from spring thaw to mid-June and from September to deer season. It is then preserved and dyed by buyers, and transported to floral supply houses throughout the most of the U.S., as well as Italy, Germany, Liechtenstein, Sweden, and Mexico. The capital transactions associated with the princess pine commodity chain are as follows:

1. Harvesting—gatherers' costs include bug spray in spring, permit fees (where required), and gasoline
2. Buying—buyers' costs or gatherer gross earnings: $0.25/lb (varies with wholesale price)
3. Processing—buyer's costs: $0.65/lb
4. Distribution—wholesale price: $1.12–$2.00/lb.

Examples of other important commodity chains for NTPF's in the Upper Peninsula include cedar oil, used as an ingredient in Vic's Vaporub; fiddleheads (*Matteuccia struthiopteris* & spp.), used as green vegetable; grave blankets (primarily *Abies balsamea* and *Picea* spp., but also *Pinus resinosa* and *P. strobus*), which are panels of evergreen boughs placed on graves during winter; and blueberries (*Vaccinium* spp.), used primarily for jam.

The following is a list of non-timber forest products in the Upper Peninsula from Marla Emery's dissertation. Many of these products would also be available in the New England States depending on your specific locality. The following legend applies: F = floral/nursery/crafts, E = edibles, M = medicinal, and C = ceremonial/cultural.

acorns (F)
apples, feral & wild (E)
artist conk (F)
ash (F)
balm of Gilead (M)
balsam, boughs (F)
balsam, cones (F)
balsam, needles (M)
balsam, pitch (M)
basswood bark (F)
bearberry (C)
berries, bilberry (E)
berries, blackberry (E)

berries, blueberry (E)
berries, gooseberry (E)
berries, huckleberry (E)
berries, juneberry (E)
berries, raspberry (E)
berries, strawberry (E)
berries, thimbleberry (E)
birch, bark (M,C,F)
birch, root (F)
birch, sections (F)
birch, twigs (C,F)
bitterroot (M)
black-eyed Susans (F)
burdock, leaf (M)
burdock, root (M)

cattail (F)
cattail, corn (E)
cattail, down (F)

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Non-Timber Forest Products

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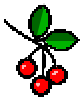
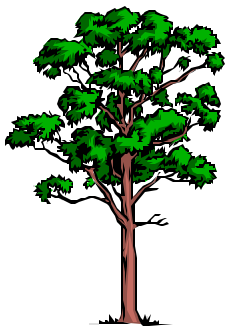
cattail, flour (E)
cattail, roots (E)
cattail, shoots (E)
cedar, boughs (M,C,F)
cedar, cones (F)
cedar, foliage (M,C)
cedar, switches & tips (C)
chamomile (M)
cherries, black (E)
cherries, choke (E)
cherries, pin (E)
cherry bark (M)
cherry, pin, twigs (F)
clover, red (M)
clover, white (M)
cowslips (E)
crabapples (E)
cranberries, bog (E)
cranberries, high bush (E)
currants (E)
dandelion greens (E)
dogwood twigs (F)
elm bark (F)
ferns, various (F)
fiddleheads (E)
flag root (M)
gold thread (M)
grapevine (F)
grasses, various (F)
hemlock, bark (F)
hemlock, boughs (F)
hemlock, cones (F)
ironwood, twigs (F)
jack pine, cones (F)
joe-pye weed (F)
Labrador tea (M)
lichens (F)
lilac blossoms (E)
maple, sap (E)
maple, twigs (F)
milkweed (F)
mint (F)
mushrooms, beefsteak (E)
mushrooms, boletes (various) (E)
mushrooms, button (E)
mushrooms, chanterelle (E)
mushrooms, cinnamon tops (E)
mushrooms, giant puffball (E)
mushrooms, gypsy (E)
mushrooms, hedge hog (E)
mushrooms, honey (E)
mushrooms, morel (E)
mushrooms, oyster (E)
mushrooms, puffball (E)
mushrooms, shaggy mane (E)
mushrooms, slippery jack (E)
mushrooms, sulphur shelf (E)
mushrooms, sweet tooth (E)
mullein (C)



nuts, beechnut (E)
nuts, hazelnut (E)
partridge berry (M)
pearly everlasting (F)
pigweed (E)
pine cones (F)
plums, feral & wild (M,E)
princess pine (F)
raspberry leaves (M)
red pine, boughs (F)
red pine, cones (F)
red willow bark (M,C)
red willow, sticks (F)
reindeer moss (F)
rose petals (M)
sage (woodland) (M)
sheep sorrel (E)
sketaugen (C)
Solomon's seal (M)
spruce, boughs (F)
spruce, cones (F)
spruce, gum (M)
spruce, needles (E)
spruce, roots (E,F)
spruce, tips (M)
stinging nettles (E)
strawberry leaves (M)
sugar plum, twigs (juneberry) (F)
sumac berries (F)
sweet fern (C,E,F)
sweet grass (C,F)
tansy (E,F)
teasel (F)
thimbleweed (M)
trailing arbutus (F)
trout lily root (E)
violets, flowers & leaves (E,F)
watercress (E)
white pine, boughs (F)
white pine, cones (F)
white pine, needles (M)
wild leeks (E)
wild rice (E)
wild rose hips (E,F)
willow, twigs (F)
wintergreen, berry (M,E)
wintergreen, leaf (M,E)
yarrow (F)
yellow waterlily (M)



Ongoing Research at the Durham Lab

Thinning in the Maine Forest

A conference entitled "Thinning in the Maine Forest" was held November 15–16, 1999, in Augusta, Maine. The conference took direct aim at the challenges and opportunities of thinning densely stocked forest stands in Maine. Forest scientists from the United States, Germany, Norway, and Canada made presentations, with most of the emphasis on spruce-fir forests. As pointed out by the opening speaker, Chuck Gadzik of Irving Woodlands and former State Forester of Maine, Maine's forests are dominated by valuable species that naturally regenerate and develop in high densities, with sapling stands often producing over 15,000 trees per acre. This is true for all forest types: softwood, mixedwood, and hardwood. These high density regenerated forests are a mixed blessing in that they regenerate very successfully, but they also develop into stands difficult to manage and are underachievers in growth if not thinned early and properly.

Dr. John Brissette of the Forest Service's Northeastern Research Station presented a paper entitled "Precommercial Thinning in Mixed Northern Conifers: Results of a Study at the Penobscot Experimental Forest." The study was started in 1976 to determine the degree to which precommercial thinning in rows (mimicking the effect of mechanical thinning) with intervening residual strips or conventional spacing, applied independently or in combination with fertilization, affects species composition and the growth and yield of individual crop trees. In the study, four levels of precommercial thinning were applied with and without fertilization in an even-aged stand of northern conifers in east-central Maine. After 18 years,

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Ongoing Research

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precommercial thinning resulted in longer and wider crowns and greater survival, growth, and yield of selected crop trees compared to untreated controls. Growth and yield were greater with uniform spacing at approximately 8' x 8' and 5' row thinning with crop-tree release in residual strips than with row thinning without crop tree release. Control of stand species composition was greatest with uniform spacing. Fertilization had no significant effect. This work, authored by John Brissette, Robert Frank, Timothy Stone, and Thomas Skratt, was published in *The Forestry Chronicle* (1999. 75(6): 967–972).

Species Composition and Structure of Northern Hardwoods After Group/Patch Selection

Bill Leak of the Northeastern Research Station published "Species Composition and Structure of a Northern Hardwood Stand After 61 Years of Group/Patch Selection" in the *Northern Journal of Applied Forestry* (1999. 16(3): 151–153). The abstract of the paper is as follows:

"The 61-year results from a study of group/patch selection in New Hampshire (four entries, 0.5-acre average opening size) showed that this system will maintain a continued proportion of about 20% of the basal area in birches and ash, or about one-third in all intolerant/intermediate species. The diameter distribution closely followed the J-shaped curve typical of unevenaged forests. There was a dead standing component of about 20 trees per acre including 3 sawtimber-sized stems."

Songbird Study in a New Hampshire Northern Hardwood Forest

Christine Costello, Mariko Yamasaki, and Bill Leak of the Northeastern Research Station, and Peter Pekins and Christopher Neefus of the University of New Hampshire recently published "Songbird Response to Group Selection Harvests and Clearcuts in a New Hampshire Northern Hardwood Forest" in *Forest Ecology and Management* (127 (2000): 41–54). The objective of the study was to determine if avian species richness and composition differ between clearcut and group selection openings, and between mature stands and the uncut portions of group selection stands. The study concluded the following:

"Species richness per stand was significantly higher in clearcut openings (p=0.010) than in group selection openings. Forested areas surrounding group selection openings were similar to mature stands in species richness (p=0.848) and composition. Our data suggest that, relative to avian use, the group selection system does not provide habitat similar to that created by clearcutting in extensive northern hardwood stands. The group selection system appears to retain much of the mature forest bird community while providing for a limited number of early successional bird species. Gradual replacement of clearcutting with group selection harvests could result in reduced avian diversity across large forested tracts."

Lichens in the Northeast

An unpublished manuscript on lichen diversity in the Northeast is available from the Durham Field Office. The article, "Lichens Growing on Northern Red Oak (*Quercus rubra*) Trees in the Northeast," was written by Roger Monthey of the Forest Service and Dr. Constance Stubbs, Assistant Scientist with the University of Maine-Orono. The short article, which describes Dr. Stubb's original research, lists common lichens found growing on red oak and includes descriptions and color photographs of some of these lichens.

Reading the Landscape

Roger Monthey of the Forest Service recently worked with researchers at the Forest History Society in Durham, North Carolina, to help produce the article "Reading the Landscape," authored by Leopold biographer Curt Meine in *Forest History Today* (Fall 1999). The article describes Aldo Leopold's early teachings in what was apparently the first course offered in the United States—perhaps anywhere—under the designation "Wildlife Ecology." Roger's father, Lawrence, took this class in its debut in 1939 at the University of Wisconsin. Lawrence Monthey's class notes constitute the most complete extant record of Leopold's instruction at a critical juncture in the evolution of his ideas. They also provide a student's eye view of a master professor at the very moment when an ecological approach to land and wildlife management was first taking hold in academia and in the conservation professions. The article is available from the Durham Field Office.

Biodiversity

Invasive Plants

Invasive plants are making our natural communities less diverse. On my family's woodlot near Madison, Wisconsin, the Tartarian honeysuckle, one of the bush honeysuckles, is dominating the shrub understory beneath the oak trees. I see very few herbaceous species growing beneath the dense shade from honeysuckles. When my folks purchased the farm back in 1953, our present woodlot did not exist; it was bluegrass pasture with a few bur oak and shagbark hickory present. Invasive plants were simply not a problem at that time. In the subsequent 47 years, natural succession has produced a beautiful oak woodlot, but also with the honeysuckle understory. The only reason that I can account for the presence of honeysuckles is the fact that birds eat the fruit and pass the seed through their digestive systems, depositing them in other locations.

An interesting twist on this story comes from an article in *Conservation Biology* (1999. 13: 46–57) that summarizes a study of nest predation in a deciduous woodland preserve near Chicago dominated by an understory of honeysuckle and buckthorn. The authors found that predation of both the American robin and wood thrush nests was higher in the non-native shrubs than in the native shrubs and trees. The researchers suggested that this increase is partly due to physical differences between the native and non-native shrubs. Buckthorn, for example, lacks hawthorn's sharp thorns, which could deter mammalian predators. Honeysuckle has sturdier branches, which could help predators climb higher and, in addition, support nests closer to the ground, where they are more accessible to predators. Thus, honeysuckle is apparently introduced by birds, but in turn can be detrimental to them during the nesting period. The authors noted that honeysuckle is an attractive nesting site to birds because it sometimes leafs out before the native shrubs.

If you are interested in controlling invasives on your woodland property, like I am, some suggested web sites include the following:

1. http://tncweeds.ucdavis.edu/esadocs.html—The Nature Conservancy. This website has information on tools (such as weed wrenches, root talons, knives) that can help you remove invasive plants.
2. http://www.nps.gov/plants/alien—National Park Service
3. http://ser.org/—Society for Ecological Restoration, 1207 Seminole Highway, Madison, WI 53711
4. http://www.natareas.org/naj.htm—The Natural Areas Journal, published by the Natural Areas Association, PO Box 900, Chesterfield, MO 63006–0900

Biodiversity Management in Action: Stream Enhancement in the White Mountain National Forest

(Editor's note: Most of the material for this article was taken from a proposal submitted for public comment by the Androscoggin Ranger District on February 24, 1999. Roger Monthey visited the site in September 1999 after completion of the project.)

During the summer of 1999, the Androscoggin Ranger District of the White Mountain National Forest conducted instream habitat restoration work in Evans Brook, Batchelders Grant, Maine. The purpose of the project was to restore the ecological processes that create and maintain healthy aquatic ecosystems. This was accomplished by placing large woody debris and boulders in the stream. The effort was necessary because Evans Brook did not meet Forest Plan Standards for instream habitat; stream habitat inventories of Evans Brook in 1989 and 1992 found a lack of pool habitat and cover. Wonalancet Brook, an undisturbed stream system on the forest, has approximately five pieces of large woody debris per 100 feet. In comparison, Evans Brook only had 0.4 pieces of large woody debris per 100 feet in the lower reaches and 2 pieces per 100 feet in the upper reaches. Stream temperatures in Evans Brook were at acceptable levels.

The lack of instream habitat diversity in Evans Brook is likely the result of extensive logging at the turn of the century that removed large trees from the streambanks and reduced the source of large wood falling into the stream channel. Additionally, the clearing of instream boulders and large woody debris to facilitate the movement of logs downstream, as well as the creation of a mill pond, may also have been a factor in current instream habitat conditions. The second-growth forest that occurs along Evans Brook now does not likely provide sufficient quantities of large wood to the stream to facilitate the formation of diverse aquatic habitats.

Boulders, logs, and rootwads were placed in the stream. ***Boulder collectors and log deflectors*** were used to constrict and divert flows. Stream meanders and pools are formed by scouring and relocating sediments. They increase spawning habitat, and resting and feeding cover for fish, and provide substrates for macroinvertebrates. ***Boulder placements*** (or groupings) in the middle of the stream were installed to

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Biodiversity Management in Action:

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increase depth by scouring, resulting in reduced channel capacity and increased current velocity. They provide substrates for macroinvertebrates and increased resting and feeding cover for fish. ***Rootwad/cover log structures*** were added on stream banks to improve bank stabilization as well as to improve aquatic habitat. They trap organic material near the streambank, provide substrates for macroinvertebrates, and also provide refuge habitat for fish. As the logs rot, they provide a more natural bank condition.

Spruce or hemlock trees (14–16" diameter) were cut for installation into the stream. Trees cut on the forest were cut either as single trees or in small groups, and were selected to maintain forest stand integrity. Rootwads and cover trees were anchored with rebar, embedded into the substrate, or cabled to the bedrock. Large boulders were transported from an existing gravel pit to the project sites. An excavator was used to place structures in the stream. For further information on this project, contact Lesley Rowse at 603–466–2713 (ext. 231).

Naturalist's Corner

Wildflower and Fern Gardens

You may be interested in creating a small wildflower or fern garden in your woodlot, similar to what Acadia National Park in Maine has done to the enjoyment of many nature enthusiasts. Walking a nature trail with native wildflowers is a wonderful outdoor activity, especially when the plants are named and interpreted. But how do you get started in such an activity? One way is to collect your own seed and plant it along your trail, or you can purchase seeds from certain nurseries. But different species require different germination methods, some of which may be unfamiliar to woodlot owners. The New England Wildflower Society provides a list of native wildflower seeds and fern spores that are available for purchase, as well as germination methods for the various species. Some species and their respective germination methods are described below.

Large-leaved aster (*Aster macrophyllus*)—methods A and B
Showy trillium (*Trillium grandiflorum*)—method C
Bloodroot (*Sanguinaria canadensis*)—methods B and D
Virginia rose (*Rosa virginiana* v. *alba*)—methods B and E
Maidenhair fern (*Adiantum pedatum*)—methods A and F
Sundial lupine (*Lupinus perennis*)—methods A and G

Method A—No pretreatment necessary. Species should germinate upon sowing in a warm location (70–80 °F). Sowing the seeds outdoors in early spring is the easiest method.

Method B—Species germinates after a 90-day period of moist, cold conditions (less than 40 °F). Waiting until late fall and sowing the seeds outdoors in a coldframe is the easiest method. For earlier germination, sow seeds in a pot enclosed in a plastic bag and place in the refrigerator for 90 days before bringing into a warm location for germination. Many species will receive adequate stratification if placed outside before mid-February (in New England).

Method C—Species has a "double dormancy" and requires alternating cold and warm periods in order to germinate. Simply sowing the seeds outside in a seedbed or coldframe in late fall and allowing 2 full years for germination is the easiest method. For earlier germination, sow seeds in pots enclosed in a plastic bag and place in refrigerator for 90 days, then place the uncovered pots in a warm location for 90 days. Repeat the cold treatment again either in the refrigerator or outside in late fall. Seeds will then germinate in a warm location.

Method D—In order to germinate, seeds need a warm, moist period (typically 90 days) followed by a cold, moist period. Sowing the seeds outdoors in the spring and waiting 1 year for germination is the easiest method. For faster results, sow seeds in a warm location for 90 days, then put the pot in a plastic bag in the refrigerator for 90 days before bringing it into a warm location for germination.

Method E—Soak seeds in warm water overnight before sowing.

Method F—Seeds or spores need light to germinate and should not be covered after sowing. Sow in container and water from bottom as necessary.

Method G—Seeds have a hard seed coat. A light rubbing with sand paper or nail file before sowing is beneficial.

We encourage you to consider wildflower gardens in your woodlot setting for educational and aesthetic purposes. Use native wildflower and fern species only, as exotic invasive plants can do significant damage to your woodlot ecosystem.

For further information, contact the New England Wildflower Society, Garden in the Woods, 180 Hemenway Road, Framingham, MA 01701–2699.

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USDA Forest Service
271 Mast Road
P.O. Box 640
Durham, NH 03824

Biodiversity Websites

http://plants.usda.gov—This website has an abundance of information on plants including plant fact sheets, links to other plant sites, global plant checklist, state plant checklists accessible by clicking on states from a United States map, USDA Forest Service plant lists, and Flora of North America with taxonomic keys and sketches of plants.

http://plantfacts.ohio-state.edu—Another plant website that features plant fact sheets from university extension offices throughout the United States.

http://www.usabmp.net—A website featuring Best Management Practices (BMP's) for maintenance of water quality during forest management operations.