How to Create and Enhance Natural Areas Around Your Home

Jonathan Kays
Extension Specialist
Natural Resources
Definitions

- **Forest** - a thick growth of trees and underbrush covering an extensive tract of land.
- **Woodland** - Land covered with woods and trees. A forest.
- **Natural Area** - self-sustaining areas with native vegetation, water, or natural features.
What We Will Learn Today

- Assessing a property & your interests to determine why and where natural areas should be created or enhanced.
- The use of natural succession and tree planting to establish natural areas.
- Managing existing natural areas to improve human and resource values.
- Using the “Woods in Your Backyard” manual as a learning tool.
Changing the Paradigm of Landscaping from Mowed to Natural Use
Converting from a Mowed Lawn to an Unmowed Natural Area – How to do it?

- Produces several benefits:
  - Improves wildlife habitat
  - Improves water quality
  - Reduces noise pollution and air pollution
  - More time to do something else!
Learning How Better Manage Existing Natural Areas

- Produces many benefits:
- Attract desired wildlife and viewing opportunities
- Source of firewood
- Improve privacy
- Improve use for recreation (campfire, sanctuary, etc)
Natural Areas Vary

Mature woods

Pond or wetlands

Old field regrowth
Trends in Forest Land Ownership

- In mid-Atlantic region, at least 2/3 of forest landowners own 10 or fewer acres
- Forested lands are being broken into smaller and smaller pieces
- Similar trends in land ownership across country
- Therefore, each land owner has important role in land stewardship
Disconnect With Small Landowners

- Most forest stewardship programs directed to owners with more than 10 acres
- Urban forestry programs address community forests
- No specific program for those with 1-10 acre forest landowners that make up the majority (two-third’s)
- There are few service providers at present to work with this audience
Forest Fragmentation & Parcelization
Landowners Play an Important Role

- Especially if neighbors cooperate, they can improve wildlife habitat.
- Everybody’s actions influence water quality, air quality, aesthetics, etc.
- Every little bit of effort helps.
What we need to know beforehand:

- Do you have goals and the resources?
- Your place in the landscape - will the natural area expand existing natural areas on your property or those that border it?
- Basic ecological & management principles
- Actual techniques and practices
Three types of land use:
- Intensive use – buildings, sheds, paved areas, etc
- Intermediate use – lawns, garden, pasture, orchard
- Natural use – forested, unmowed areas with small trees & shrubs

Paired 3-acre plots
Intensive – Intermediate – Natural Use Areas

Natural Succession
Some Planting after 3 years

Natural Succession
Some Planting after 16 years
Looking Down Property Line
Forested on Left - Mowed on Right

4 years

17 years
Draw a Map of Your Property
Aerial Photos Can Help Broaden Your Perspective – Pg. 19

- Provide big-picture perspective to reveal landscape patterns that are difficult to see from the ground
- Scale of aerial photos varies
- Soil conservation district – regular B & W
- In MD: www.mdmerlin.net
Google Earth

Google Earth helps you see your place in the landscape

A single property of less than 10 acres can’t possibly meet habitat needs of many species

http://earth.google.com
Habitat Patches

- In land management a “habitat patch” refers to a single kind of habitat (e.g., an old field, a young forest)
Patch size and proximity affect wildlife habitat

Larger, closer, and connected habitat is more useful to wildlife

Figure D above is best for wildlife; Figure A is worst
Edge occurs at the interface between 2 or more habitats

- Hard Edge
- Soft Edge
Expanding existing forest areas

The planting area on the left expands the existing forest buffer to. The aerial picture on right shows how planting could expand an existing forest area.
Look Beyond Your Boundaries

Try to expand existing natural areas to reduce fragmentation of the forest.
Cooperate to Reach Your Goals

- You may not be able to provide all habitat elements needed by the wildlife species you desire, so...

- *Cooperate with neighbors to achieve shared goals*
Constraints to Land Management
Any Ideas?

- Economic & physical
  - Family & friends
- Ecological
  - Sloped or flat
  - Flooded
  - Latitude & attitude
- Social
  - Aesthetics of neighborhood, etc
- Legal
  - Easements & right-of-way
  - Covenants
  - Regulations
  - Zoning
Economic and Physical Constraints

- Will family/friends help you do most of the work?
- Do you have the basic equipment, skills, knowledge, and strength?
- Are there public programs to provide financial & technical assistance (for example, Rural Residential Stewardship Initiative – Baltimore Co.?)?
- Are there private service providers that will do work for a fair price?
Investigate the Legal Constraints on Your Land

Easements – None

Rights of way – None

Covenants – The homeowners association covenants include a provision that grass not be more than a foot tall. This might prevent us from turning some of the lawn into a forested natural area. We figured our best chance of getting an exception to this covenant was accurate information and thorough planning.*

Other constraints – None

*P.S. from Ellen: We continued to work our way through the exercises in this book, and when we were done, Tim presented our land management plan at a meeting of the homeowners association. He emphasized the benefits of improved water quality in Oak Creek and improved air quality and reduced noise pollution from less lawn mowing. In the end the homeowners association agreed to the plan as long as the lawn area to be planted in trees was at least 25 feet back from the road. We agreed to mow between the trees until the forest canopy closes.
Note on Commercial Logging

- Most commercial loggers work only on properties larger than 10 acres
- Never agree to a harvest without first educating yourself about the process
- Some companies cut all your best trees, leaving nothing of value for the future (high-grading)
- State and county Cooperative Extension staff can help, as can Extension publications
Logging in Large-Lot Suburban Developments with a Good Forester
What are Your Interests?

- Reduce time spent mowing lawn and improve wildlife habitat.
- Improve the water quality of Oak Creek.
- Improve aesthetic enjoyment and sense of privacy.

<table>
<thead>
<tr>
<th>Table 1 – Determine your Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource Benefit</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Natural Area Improvement</td>
</tr>
<tr>
<td>Natural Products</td>
</tr>
<tr>
<td>Wildlife Habitat</td>
</tr>
<tr>
<td>Water Quality</td>
</tr>
<tr>
<td>Recreation</td>
</tr>
<tr>
<td>Aesthetics</td>
</tr>
</tbody>
</table>
Sample Projects for Each Resource Benefit

- Natural Area Improvement
- Forest Products - firewood for personal or others’ use, Ginseng or other medicinal plants, Grapevines for wreaths, Shiitake mushrooms
- Wildlife Habitat
- Water Resources
- Recreation
- Aesthetics
Ecological Principles

Definition - Ecology: the study of natural communities and how they function and interact.

- Principles of succession
- Principles of forestry
- Water resources and your natural area
- Principles of wildlife ecology
The Dynamic Natural Area: Principles of Succession

1. Natural areas change over time, whether or not you do anything to them.
2. You can alter the process of succession.
3. Trees vary in their requirements for sunlight.
The first vegetation to grow is that which like full sunlight.
Tree Planting: Push succession ahead
Ecological impacts?

Forest Harvesting
Push succession back.
Succession Principle 3

- Trees vary in their requirement for sunlight.

### Shade Tolerance of Some Common Eastern Trees

<table>
<thead>
<tr>
<th>Shade-tolerant</th>
<th>Intermediate</th>
<th>Shade-intolerant</th>
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</thead>
<tbody>
<tr>
<td>Beech, American</td>
<td>Ash</td>
<td>Aspen, quaking</td>
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<tr>
<td>Blackgum</td>
<td>Birch, sweet</td>
<td>Birch, gray</td>
</tr>
<tr>
<td>Cedar, Atlantic white</td>
<td>Birch, yellow</td>
<td>Birch, paper</td>
</tr>
<tr>
<td>Dogwood, flowering</td>
<td>Cherry, black</td>
<td>Cedar, eastern red</td>
</tr>
<tr>
<td>Hemlock, eastern</td>
<td>Hackberry</td>
<td>Larch</td>
</tr>
<tr>
<td>Hickories</td>
<td>Magnolia, cucumber</td>
<td>Oak, pin</td>
</tr>
<tr>
<td>Maple, red</td>
<td>Oak, northern red</td>
<td>Pine, red</td>
</tr>
<tr>
<td>Maple, sugar</td>
<td>Oak, white</td>
<td>Pine, shortleaf</td>
</tr>
<tr>
<td>Sourwood</td>
<td>Pine, eastern white</td>
<td>Pine, Virginia</td>
</tr>
</tbody>
</table>
Silvics

Silvics are the biological characteristics of individual trees, such as...

- Natural range
- Shade tolerance
- Place in succession
- Regeneration characteristics
  - seedbed requirements,
  - seed dispersal,
  - germination requirements
- Growth form
- Longevity

Stand Development Function

- Site quality
- Past history
- current practices (grazing, for example)
- species composition

- A photographic history from the Allegheny Plateau in Pennsylvania (1927-1998)
The Dynamic Natural Area: Principles of Succession

- Different successional stages provide different wildlife habitat, aesthetics, and recreation.
- Every small wooded lot may not contain every stage of succession.
Each stage of succession supports different wildlife.
Stages of Succession

- Different stages of succession represent different habitat patches (i.e. mature forest, old field, young forest, etc).
- Advantage of working with neighbors.
Forestry Principles

1. Tree size not directly related to age
2. Different tree species require different conditions
3. Trees grow at different rates - compete for resources (i.e., sunlight, water, and nutrients)
4. Forests are 3-dimensional

The center tree has space to grow on three of its four sides.
Which trees are older?

Different Stages?
Sunlight Competition

The trees that are most successful in the competition for light outgrow and overtop the others.
Development of vertical stratification as trees die, holes are filled, others seed in.
Forestry Principles: Getting Down to Basics

1. Trees reproduce either from seeds or sprouts
2. Trees don’t live forever; dead trees valuable for wildlife and soil
3. No matter how you manage your land, but especially if you practice passive management, invasive and exotic species will inhabit it.
Some species need bare soil to germinate, some germinate from nuts, hardwood trees re-sprout when cut.
Dead wood on the ground has ecological value...how this affects your use of the woods.
Common Invasive & Exotic Species
Do you recognize them?
Invasive and natural species can take over. Especially in early succession.
### Exotic Species

<table>
<thead>
<tr>
<th>Insect, disease, or plant</th>
<th>species affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chestnut blight</td>
<td>American chestnut</td>
</tr>
<tr>
<td>Dogwood anthracnose</td>
<td>Flowering dogwood</td>
</tr>
<tr>
<td>Gypsy moth</td>
<td>Oaks, hickory</td>
</tr>
<tr>
<td>Dutch elm disease</td>
<td>American elm</td>
</tr>
<tr>
<td>Balsam woolly adelgid</td>
<td>balsam &amp; fraser fir</td>
</tr>
<tr>
<td>Hemlock woolly adelgid</td>
<td>eastern hemlock</td>
</tr>
<tr>
<td>Sudden oak death syndrome</td>
<td>western (eastern?) oaks</td>
</tr>
</tbody>
</table>

A few invasive exotic (non-native) plants:

- multiflora rose
- autumn olive
- ailanthus (tree-of-heaven)
- kudzu
- honeysuckle
- paulownia
- privet
- lespedeza
- Johnson grass
- KY31 tall fescue
- crown vetch
- English ivy
- garlic mustard
- phragmites...
Controlling Invasives & Exotics

- Expect that invasive & exotic plants will invade a planting site or area going through natural succession. They will be a problem in all natural areas.
- Good preparation of planting site will help you avoid problems.
- The judicious use of herbicides is essential to have a lasting impact on controlling I & E plants.
- Multiple applications and followup may be required.
Ailanthus (also known as Tree-of-Heaven)
Gypsy Moth

mature larva

laying eggs

defoliated woodlot
Learn to Identify Invasive & Exotic Species

Emerald Ash Borer
Forests and Water Resources

- Natural area soils act as a sponge and filter, absorbing water and removing impurities
- Trees and shrubs grown on banks prevent erosion
- Water attracts wildlife
- Herbicide and fertilizer application can affect water quality, impacting human and wildlife neighbors
Improving Wildlife Habitat Value

- Natural areas will increase food, cover, water, space
- While the area may be mowed for a few years for aesthetics, at some point it must be allowed to go natural.
- Getting across the message, ‘Messy is okay’
- New natural areas will attract wildlife that will increase wildlife-human conflicts (i.e. deer)
Wildlife/Human Interaction
4 Elements of Wildlife Habitat

- Food
- Cover
- Water
- Space
Providing and Enhancing Habitat Elements

- Mast trees (produce edible fruits/nuts)
- Rocks (cliffs, outcroppings, piles)
- Snags (dead standing trees)
- Water (stream, pond, wetland, spring)
- Wolf trees (large, spreading, in the open)
Providing and Enhancing Habitat Elements

To increase the amount and/or variety of wildlife you host

- Brush piles
- Dense thicket
- Edge
- Forest openings
Mowing for awhile… but then let it go.

Tree plantations when established can be mowed for a few years to assure establishment but then let it go. Otherwise, the wildlife, water quality, and other benefits will not be realized.
Land Management Techniques
“Taking forestry to the backyard”

- Best management practices
- Brush piles
- Create campfire area
- Firewood cutting
- Food plots
- Mast trees
- Tree planting
- Trails & roads
- Much more...
Application of Common Forest Management Techniques

- Firewood thinning
- Creating a snag by girdling
- Planting trees with shelters for deer protection
Learn to look up

Learn how to use equipment safely
Sizing up the situation – why plant trees?

- Possible goals include:
  - Wildlife habitat, aesthetics/privacy, soil stabilization, water quality, timber income,
  - One main goal or a combination

- Impacts what is planted and how
  - What species
  - What density or spacing
Sizing up the situation – what is the site telling you?

- **Site Quality**
  - Function of: soils, slope position, aspect, past practices, etc.
  - Low quality = pines
  - High quality = hardwoods

- **Site sensitivity**
  - Soils (Hydric)
  - Ramifications on site prep, planting & maintenance
Try to Plant Drainage Areas
Look at Soil Survey online

Areas with high water quality and habitat value.
Fall - Determine the area and spacing so you can calculate number of seedlings and tree shelter (if necessary) needed.

- Usual spacing is 10’ X 10’ (435 trees per acre) or 12’ X 12’ (302 trees per acre).
- Order seedling from DNR Forest Service nursery online or from other state or private native plant nurseries.
- Place order before January 1 if possible.
Site Preparation

- Fall prior to Planting:
  - Cut the grass to a low height if needed.
  - Spray 6 ft. strips with appropriate herbicide every 10’ or 12’, depending on your spacing. This should be done again in the spring.
  - Check for presence of voles and consult resources to see if treatment is necessary.
Orientation of Trees

- Most tree plantings done in plantation style with 10’ X 10’ spacing and straight rows.

- Small backyard planting better suited for more random or clumped planting. Takes more effort but will look more “natural” as it develops.
Plant trees with a mechanical tree planter or by hand using a planting bar.
Tree Shelters?
Tree Shelters…

- Allow for application of broad spectrum herbicides (Roundup) to remove competing vegetation
- Easy to know where seedlings are
- Do require yearly maintenance
Herbicides as a Tool - Advantages

- Very effective
- Cost effective in many situations
- Little/no soil disturbance
- Retains/increases soil organic matter
- Relatively low risk of non-target damage
- Not limited to “drivable” land
- Appropriate for large or small areas.
Herbicides and Site Prep

- Spraying used to
  - control weed competition
  - In combination with burning
    - Better burn
    - Better weed control
- Usually in spring, summer, or fall just prior to planting the following winter or spring.
- Broad spectrum herbicides used
  - Accord (glyphosate), Arsenal AC, Chopper (Imazapyr), Tordon K, Tordon 101 (Picloram), Garlon 3A, Forestry Garlon 4 (Triclopyr).
Herbicides and weeding

- Herbicide during the first growing season to control competing vegetation, if necessary to achieve establishment.

- Selective herbicides, rates or applications used:
  - Pines generally call for selective herbicides
  - Velpar L (hexazinone), Arsenal AC (imazapyr)
    - As aerial broadcast
  - Hardwoods generally call for directed/selective application methods.
Directed Sprays - Woody

Grid - Release

Spot Around - Woody

Banding

Individual Woody Stems

Tree Centered Spots - Herbaceous
Herbicide Strips or Circles
Without Mowing
Weeds Encroach Quickly
Prime Vole Habitat
Comparison: Pine Vole and Meadow Vole

Adult Males

Pine Vole
(Microtus pinetorum)

Meadow Vole
(Microtus pennsylvanicum)
Tunnel Systems

Surface Tunnels:  
meadow voles

Subsurface Tunnels:  
pine voles
Initial Field Inspection

Start at seedling and look for vole tunnel or holes. Hole with no surface tunnels near this seedling indicates pine voles. Seedling still green but no root system.
Prime Vole Habitats

- Old pastures
- Riparian buffers
Integrated Pest Management for Voles
IPM for Voles

Cultural Methods
Reduce habitat by mowing grass, use of herbicide strips, and minimize mulching.

Biological Methods
Encourage predators. Provide perches. Don’t kill snakes

Trapping Methods
In landscapes and small areas use mouse traps.

Chemical Methods
Restrict to commercial applications. Requires pesticide certification. Alternate types of baits.
Factors Affecting the Life Cycle of a Plantation

- Initial successional stage of site
- Type of tree establishment used:
  - Vegetation adjacent to the plantation site
  - Type of monitoring and wildlife control used for problem
- Post planting maintenance of vegetation and wildlife
Initial Condition of Site
Previously in Row Crops (last 1-2 Year)

- Earlier stage of succession – less established vegetation
- Easier site preparation and follow-up with herbicides
- Easier for wind blown – animal transported to establish themselves.
- Less likely to have vole problems, established deer trails may be regularly interrupted
Previously in Pasture

- Later stage of succession – established grass and some woody cover
- Difficult to use natural regeneration without some initial vegetation control
- More challenging site preparation and follow-up maintenance with herbicides
- Pre-planting monitoring of voles essential
- Assessment of deer browsing needed to
Previously in lawn

- Must kill fescue around trees or grass will take all available moisture
- When using natural regeneration will have to control invasives
- Assessment of deer browsing needed to determine need for use of tree shelters
Monitoring and Control of Wildlife Damage

- None – whatever happens – not an option
- Tree shelters
  - Good survival and early growth in areas with abundant deer
  - Very expensive and require considerable maintenance.
  - Easier vegetation management
- Perimeter fence
  - Protects biodiversity of site
  - Make vegetation control more difficult
  - May be more cost-effective in some applications
Let it Go Wild
(As trees grow and crowns close.)
Plantation Maintenance

- Keep mowed to control voles and herbicide around trees to remove competition, especially from grasses. First few years.
- Tree shelters must be checked each year and removed before tube constricts diameter growth of tree
- As crowns start to close stop mowing and allow to go wild
Improving Existing Natural Areas

- Forest health
- Wildlife
- Forest products
- Recreation & aesthetics
Safety

Hazardous trees

- Structural integrity compromised
  - look for dead wood, cracks, weak branch unions, decay, cankers, root problems, poor architecture
- Valuable targets
- Move target or prune/remove tree

Equipment

- tractor
- chainsaw
Rules for Chopping Your Own Wood

- Never park down hill of a tree you are cutting.
- When in doubt, park twice as far from the tree as the tree is tall.
- Just because you live within driving distance of a forest does not make you a Lumber jack.
- Always use the neighbor’s truck!
Other Techniques – Crop Tree System

- Crop Tree Release
  - applied to younger stands
  - at least 25’ tall to express canopy position
  - up to 70 trees per acre.

- Crop Tree Management
  - Select “crop” trees, ~20 - 30/ac (25’ between CT minimum)

- Release (Free To Grow) on 3-4 sides
  - Concentrates/accelerates growth
Crown Touching Release

Top View

Before Treatment

Side View

After Treatment
Crop Tree Management

This graph shows how an increase in free-to-grow rating from a crown-touching release can dramatically increase crop-tree growth.

From: Crop Tree Management in Eastern Hardwoods. USDA-FS.

Crop Tree Management: What you need to know.

- Silvics of the species
  - How will it respond to release?
  - Longevity?

- Aware of regeneration implications
  - Shade tolerant vs. intolerant

- How to kill trees...
How to Kill Trees

- Cutting
  - Immediate
  - Leaves the root system in place
- Girdling
- Chemically
- Combination
Girdling

- Hatchet or chainsaw
- Cut through the cambium
- Some species easier to kill than others.
Herbicides – Common Methods

Remember: always read and follow the label.

Cut Stump Application

C. Hack-and-squirt
Enhancing Recreation & Aesthetics
Best Management Practices

- **Purpose** – to reduce erosion and prevent or control water pollution resulting from actions which disturb soil.

- **Management Practices with risk**
  - Road/trail construction
    - Especially near or across water
  - timber harvesting (skidding & loading)
  - site preparation
  - chemical applications
Stream crossing options

- Bridge
  - permanent
  - temporary
- Culvert(s)
- Fords

Photo credit: USDA Forest Service, Northeastern Area, State & Private Forestry
Best Management Practices

- properly designed & built travel ways
  - minimize grade
  - divert water (dips, turnouts, culverts)
  - avoid sensitive areas
- streamside management zones (SMZs)
Best Management Practices – Con’t

- minimize stream crossings
- keep debris out of streams
  - allow for unimpeded flow
- vegetated stream buffer zones
  - Shade for aquatic wildlife
  - Stabilized soil
  - Filter strip
- minimize compaction
  - equipment use, wet soils, time of year, entries
- seeding & fertilizing bare soil
- reforestation strategy
Creating a Trail

- Visually interesting and variable terrain
- Follow natural contours and meander, not straight
- Respect privacy and property of neighbors
- Use BMP’s to reduce erosion potential
- Lay it out first with ribbon and then adjust
- Cut trees and brush or find a service provider to do it for you
<table>
<thead>
<tr>
<th>Management unit</th>
<th>Goal</th>
<th>Project description (Provide details and step-by-step activities)</th>
<th>Priority</th>
<th>Start date</th>
<th>Projected completion date</th>
<th>Who will do it?</th>
<th>Cost estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-lawn</td>
<td>convert to trees</td>
<td>Use Roundup herbicide on the grass in the fall before planting in the spring. Use trees and shrubs that flower and/or have great fall color and/or produce wildlife food to reforest lawn in front of garden. Seedlings will include yellow poplar, black walnut, red oak, black cherry, and white pine. Order bare root seedlings from state nursery in late fall. Plant on a 10’ x 10’ spacing in this 0.75-acre area (~225 trees). Install a tree shelter and a wooden stake around each seedling to protect it from deer browsing. Respray the grass between the rows with herbicide in the summer after planting, if needed. Mow between the rows until forest canopy closes because of homeowner association rules.</td>
<td>1</td>
<td>this fall</td>
<td>end of spring 3 years from now (split plot in thirds so the cost and time required per year are less; start closest to the road)</td>
<td>mainly Tim with help from Ellen</td>
<td>$300 for plants at ~$1.35 per plant; $100 for Roundup herbicide and backpack sprayer; $900 for shelters and stakes at $4-5 each</td>
</tr>
<tr>
<td>4-riparian area</td>
<td>plant a riparian forest buffer to help protect water quality in Oak Creek</td>
<td>Plant trees and shrubs (~440) recommended for riparian buffers throughout area currently in tall grass and thorny shrubs (1 acre). Plants will include river birch, green ash, sycamore, red maple, dogwood and buttonbush. Use tree shelters as described above. Mow grass before planting and frequently thereafter until trees establish. Do not use herbicide next to the stream.</td>
<td>2</td>
<td>next fall</td>
<td>end of following spring</td>
<td>mainly Tim with help from Ellen</td>
<td>$600 for plants; $2,200 for tree shelters and stakes</td>
</tr>
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</table>
## Activity 20

### Record Your Progress

<table>
<thead>
<tr>
<th>Management unit</th>
<th>Project</th>
<th>Date completed</th>
<th>Actual cost vs. projected cost</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-lawn</td>
<td>Conversion of lawn to trees</td>
<td>-</td>
<td>N/A vs. $1,300</td>
<td>Almost finished. So far cost is a little less than projected.</td>
</tr>
<tr>
<td>4-riparian</td>
<td>Plant riparian forest buffer along Oak Creek</td>
<td>spring 2006</td>
<td>$3,000 vs. $2,800</td>
<td>Completed. Cost was a bit more than projected because we slightly underestimated the number of plants needed.</td>
</tr>
<tr>
<td>area</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>throughout</td>
<td>Create a trail throughout property</td>
<td>fall 2005</td>
<td>$68 vs. $45</td>
<td>Completed. Cost was a bit more than projected because we added some trail drainage features. Finished work two seasons after we planned to, but we are now happily using the trail with the kids.</td>
</tr>
<tr>
<td>property</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-riparian</td>
<td>Enhance habitat for reptiles and amphibians</td>
<td>summer 2005</td>
<td>$125 vs. $100</td>
<td>Completed. Cost was a bit more than projected because plants were more expensive than expected. Have seen turtles and frogs on numerous occasions and have seen a couple of small snakes. The kids are fascinated!</td>
</tr>
<tr>
<td>area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Important: Take Pictures!
The Woods in Your Backyard Manual

- 17 Lessons
- 20 Activities
- 4 Appendices
- Resources List
- Glossary of Terms
- Five Parts
  - Part I – Introduction
  - Part II – Get to Know Your Property
  - Part III – Ecological Principles
  - Part IV – Put Your Knowledge into Practice
  - Park V - Workbook
Use the Workbook & Resources
Part V. Page 79

- Workbook – Pg 81-104
- 2 more case studies
  - The Lees – Pg. 105-111
  - The Rothmans – Pg. 112-119
- Appendices – Pg 121-130
  - Characteristics of trees, wildlife food, habitat requirements, tree & shrub uses & requirements
- Resource List – Pg 131-136
- Glossary – Pg 137
Now Available

- 138 pages
- 91 color photos
- 20 activities
- 8 tables
- Workbook
- PLUS
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