WOODLAND STEWARDSHIP PLAN

Prepared for:

North Shore Community School
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SW ¼ of the SW ¼ of
Section 32 – T52N – R12W

Total Parcel Acres: 40
Stewardship Acres: 27

Updated by:

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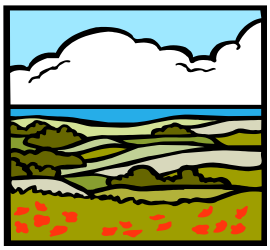
16 July 2007

Forest Stewardship goals for this School Forest property:

1. Use the School Forest as an educational tool to assist the students.
2. Improve the quality of both wildlife habitat and timber resources.
3. Learn from the interactions of nature's natural communities.

Property Description

STEWARDSHIP ACRES: 27



TOTAL ACRES: 40

LANDSCAPE REGION: North Shore Highland Subsection
The enclosed Minnesota map shows the ecological landscape subsections. The actual boundaries are not as sharp as the lines might imply. In fact, there can be islands of one landscape region inside another. However, There are basic ecological differences between the units.

Your School Forest is located in the North Shore High lands subsection and is described in more detail on the following page. The purpose of providing this "landscape region" and the "Interaction with Nearby Properties" information is to help you assemble a picture of how your land and your activities fit into the larger landscape.

The "Conservation Issues of Concern" are of particular note. It is likely that at least some of your activities will affect these larger scale issues.

INTERACTION WITH NEARBY PROPERTIES:
The surroundings of this School Forest is mostly privately owned property. Schmidt Creek passes through near the North border of the property with the outdoor classrooms located fairly close to the banks of the creek. Access to the area is over paved roads on both the west and south sides. The overall topography of the entire area varies not more than twenty feet.

In checking the Natural Heritage database, four rare natural features were found nearby, but not on the property: the wood turtle, Blanding's turtle, Moschatel, Carolina spring beauty and barren strawberry.

GENERAL PROPERTY DESCRIPTION:
The property is located at the junction of Lismore and Ryan road. Both of these roads are all season roads providing excellent access to the facility. North Shore School is found about one mile east and about three miles North of the easternmost portion of Duluth. The school is a local gathering point for many of the residents and is a great example of what a community can achieve.

Almost three-quarters of the property are covered with trees of varying species with a wide variety of ground vegetation. Schmidt Creek trickles through along the northernmost boundary from west to east. The soils over most of the area are a mix of clays, loams, and on the creek bottom, silty sands. The timber is a nice mix of young regeneration, immature, mature, and over-mature trees.

NATURAL HERITAGE

The legal description has been compared with the state archaeological site database maintained by the Minnesota State Historic Preservation Office (6/27/07). No cultural heritage sites have been documented within or adjacent to the parcel.

There are no known rare, endangered, or threatened features, based on checking the Natural Heritage database 3 July 2007.

CONSERVATION CONCERNS

Erosion is of primary concern on this property due to the potential for heavy foot traffic from students. The steep slopes increase the rate that water can move, picking up soil particles on the way. The water quality could be significantly reduced if too much soil is deposited into the marsh, which could also affect fish populations. Erosion concerns can be mitigated along all trails by installing and maintaining water bars or using other appropriate erosion control options as needed.

SOILS

The soils at this site are classified as Ontonagon silt loam, which consists of deep, nearly level well and moderately-well drained soil formed in clayey sediment. This is the dominant soil west of Two Harbors. With these soils, it is typical to find a layer of decomposed and undecomposed plant material about 1 inch think. Water and air movement through the soil is poor (<0.06 inches/hr; very slow). Available water capacity (the amount of water that a soil can store that is available for plant use) is moderate; organic matter content and natural fertility are medium. The available water capacity, organic matter content and natural fertility of these soils give it a fair potential for growing trees and crops, and a good potential for wildlife habitat. Common tree species found growing in theses soils are trembling aspen, eastern white pine, white spruce, balsam fir, and paper birch.

LANDFORMS AND WATERSHEDS

Slopes are 0-2%. The school forest is located in the Major watershed of Lake Superior South with the minor watershed being Schmidt Creek.

Property Description

NORTH SHORE HIGHLANDS SUBSECTION

DISCUSSION
The North Shore Highlands Subsection parallels the western edge of Lake Superior, extending about 20-30 miles inland. The land is gently rolling to stoop. Soils are very rocky. The area is marked by a number of short streams that rush toward Lake Superior, where they often end in a waterfall near the shoreline.

CLIMATE
Lake Superior dominates this region. It moderates the climate throughout the year, acting as an air conditioner in the summer and a heat sink in the winter. Total annual precipitation is about 29 inches. Growing season ranges from approximately 121 to 135 days, with the longest growing season along the shore of Lake Superior. The growing season on Lake Superior is about 10 days longer than just 6 miles inland. Lake effect increases the amount of snowfall by about 10 inches within 5 miles of the Lake Superior shoreline, but a similar trend is not apparent in the annual precipitation data.

HYDROLOGY
Lakes make up about 2-3 percent of the subsection – there are 20 lakes larger than 160 acres in size. 117 of these are located on the Highland Moraine. Numerous short streams, 10-15 miles long, lead directly from the highland to the shore of Lake Superior. Most of them have waterfalls near the shoreline.

PRE-SETTLEMENT VEGETATION
White pine-red pine forest was most common on thin soil over bedrock, concentrated on the ridges. In the northern half of the subsection, aspen-birch was dominant, with very little white-red pine forest or mixed hardwood-pine forest. Mixed hardwood-pine forest persisted in area within 6-10 miles of the shoreline on the ridge tops.

NATURAL DISTURBANCE

Fire was an important disturbance, especially in the northern half of the subsection. Spruce budworm defoliation was and continues to be a significant disturbance to stands of balsam fir and spruce.

PRESENT VEGETATION AND LAND USE

Almost the entire subsection remains forested, with forest management and recreation as the major land uses. Following logging, the extensive white pine-red pine forests have been replaced by forests of trembling aspen-paper birch. Tourism and mining are the other important land uses. There are no mines within the subsection, but ports were set up to get the iron ore from the range to steel mills in Indiana and Ohio. The city of Duluth has a large port area and ships significant amounts of agricultural commodities, as well as iron ore.

RARE ANIMALS AND PLANTS

Rare animals include the bald eagle and the gray wolf. Rare plants of the area are numerous and include the Beach Grass, Arnica, Marsh Reedgrass, Michaux's Sedge, Black Hawthorn, Norwegian Draba, Neat Spike-rush, Small-flowered Woodrush, Braun's Holly Fern, Knotty Pearlwort, Encrusted Saxifrage, Northern Spikemoss, Clustered Bur weed, Small False Asphodel, Alpine Nilberry, Smooth Woodsia, Rocky Mountain Woodsia, and several species of lichens.

CONSERVATION CONCERNS

A major environmental concern associated with the area is the protection of biological diversity. Old growth hardwood and rare upland northern white cedar forests contribute significantly to the diversity of species. The closeness of the urban center of Duluth and the desire to provide for the needs of the people is also a concern.

Another major concern is soil erosion. With the slopes as steep as they are and the projected foot traffic, there is a much higher potential for erosion control issues to develop unless adequate control measure are implemented when needed.

Woodland Stewardship Cover Types

DESCRIPTION OF MANAGEMENT UNITS

Stand	Type	Acres	Age
1	Black Ash	7.5	70
2	Aspen	6.2	62
3	Oak	12	75
4	Windbreak	0.75	36
5	Lowland Brush	0.7	N/A

This wonderful property is 40 acres in size with approximately 27 acres being wooded. In this section of your Woodland Stewardship Plan, each stand will be described in more detail. Information for each stand includes: a stand objective(s) and activities to achieve the objective(s); at least one alternative objective; and which references in your Woodland Stewardship binder could be helpful for that stand.

For timber, instead of using numbers for quality of growth potential, basal area (density), and timber quality; a range will be used. The range from better to worse is: Excellent, Good, Fair, Poor.

On page 18 there is an ACTIVITY SCHEDULE/PLAN SUMMARY of a suggested timeline for completing specific projects.

Below, on this page, is a summary of some Stewardship Binder Reference tabs that may be helpful while managing your School Forest Property.

Stewardship Binder References:

Tab	Reference Name
Wildlife……..	"Landscaping Woodlands for Wildlife"
Ecology……..…	"Forest Ecology-Succession"
Tree Species……...	See all that Apply
Soils…….……..	"Forestry and Soils – Compaction" & Table 2
Water and Wetlands…….……..	"Water Pollution"
Forest Stand Improvement……	"Timber Stand Improvement-Coniferous"
Protection…….……..	"Aspen – Insect and Disease Guidelines" & "Pest Management for Woodland Owners"
Harvest…….……..	"Guidelines for Forest Management"
Forest Products……..	"Balsam Bough-Careful Harvest Fact Sheet"
Regeneration…….….	"Tree Planting"

BLACK ASH

Stand Number: 1
Stand Acres: 6.2

Tree Summary Data		Estimated Volume/acre	
Age	70	Black Ash	10 cds
Growth Potential	Good	Balsam Fir	4 cds
Tree Density	Excellent (75 BA)		
Timber Quality	Good		
Timber Volume			14 cds/ac*

*Volumes not accurate for timber sales.

Stand Description

This stand is dominated by mid-sized black ash of fairly good quality mostly located to the north of the stream. Also in the stand are scattered balsam fir and white spruce with a light amount of alder in the understory. There is a small amount of trees that have been up-rooted by the wind (windthrown) and could be hazardous to the students. Some of the regeneration of trees present on the forest floor are varying sizes of black ash, balsam fir, basswood, and willow scattered around in low densities.

The soils here are much heavier and water-logged than the rest of the site with numerous plants present that tolerate wet soils. Some of the plants we found are: bedstraw, stinging nettle, lady fern, sensitive fern, early meadow rue, wild sarsaparilla, and ostrich fern. Part of the reason for the water-logged soils is due to Schmidt Creek trickling through this part of the property, heading from the general direction of west to east, along most of the northern boundary.

Stand Objectives

- Maintain/improve water quality.
- Keep students safe.
- Learn!
- Keep soils compaction and erosion to a minimum.

Recommended Activities to Achieve Stand Objective:

- Harvest dead and hazard tree, especially near trails, for the safety of the students. Could also cut "cookies" off the stump and varnish them to keep for years instead of coring healthy trees.
- Study aspects of wetlands like:
    - Stream morphology-peak water flow
    - Life cycles of fish and amphibians
    - Wetland plant and tree identification (note how these plants are not found in other areas of the forest where it's dryer)
    - Aquatic invertebrates
    - Animals that use wetlands
    - Wetland soils
- Talk about the importance of wetlands, riparian zones, and floodplains and how they help filter/clean water and act as buffers.
- Study importance of coarse woody debris (CWD) in streams for fish.
- Explain what compaction and erosion is and why it is bad for the soil and water. Take care to follow proper trail construction techniques that aid in inhibiting soil from movement.
- Put up wood duck boxes
    - Study aspects of wetlands like peak flow from the creek, life cycles of fish and amphibians, practice wetland plant identification (note how these plants are not found in other areas of the forest where it's dryer).

Alternative Stand Objective:

- Work on stream bank stabilization
- Leave "as is"

Stewardship Binder References:

Tab	Reference Name
Tree Species……..	See all that Apply
Regeneration…….	"Tree Planting"
Protection……..	"Pest Management for Woodland Owners"
Water and Wetlands……..	See all that Apply
Soils…….……..	Compaction & Table 2
Wildlife…….	See all that Apply

ASPEN

Stand Number: 2
Stand Acres: 7.5

Tree Summary Data		Estimated Volume/acre	
Age	62	Aspen	10 cds
Growth Potential	Fair	Balsam Fir	3 cds
Tree Density	Fair (83 BA)	Red Maple	3 cds
Timber Quality	Fair	Bur Oak	1 cd
Timber Volume			17 cds/ac

*Volumes not accurate for timber sales.

Stand Description

This stand is predominately made up of aspen that is in declining health, with scattered balsam fir, red maple, and bur oak. There is a fair amount of aspen infected with Hypoxylon canker caused by the fungus *Hypoxylon mammatum*. This is a common canker in aspen stands in eastern North America and is not something to be concerned about. However, it does weaken the tree and make it more susceptible to windthrow, creating safety issues for those that use the school forest.

The ground vegetation is made-up of dewberry, starflower, baneberry, big leaf aster, wild rose, bracken fern, thimbleberry, grasses, horsetail (*Equisitum spp*.), and Mint family species. Regeneration is made up red oak, bur oak, red maple, black ash, and thick patches of balsam fir.

Stand Objectives

- Safety
- Education
- Plant trees!

Recommended Activities to Achieve Stand Objective

- Remove hazard trees along trails for safety of users.
- Harvest balsam boughs to teach students about forest products and how to use these products sustainably.
- Continue planting trees for Arbor Day.

Alternative Stand Objective:

- Harvest all merchantable aspen and allow to regenerate.
- Leave "as is".

Stewardship Binder References:

Tab	Reference Name
Wildlife……...	"Landscaping Woodlands for Wildlife"
Tree Species……..	See all that Apply
Protection……..	See all that apply to Aspen
Forest Products…….	"Balsam Bough-Careful Harvest Fact Sheet"
Regeneration…….	"Tree Planting"

OAK

Stand Number: 3
Stand Acres: 12

Tree Summary Data		Estimated Volume/acre	
Age	75	Bur Oak	3.7 cds
Growth Potential	(SI)	Red Maple	2 cds
Tree Density	Fair (BA 47)	Black Ash	1.3 cds
Timber Quality	Fair	Aspen	0.7 cds
		Balsam Fir	0.3 cds
Timber Volume			8 cds/ac*

*Volumes not accurate for timber sales.

Stand Description

Overall this stand is quite a mix. The stand age is varied due to fairly young patches of aspen scattered about, with the mixed bur oak, red maple, and black ash in-between. In most cases the oak is the dominant over-story tree with a couple mature aspen sticking up here and there. The ash is in declining health and probably won't remain a major component of the stand much longer. As in stand 2, a fair amount of aspen are infected with the Hypoxylon canker.

There is great regeneration in the understory including balsam fir, black ash, red maple, aspen, bur oak, and red oak; all well represented. The shrub layer is sparse with scattered alder and red-osier dogwood. Ground cover includes big leaf aster, wild rose, dewberry, starflower, thimbleberry, bedstraw, ferns, trillium, grasses, species from the mint family, and horsetail.

This portion of the forest is not used as much as the northern portion and only has one trail running through it, which is used as a cross-country ski trail in the winter.

Stand Objectives

- Safety
- Use for viewing wildlife and learning about snag trees and how wildlife uses them.
- Harvest products (teaching opportunity)
- Plant trees!

Recommended Activities to Achieve Stand Objective

- Remove hazard trees from trail corridor.
- Teach students about how different animals use different trees for food (example, how animals use oak vs. red maple). Also found a large anthill in this stand that would be great way to teach about the complexity of ant colonies and the different roles ants can have.
- Perform crop-tree release (oak being the crop tree) by harvesting undesirable species that are near the oak to decrease the competition between oak and the other species and give oak more room to grow. Could even do two different types of harvests in this stand so the students can compare and contrast the outcomes and how those outcomes benefit different tree species. (This would be more of a Timber Stand Improvement {TSI, non-commercial cut.) *See Important Terms for clarification.*
- Use the "Balsam Bough-Careful Harvest Fact Sheet" to teach students sustainable ways to harvest products from the forest.
- Continue planting trees for Arbor Day.

Alternative Stand Objective:

- Harvest all aspen (less work in setting timber sale set-up)
- Leave "as is".

Stewardship Binder References:

Tab	Reference Name
Wildlife…….	"Landscaping Woodlands for Wildlife"
Tree Species……..……	See all that apply to trees in stand
Protection……..	"Aspen – Insect and Disease Guidelines"
Harvest……..	"Guidelines for Forest Management"
Forest Products…….	"Balsam Bough-Careful Harvest Fact Sheet"
Ecology…….	"Forest Ecology – Succession"
Forest Stand Improvements…..	See all that Apply
Regeneration…….	"Tree Planting"

RED PINE WINDBREAK

Stand Number: 4
Stand Acres: 0.75

Tree Summary Data		Estimated Volume/acre
Age	35	Red Pine
Growth Potential	Poor	Jack Pine
Tree Density	Fair (BA)	
Timber Quality	Poor	
Timber Volume		

*Volumes not accurate for timber sales.

Stand Description

This is a Red Pine windbreak along the Ryan and Lismore Roads providing a boundary that will likely limit the students from venturing too far from the school grounds, not to mention a wind barrier. Currently, there are pockets of red pine decline, most likely due to the fact that the soils are not well drained enough for red pine to grow well and remain healthy. There is evidence of insect infestation of the stressed, dying and dead trees, but are most likely not initial cause of the problem.

Maintain this windbreak through careful mowing of the grass cover near the base of these trees. This is an open area adjacent to the playing grounds for the students.

Stand Objectives

- Maintain windbreak for aesthetic purposes, added privacy, and providing a boundary for students.
- Use this area to teach students about red pine identification, insect and disease problem, and management techniques.
- Plant to fill in gaps.

Recommended Activities to Achieve Stand Objective

- Monitor health of the pine by periodically inspecting the needles and bark for insects and disease.
- These trees are currently overcrowded and too close together and need to be thinned slightly to help keep the healthier ones from further decline. Remove dead and dying trees. (If dying trees are left, they are the perfect host for bark beetles, which produce 3 generations of offspring a year, each generation infesting and killing more trees.)
- Plant shrubs underneath the red pine, such as red-osier dogwood and high bush cranberry, to help fill in the gaps. (Arbor Day wildlife packet)

Alternative Stand Objective:

- Leave “as is”.
- Fill in spaces where red pine has died with more suitable trees for the site such as balsam fir and white pine (Arbor Day).

Stewardship Binder References:

Tab	Reference Name
Tree Species……..	“Red Pine”
Protection…….	See all that apply
Forest Stand Improvement……...	“Timber Stand Improvement-Coniferous”

WILLOW & LOWLAND BRUSH

Stand Number: 5
Stand Acres: 0.7

Stand Description
This area located in the northwest corner of the property is primarily made-up of thick alder and willow with a few aspen, spruce, and red pine scatted along the fringe. It acts as a nice windbreak for the small nursery next to it and for the school during the winter.

Stand Objective
- Study wildlife and plant species that are associated with lowland grasses.
- Study soils

Recommended Activities to Achieve Stand Objective
- Take students to this stand and compare the ground vegetation to the other stands.
- Dig a soil pit a few feet deep to identify different horizons (see Soil tab in Stewardship binder for more soils information). Could also talk about different types of soils (clay vs. loam vs. sand). Compare soils in this stand vs. stand 1,2, or 3. Talk about compaction and how it affects the soil. Could also dig another pit in one of the other stands for comparison.
- Observe what wildlife species use this type of cover.

Alternative Stand Objectives
- Leave stand as it is.
- Could do a brush clearing and plant trees, or clear the area to make more room for the nursery.
- Improve the variety of trees (diversity) within the stand by planting

Stewardship Binder References:

Tab	Reference Name
Wildlife……..	"Landscaping Woodlands for Wildlife"
Ecology……	"Forest Ecology-Succession"
Tree Species……..	See all that Apply
Soils……..	"Forestry and Soils – Compaction" and All that Apply
Water and Wetlands……..	See all that apply

Summary

TIMBER MANAGEMENT

The timber management on this area is second in priority to education the youth using this school forest. However, it is a wonderful way to educate the students on how harvesting can be good and even necessary (especially when diseases and insects are involved), and different techniques used to gain a desired outcome, all the while be sustainable. It may even be possible to set-up a timber sale with a near-by landowner and point out differences in harvesting techniques and species cut, to the students. Any future harvesting can be set-up with reserve areas, scattered reserve trees such as conifers, maples, birches, and buffer strips along trails to maintain an aesthetically pleasing appearance of the property.

Any harvesting done on the school property will most likely be noncommercial and more of a timber stand improvement (TSI) due to the quality of the timber and the poor timber markets.

Another great learning opportunity would be to use the trees in the school nursery to plant in the school forest. Some of these trees are getting close to an age where it will be too late to transplant them and expect good chances of survival. The trees in there would be perfect for the school forest since they have already been acclimated to the soils on the property and could be moved quickly. The spruce would work great to fill in the open spots in the windbreak where red pine has died.

WILDLIFE MANAGEMENT

The students' interest in wildlife management can be satisfied through a variety of avenues. Wildlife projects have been outlined in this plan including harvesting mature timber. Leaving some residual trees including bur oak, balsam fir, ash, and red maple with scattered dead snags (but not near trails for safety issues), are a good way of providing birds and other animals with some of their needed habitat components such as cover and food.

Providing a variety of habitat types and different ages of trees for wildlife diversity, establishment of wildlife food shrubs on the property and maintaining some of the wildlife openings present are good options for wildlife. It's also a good idea to look at the surrounding ownership and see what they have for wildlife cover that the schools' property make lack. This will help to insure that diversity of age classes will provide habitat and food benefits that many species of wildlife thrive on.

Summary

RECOMMENDED ACTIVITIES TO ACHIEVE OBJECTIVES

1. Remove all hazard trees along trails for safety.

2. Dig soil pits in different stands to compare the soil profiles.

3. Study stream morphology and related wetland habitat and vegetative topics.

4. Monitor stands for insects and disease.

5. Perform a crop-tree release harvest in stand 3 (Oak).

6. Harvest balsam boughs in Stands 2 and 3 and teach about sustainability.

7. Install wood duck houses in Stand 1.

8. Continue planting trees in the spring for Arbor month with trees and shrubs supplied by the MN DNR Forestry. Pick different sites each year and replant where survival was undesirable.

9. Monitor trails for soil erosion and compaction. Take necessary action to amend a problem as soon as it appears. Keep in mind soil compaction and erosion can be an issue with the soils (refer back so soils portion of plan). Some tips for curtailing these issues are:
    a. Take into consideration the natural topography
    b. Install water bars
    c. Reduce then number of long and straight routes down slope
    d. Position trails along ridges and north and east facing slopes.

    The Recreation tab has "Woodland Trail Construction" information that would be very helpful for this project.

Summary

ACTIVITY SCHEDULE/PLAN SUMMARY

Year	Project Prescription	Acres
2007	Remove all hazard trees along trails	N/A
2008	Begin planning harvest in Stand 3	12
2008	Remove dead and dying red pine from windbreak	0.5
2008	Plant for Arbor Month (especially under red pine)	5
2009	Harvest stand 3 (winter)	12
2009	Plant for Arbor Month	5
2009	Harvest balsam boughs in stand 2 with students	7
2010	Plant for Arbor Month	5
2010	Dig soils pits for soil profiling	N/A
2011	Plant for Arbor Month	5
2011	Build and install wood duck boxes	N/A
2012	Plant for Arbor Month	5
2012	Teach about importance of wetlands, etc.	N/A

Additional Information

POSSIBLE EDUCATIONAL OPPORTUNITIES

- Teach students about local and statewide economic benefits from timber sales and wood products industries and value added benefits.
- Teach students about suppressed, intermediate, co-dominant and dominant trees in a forest ("Teachers Guide to Arbor Month" from Amy Kay Kerber)
- Plant native shrubs in the understory that wildlife likes, such as high-bush cranberry, choke cherry, nannyberry, etc (Wildlife tab)
- Teach students about the natural succession of tree species ("Teachers Guide to Arbor Month", "Primer to MN Forestry", "Biomes of MN" poster, and "Trees for All Seasons" poster all have information on this and you can get them from Amy Kay Kerber)
- Teach students about exotic species and the difference between native and non-native exotic species (http://www.dnr.state.mn.us/invasives/index.html)
- Teach insect and diseases such as Hypoxylon canker and white heart rot on aspen, conveniently located on the school property! (Protection tab)
- FIREWISE information to teach students what their family can do to protect their home from wildfires (see "Will Your Home Survive?" brochure under Protection tab)
- How wildlife uses snag trees-trees with hole and are rotten in the middle-for food and shelter (Wildlife tab).
- Tree identification (Tree Species tab, http://www.dnr.state.mn.us/trees_shrubs/index.html).
- Plant identification
- How students use trees everyday ("Teachers Guide to Arbor Month", Project Learning Tree, both have activities and information on this topic and you can get them through Amy Kay Kerber).

Other helpful websites: http://www.myminnesotawoods.umn.edu/, http://www.mntrees.org

ADDITIONAL ASSISTANCE

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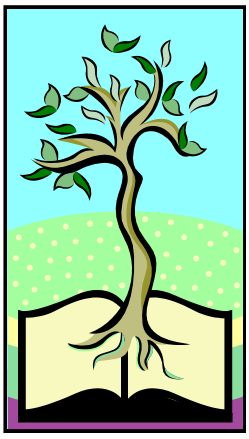

Important Terms

Note: The majority of these definitions come from the Woodland Stewardship *soft covered book*

Basal Area (BA) is a measure of the average density of square feet of trees per acre in a given stand. It is typically measure with a 10-factor prism at 4.5 ft on a tree. Different trees and forest types have different optimal basal areas that coincide with optimal tree growth for that stand. Example: If you cut down an acre of trees and measured the circular area of the sum of leftover stumps, that's your basal area. Refer to figure 18 on page 19 of the *Woodland Stewardship* soft covered book for a more detailed explanation of this commonly misunderstood measurement.

Commercial Cut is a timber harvest that yields a net income (receipts for the sale of products exceed the cost of the cutting).

Crop Tree is a tree that is to be grown to maturity and that is not removed from the forest before the final harvest. Usually selected on basis of its species, location with respect to other trees, and quality.

Diameter at Breast Height (DBH) is the diameter of a tree measure at 4.5 feet on the high side of a tree.

Even-Aged Forest is a forest or stand in which the age difference between trees forming the main canopy does not exceed 20 percent of the age of the stand at maturity. Aspen stand are almost always even-aged stands.

Noncommercial Cutting is a cut that does not yield a net income, usually because the trees harvested are too small, of poor quality, or of nonmerchantable species.

10-factor Prism is a tool used to take a $1/10^{th}$ of an acre sample of trees in a stand.

Overstory is the highest canopy in a stand of trees. Contrast with Understory.

Rotation Age is the number of years required to establish and grow trees to a specified size, product, or maturity.

Site Index (SI) is a number that uses age and height to calculate the quality of a site for the growth of a particular tree. (The higher the number, the better the site. Charts are available that show "bad, good, and great" ranges of SI for a particular species.)

Stocking is a measure of the degree of crowding of trees in a stand, also known as stand density. Commonly expressed by the number of trees per acre or percent of crown cover.

TSI (Timber Stand Improvement) is a practice in which the quality of a residual forest stand is improved by removing less desirable trees, vines, and occasionally, large shrubs to achieve the desired stocking of the best quality tree. (Woodland Stewardship Binder)

Understory is low-growing woody or herbaceous vegetation that forms a layer beneath the overstory.

Uneven-Aged Forest is a forest or stand in which there are more than two age classes of trees present. There usually is a minimum age difference of 20 percent of the rotation length in years.

Windthrow refers to trees uprooted by wind or to a phenomenon that causes uprooting. (http://en.wikipedia.org/wiki/Windthrow)

For additional and more detailed information, please see the Woodland Stewardship *soft covered book and the* Woodland Stewardship *Plan binder.*