Multiple-Use Forest Management Plan

for

Black Hawk Park: South Area

Statement of Management Goals
The overall goal of this undertaking is to manage the forest for sustainable, multiple-use forest benefits, including recreation, environmental services, and forest products. Recreational activities include game hunting, bird watching, hiking, and mushrooming. The provision of high quality habitat for wildlife, both game and non-game species, is of highest priority.

Basic environmental services that the forest can provide include air, soil, and water quality protection, ecosystem health & biodiversity, carbon sequestration, and aesthetic values. Under no circumstances should management activities compromise the ability of the forest to provide these services.

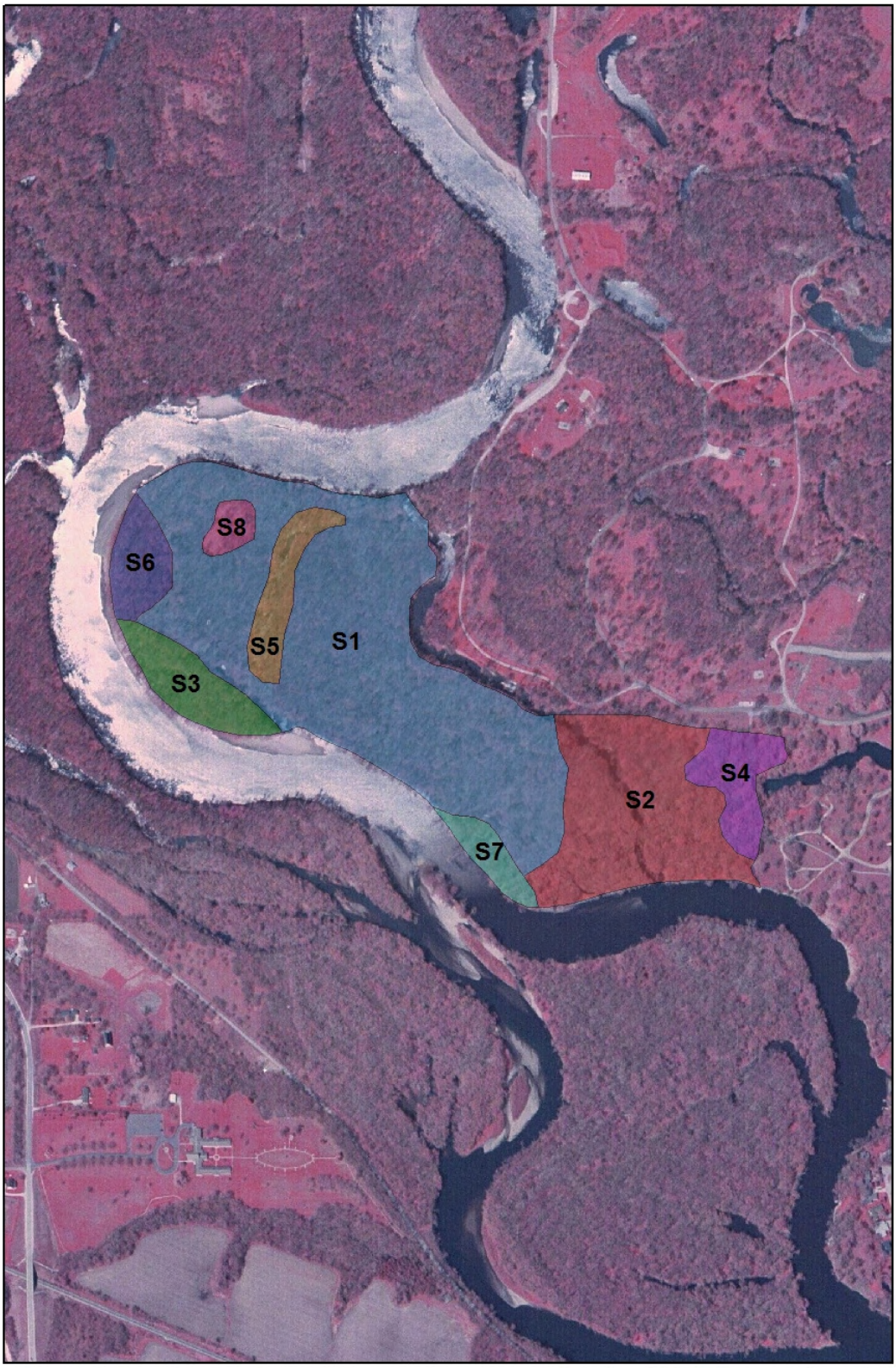
Harvesting timber for forest products will be utilized as a means of supporting habitat improvement projects on this property and elsewhere in Black Hawk County, and to create a natural patchwork of different forest successional stages (young, middle-aged, and old) for forest wildlife habitat diversity. All harvest areas will be promptly and sufficiently restocked with young, vigorous trees through natural means or by planting.

Overview of the Forest
In this portion of the park, 86.2 acres of forest were observed in the field to assess the current conditions in terms of age-class structure/successional stage, species composition, forest health, and management needs.

The forest was divided into 8 different "stands" or management compartments, labeled on the first map "S1" through "N8." Each stand represents a unique situation in terms of the species mix, age-class/successional stage, canopy layering, and/or management needs. A description of each stand is given in the Appendix of this plan.

In general, the forest contains bottomland species native to this part of Iowa, including silver maple, cottonwood, willow, green ash, American elm, honey locust, bur oak, hackberry, and walnut. Kentucky coffee tree, eastern red cedar, black maple, and other species which are unusual for this environment can also occasionally be found where soils are exceptionally well-drained and flood waters do not persist too long. Tree sizes vary from saplings to overmature sawtimber trees 40" in diameter, and stands vary from pure even-aged cohorts to 2-aged to multi-aged forests.

Management Strategy
Forest management involves three basic activities over the course of a stand's lifespan, or rotation: 1) planting/regeneration; 2) tending the crop for optimal growth (TSI); and 3) harvesting. In a bottomland setting, 70 years is the approximate amount of time to grow trees from seedling to sawtimber size, 20-25", when they are mature. Stands should be managed using even-aged silvicultural techniques since most desirable bottomland species require full sunlight to grow.



South Area Stand Map

Sect. 34, Washington Twp., Black Hawk County, Iowa

1 inch = 880 feet

DNR Forestry

In summary, the break-down of management priorities is as follows:

86.2 acres total

- 6.0 acres are "high priority" candidates for Timber Stand Improvement thinning
- 22.2 acres are mature soft maple w/ potential for commercial harvest
  - From the total, 4.2 acres in this category could be managed as bottomland bur oak savanna following harvest
- 8.2 acres of silver maple/cottonwood will have harvest potential in 5-10 years
- 48.4 acres should gradually undergo stand conversion to more desirable trees
- 1.4 ac can be kept relatively open w/ shrubs & herbaceous vegetation for habitat diversity

To achieve true multiple-use forest management, you should theoretically harvest and regenerate 5 acres of land every 5 years for posterity. This work would be accomplished whether there is commercial timber that can be sold from the 5 acres or not, as the objective is actually to *regenerate* (replant) those acres and get trees started growing. By the time you complete the final 5 acres, 70 years will have passed and the original planting will be ready for harvest. From that point forward all harvest & regeneration activities will be financially self-supporting and there will be an even representation of all successional stages for forest wildlife to use.

Regeneration can be accomplished using both natural techniques (seed from surrounding trees) and/or artificial means (seedling planting) to achieve the desired mix. Soil & water table conditions will largely determine species mixtures, with silver maple & cottonwood stands occupying low-lying clays and hard-mast trees (oak, walnut, coffee tree) being planted on higher/sandier ground.

Management Priorities

The enclosed maps depict the geographic locations of stands with high management priorities. The map on Page 4 shows "high priority" areas calling for Timber Stand Improvement; the next map shows areas having commercial harvest potential; after that are areas calling for stand conversion to more desirable species; and finally, areas that can be managed as unique habitat types on this area.

5-year Management Schedule

- Winter 2010: Mark 5 acres in mature soft maple stands (S2 and/or S4) to harvest & regenerate this or next winter
- Winter/Spring 2010: Complete 6.0 acres of high priority TSI in Stands S5 & S7 using staff labor w/ assistance from forester (see Technical TSI description in Appendix)
- Fall 2010/2011: Harvest cleanup. Kill all weed trees, fell culls, windrow tops & slash to prepare site for natural regeneration.
- Spring 2011-2015: Monitor harvest area for natural regeneration success, controlling competition as needed and maintaining adequate seedbed for natural reseeding.
- Fall 2015: Initiate 5-acre patch regeneration in S1

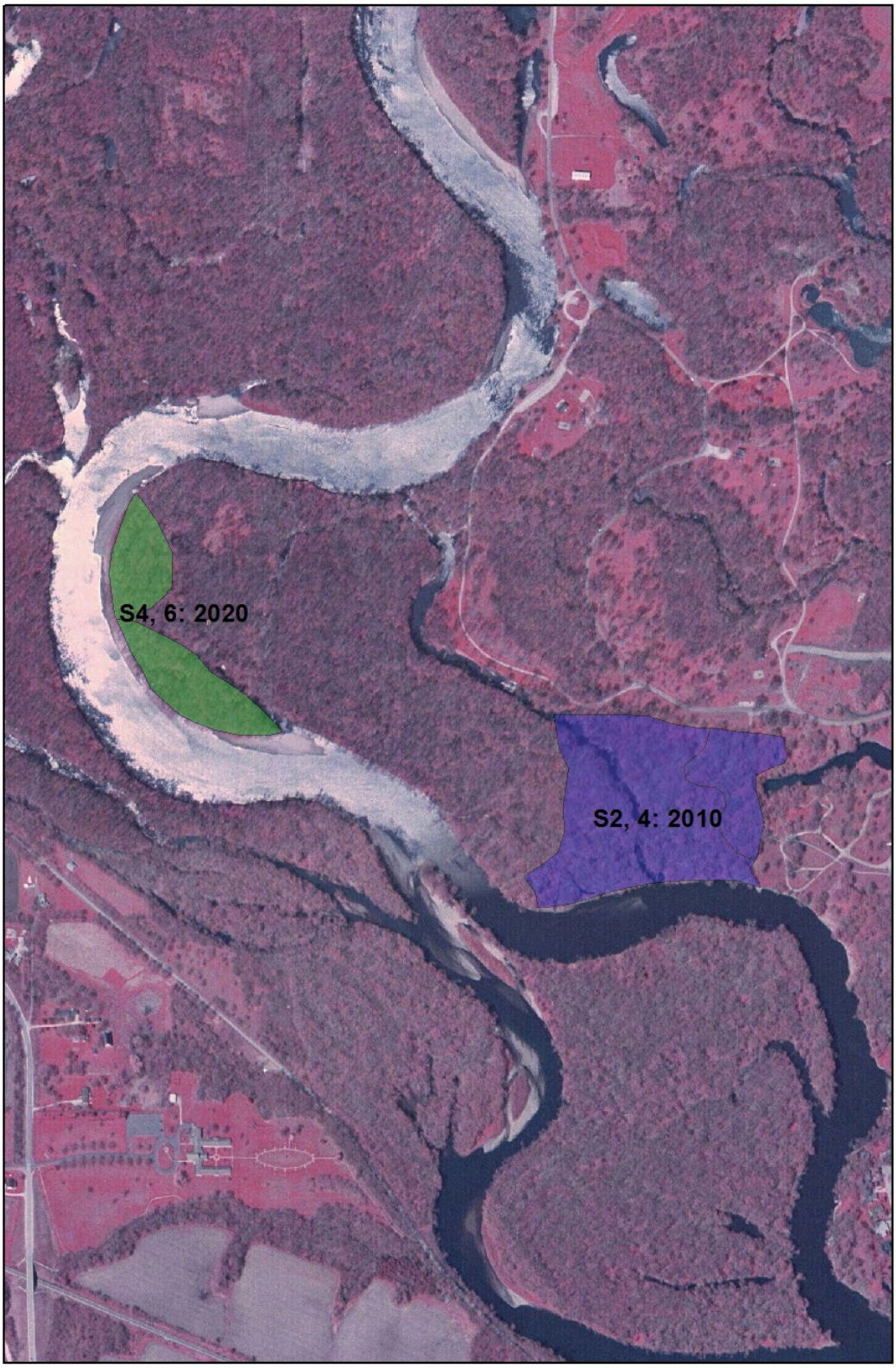
Long-Term Management Schedule

- Continue 5-acre harvest/regeneration patches every 5 years (Stand S1)
- Prescribed burning in bur oak savanna every 2-3 years and manual vegetation control as needed (S4 & S8)
- TSI thinnings in young stands every 10-15 years following regeneration until harvest

South Area TSI* Priorities (6.0 ac.)
Sect. 34, Washington Twp., Black Hawk County, Iowa

1 inch = 880 feet

DNR Forestry



South Area Harvest Potential
Sect. 34, Washington Twp., Black Hawk County, Iowa

1 inch = 880 feet

DNR Forestry

South Area Regeneration Priorities (48.4 ac.)
Sect. 34, Washington Twp., Black Hawk County, Iowa

1 inch = 880 feet

DNR Forestry

South Area Special Mgmt Areas (5.6 ac.)
Sect. 34, Washington Twp., Black Hawk County, Iowa

1 inch = 880 feet

DNR Forestry

APPENDIX

Description of Individual Stands

S1 of 48.4 acres is mixed-age, mixed hardwoods. The most prevalent trees are 4-11" elm, hackberry, and boxelder. Another large portion of the growing stock is made up of 12-18" ash, locust, and elm. Some low-quality silver maple are also found in this size class. Finally, oversized 25-30" silver maple & cottonwood that are falling apart are widely scattered about. Understory hawthorn occur randomly and sometimes in clumps. *Recommendation:* Begin converting 5-acre patches to new, young, even-aged stands of desirable hardwoods via harvest & regeneration every 5 years. If that is not feasible, the stand can simply be allowed to continue as a multi-canopied/multi-aged forest of elm, ash, locust, and hackberry, with occasional pallet log salvage harvests (selective) occurring at irregular intervals. Windthrow & gap mortality by Dutch elm disease will control stand dynamics.

S2, 18.0 acres, contains moderate to high quality even-aged silver maple w/ some cottonwood. The stand is in the 18-22" diameter range putting it close to maturity. The understory is relatively sparse, with few scattered elm, boxelder, & hackberry seedlings. *Recommendation:* The stand can be harvested/regenerated at any time. Harvest in irregularly-shaped 5-acre patches using clearcut method (see Harvest discussion below).

S3, 4.9 acres, is small sawtimber (14-18") cottonwood and silver maple. It is in good growing condition and is fully stocked. *Recommendation:* let grow another 5-10 years and then harvest.

S4, 4.2 acres, contains old-growth bur oaks w/ wide horizontal sweeping branches, and second-growth silver maple of sawtimber size but relatively low quality. There is also an abundance of sapling/polesized elm, hackberry, and other common bottomland species. *Recommendation:* This stand could be managed as an open bur oak savanna habitat. Remove all trees & woody vegetation except the large healthy oaks, clear the slash, and begin a regular prescribed burning program. After 3 years or more of burning, assess the site for possible native forb & grass seeding needs.

S5 is a 3.8-acre strip of nice walnut in the 14-18" size class. The quality/value of the lower trunks could be improved by pruning 1-2" diameter branches from the lower 17 feet of bole, and many have potential to be released from adverse competition for faster growth. *Recommendation:* Perform crop tree pruning & release as described in TSI technical description.

S6, 3.6 acres, is pure even-aged cottonwood of sawtimber size (12-18"). The understory is bare from shade. *Recommendation:* Lump w/ S3 and let grow, considering harvest/regeneration in another 5-10 years.

S7, 2.2 acres, is a 2-aged stand. The older trees are widely spaced large (25-30") bur oak, while the younger generation is dense even-aged poletimber trees in the 4-11" diameter range. The species in this second generation is probably 75% hackberry, but some good white oak and walnut can also be found. *Recommendation:* Retain the old-growth oaks for mast & aesthetics, and perform crop tree release for preferred white oak and walnut in the younger generation of poletimber.

S8 is a small 1.4-acre opening. Deep snow at the time of field work made it difficult to tell what vegetation was growing, but it is probably reed canary grass. Some shrubs & saplings exist around the edges. *Recommendation:* Consider keeping this area open simply for some habitat diversity. Do this by periodic mechanical tree removal & possibly burning.

Technical Description of TSI Thinning Operations
Timber Stand Improvement activities will center around two themes: 1) thinning overcrowded young or mid-rotation stands to achieve optimal spacing for health & fast growth; and 2) weeding & culling in old/mature stands at or just before harvest time. A description of each process is provided below.

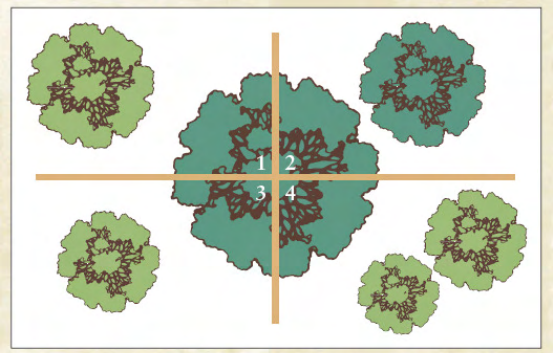
Crop Tree Management
Crop tree management is the process of selecting and managing specific trees to maturity in a woodland. At maturity, there is only room for 40-50 large, dominant trees per acre. Practicing crop tree management involves pre-determining which trees in your woods will be these final 40-50 trees. The selection process should begin when the trees are still young and in the pole-sized stage (4-11 inches diameter), but can be applied to older stands in certain situations.

Crop trees can achieve multiple objectives of providing wildlife value, timber production, and overall stand diversity. With this in mind, crop trees should always be selected based on the following core attributes: species, form, health, and crown:

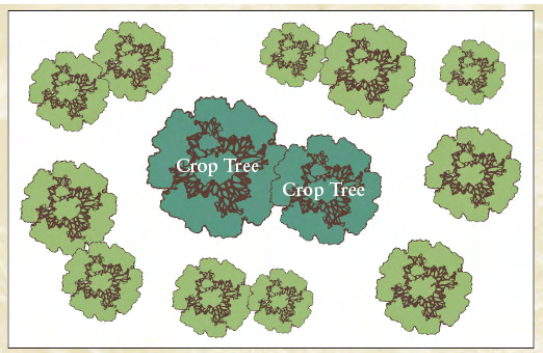
- *Species:* Favor oaks & hickories for their wildlife benefits, and silver maple for its sawtimber value. Avoid choosing elms as crop trees since they have a limited lifespan.
- *Form:* Choose only trees that have strong central leaders and strong crowns. Don't select trees with forked stems, narrow branch angles, or crooked trunks unless.
- *Health:* Select trees that have good health and predictably long lifespans. Avoid choosing trees with signs of disease or decline, dead limbs, epicormic branches, or long-lasting damage.
- *Crown position & size class:* Crop trees should show a genetic predisposition to fast growth and dominance over weaker trees. They should have either dominant or co-dominant crowns in the main stand canopy and should be in the largest diameter class. Intermediate or suppressed trees won't respond to release and should be avoided.

When you have selected a good balance of crop trees throughout the stand, release them on all four sides of any competition touching or overtopping their crowns (see figures below). In older stands with larger trees, sometimes a 2 or 3 sided release is all that can be done. This can be done by felling or girdling. No chemical application is warranted.

To increase wildlife value through this practice, trees that are cut can be "hinged" and directionally felled into brushpiles during the growing season. This practice leaves part of the tree attached so that it resprouts for browse and cover, while also creating dense brushpiles of tree canopies with their leaves still attached.



The space around a crop tree is divided into four sides or quadrants for thinning.



Two crop trees growing close to each other are treated as a single when thinning around them.

Weeding & Culling

Weed & cull tree removal can be done anytime during a stand's rotation to improve species composition or aesthetics, but it isn't absolutely necessary until the stand is ready to be regenerated.

A "weed tree" is any species of tree that doesn't meet your management objectives for whatever reason --- commonly they are trees that tend to be thorny, messy and/or spread easily, have brittle or weak wood, are short-lived, may be non-native, have little wildlife value, or do not grow into attractive or valuable trees for lumber or shade. While one person's list of weed trees may differ slightly from another's, most people accept the following species as common weed trees found in the forest: **boxelder, mulberry, elm, honeylocust, ironwood, honeysuckle, buckthorn, and autumn olive**. To some people, hackberry, basswood, bitternut hickory, and ash are also weed species, but it depends on your situation.

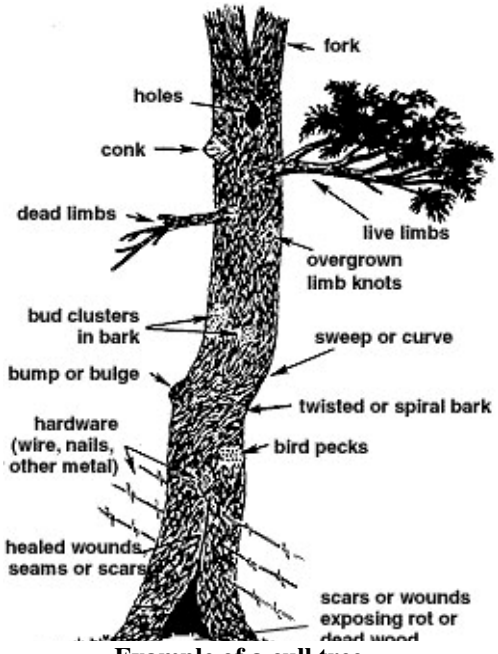
Weed trees can usually be killed by felling or girdling and by applying herbicide to the fresh wound. Herbicide treatments may include Tordon RTU, Pathfinder II, or straight Roundup (41% glyphosate). The best time to accomplish this work is late summer, fall, and early winter when sap is being moved down to the roots for winter storage. Chemical treatment of weed trees should generally be avoided in late winter and spring when the sap is rising, as it will not be as effective. Follow all label instructions as required by federal law.

Stump-cut chemical treatment, chainsaw girdle, and hatchet girdle methods of weeding.

"Cull" trees have no future market potential because of poor form, defect, damage, disease, or otherwise. These may be old hollow "wolf" trees, or they might be young, stunted saplings which have been growing in shade for too long. Cull trees occupy growing space which could be otherwise utilized by high quality desirable trees.

Cull trees that are of a desired species should <u>not</u> be treated w/ chemical; rather, cut them off at ground level in late winter and allow them to resprout from the base. This practice, known as "coppicing," works on most deciduous trees less than 12" in diameter that are young & healthy.

Culls may also be double-girdled using a chainsaw and left standing, creating dead standing "snags" for insects & cavity-nesting wildlife.



Example of a cull tree

Technical Description of Harvest/Regeneration Operations
Harvesting can be done to establish a new generation of desirable trees, to create early successional forest habitat for wildlife, or to salvage value from mature/declining trees for reinvestment into other habitat projects w/ management expenses. Not all harvest activities are commercial ventures, depending on what species are present, their quality, and quantity --- in some areas, there may be no merchantable trees to sell. If a harvest area contains merchantable trees, they will be sold as markets allow; all other non-merchantable trees will need to managed so they do not impede the establishment of the next generation of seedlings.

Harvest/regeneration areas will be designed as irregularly-shaped polygons to promote a natural appearance and provide for adequate natural reseeding by surrounding trees.

Regeneration of cut stands will be done by one of 2 methods, depending on the environmental conditions of the site, stand conditions, and objectives: 1) shelterwood; 2) clearcut. Both natural regeneration and artificial (hand planting) may be used under these systems.

The **shelterwood** method is a process that occurs over a 5-15 year period, *before* harvesting. It is used to get desirable seedlings established on the site using natural regeneration in partial shade. *Phase 1* of a shelterwood involves heavy weeding & culling (see technical description above) of the understory and mid-story layers, allowing increased levels of diffuse sunlight to reach the ground. Some overhead canopy trees may also be removed if they are of undesired species that we don't want seeding in to the next generation, but no more than 50% of the overhead canopy should be removed. High quality trees of desirable species are retained to drop seed and naturally germinate in the partial shade. (The result after Phase 1 weeding/culling is a stand that appears "park-like"). In *Phase 2*, the stand is given time to establish a new generation of seedlings on the ground. If necessary, competition from weeds, grass, and sprouting weed trees are controlled to maintain the shelterwood environment, and certain practices such as mowing, herbicide application, or scarification may be used to improve seedbed conditions. Seedlings may also be hand-planted at this time if desired, to speed up the process. The new generation of desirable seedlings are allowed to grow to chest height, at which point they are established and ready for more sunlight. At this point, which begins *Phase 3*, all remaining overstory trees may be harvested & sold, releasing the young seedlings to full sun. An alternative option would be to remove half of the residual overhead canopy trees, allowing enough sunlight to grow the new generation but keeping some old growth trees for roosting, shade, mast, and aesthetics, creating a 2-aged stand.

The **clearcut** method is simply removing all trees from a small patch (3-5 acres in size) to give full sunlight for rapid growth & high stem density. Trees that are merchantable can be sold, and all other non-merchantable trees are cut off at the root collar and either killed chemically (weed species) or allowed to resprout (culls). 5-10 trees per acre which weren't merchantable are girdled and left to die standing for wildlife snags. The site can then be replanted or regenerated naturally.

Hand planting will occur mainly on well-drained sites that can support hard-mast trees such as walnut, oak, coffeetree, and hickory. These sites will be identified prior to harvest based on species composition and vegetation type. Trees will be planted at a reduced rate (50 per acre, i.e. one every 30 feet at uniform spacing) so that extra resources may be invested in their survival. Animal protection devices (vented tree tubes 4-feet high or a metal wire cage) should be placed around every tree to not only reduce depredation but help in locating & nurturing trees in coming years. Competition from sod grasses should be chemically controlled as necessary during the first 5 years of the seedlings' life. Also, the trees should be inspected every 10 years or so to

ensure they are not being overtopped or outcompeted by faster-growing bottomland trees (perform crop tree release as needed).

Supplemental natural regeneration will provide "trainers" throughout the regeneration area to help the planted hardwoods grow tall and straight, self-pruning lower branches as the stand ages. These trees will arise naturally from well-dispersed seed of surrounding bottomland stands of soft maple, cottonwood, willow, et al. A good mineral seedbed in the early spring is all that will be needed to provide for this. Chemical control of weeds/grass may be needed to provide proper seedbed conditions in the early years.

Reed canary grass (RCG) can be a particular challenge in regenerating floodplain stands. The best short-term control for RCG is herbicide; the best long-term control is shade. RCG cannot survive in dense stands of towering trees, and it dies out in thick, young thickets of willow, soft maple, or cottonwood. Therefore, quickly establishing a thick stand of trees is crucial to successful forest regeneration on these sites. If RCG does gain a foothold, the only way to combat it will be with herbicides and mowing to re-establish the seedbed conditions needed for natural reseeding of trees into the site. For this reason, it will be advised that all tree tops, debris, and slash from harvests be cleared off to the side so that spray equipment may have access to a site if necessary.