FOREST MANAGEMENT PLAN prepared for :

DANIEL J. PETERSEN
1330 Columbia Ave
Franklin, TN 37064
daniel@dpetersenco.com 615 – 572 - 3343

PROPERTY : Tax Map 39 Parcel 21.00 located at 1428 Egypt Hollow Road in Williamson County

Total acres : 32.24

Wooded acres : 22.14

Date : 28 FEB, 2022

FOREST MANAGEMENT PLAN PREPARED BY :

Michael B. Huddleston
3312 HWY 48
Cunningham, TN 37052
Forester.MichaelH@gmail.com

B. S. and M. S. Forestry, University of Tennessee
Retired Forester State of TN, 30+ years service
National, International, Family Wood Products
Business, 8+ years, Consultant, 7 years

FOREST MANAGEMENT PLAN

This plan was prepared for DANIEL J. PETERSEN of 1330 Columbia Ave. Franklin, TN 37064 (daniel@dpetersenco.com 615 – 572 – 3343) who has requested planning assistance in management of property located at 1428 Egypt Hollow Road in Williamson County, as shown and described on the attached Tax Map 39 Parcel 21.00. An inspection of the property was made in FEB 2022, and the following objectives for ownership and management were determined.

Objectives for Ownership of the Land :

1. Improve wildlife habitat (planting foodplots and trees, silviculture)

2. Maximize the productivity and value of woodlands

3. Protect and improve water resources

4. Mitigate wildfire risks to future buildings

Objectives for Management :

1. Mark property boundaries

2. Improve standing hardwoods and natural regeneration (planting too)

3. Improve access and trails

4. Control exotic invasive vegetation

Description of property :

This property has a view of the Natchez Trace Bridge crossing HWY 96 made possible because of steep rising slopes in mostly open grassland (really too steep for management except careful grazing but grazing also may have a negative effect on water quality of the small perennial stream at the base of the slope shown on the USGS topo map). Best Management Practices (BMP's) recommend a wooded SMZ – Stream Side Management Zone of AT LEAST 25 feet on each side of the creek (and SMZ fenced off from grazing). Here there are just a few random " shade " trees like walnut (highest valued species, some sassafrass, etc). This unnamed stream flows into Little East Fork Creek close by. In wet weather the steep drain on the northeast side of the property also has flowing water.

This tract lies on the west side of the county on the edge of the interior Highland Rim, with a narrow east to west ridge whose hillside falls sharply north to the small perennial creek and an interior short west running drain. The north side of the property has a gentle cleared south slope to the creek that could be planted in a foodplot, grassland, or in particular desirable tree species while an area on the ridge might be cut out for a scenic vista. Elevation on the property falls about 230 feet from 910 feet on the southeast ridge knob to about 680 feet on the creek northwest side. About 12.1 acres of the tract are < 12 % slope. The odd boundaries might be adjusted to make acres more useable and accessible by swapping with one or more neighbors. There is variation in the forest composition because of slopes, soils, past land uses. Several weak contour " field lips " are on contours on the wooded slope with lots of pole sized poplar and other hardwoods that regenerated upon abandonment. OLD fences also indicate the property was grazed years ago but the steep wooded hillsides are best suited to woodland use. Future grazing of woods should be prohibited as livestock get no nutritional value, destroy regeneration, compact and erode soil, etc. The creek area may have the most potential productivity and tree value (as well as wildlife value).

SOILS :

Soil types are correlated to slopes and in part determine the productive potential and uses of land. The soil types are loosely drawn to the topography but not exactly accurate. Roughly from highest to lowest ground are Mountview, Bodine, Mimosa – Rock, Sulphura, Dellrose, Huntington. Mountview has loess over limestone derived material naturally fairly productive but agricultural past activities probably eroded this away. Bodine soil is limestone derived silt loam, cherty (much is angular softball sized), low productivity, limited for tillage by slope and erosion potential. Mimosa has a thin cherty layer also phosphatic but still rather low productivity, shallow to shale. Sulphura soil is similar, a gravelly residuum, much poorer, shallower, and droughty with occasional exposed rock outcroppings and ledges, shaley. Dellrose soil found on lower slopes is material washed down from above, can be fairly deep and productive, phosphatic (blackish color sometimes, walnut likes phosphate). But " sheltered " topography improves tree growth so some good tree heights exist in drains on north – east slopes. Huntington is fertile deep well drained colluvium in a first bottom too, can be phosphatic and / or cherty and / or sandy.

Detailed and specific information about soil types can be downloaded from the USDA – NRCS Web Soil Survey internet site. The attached soil map is made from this site and delineates transition from one soil type to another correlated to slope contours (on the aerial photograph) but may NOT accurately align topography to the aerial photo. After searching the address location, an " Area of Interest – AOI " has to be drawn on the aerial photo which includes the property by zooming in, panning, and drawing boundaries. Activate the tabs for soil map and create printable view to print and / or save as a pdf. The soil type names and brief description accompanies the soil map showing soil type abbreviations and areas. By clicking on soils data explorer tab, one can get soil properties and soil reports including Forest Productivity (not all soil types will have Site Index by species). Or go to the Web Soil Survey Home page and then Official Soil Series Descriptions (OSDs), click on View OSD by Series Name (with best-match feature or wildcard characters). Sometimes soil survey books from the county or an adjacent county archived on the Web Soil Survey can be referenced (though the old aerial maps are only available with a hard copy of that book).

Forest productivity is generally indicated by Site Index for a particular species which is a ballpark height in feet that species should reach within its first 50 years of growth. Actual Site Index is often 3 (to 6) points higher than published numbers. One rule of thumb says there is full stocking when Basal Area and Site Index are equal. 80+ for oaks is good. Basal Area is the total square feet of tree cross sections at DBH – Diameter at Breast Height on an acre. North facing slopes and hollows can have MUCH better

timber than west or south facing aspects. Productivity and drainage can be improved on ridges and in a " bottom " by deep ripping (WATCH OUT for any underground utilities). Woodland growth can be improved with soil amendments (spreading out tobacco stalks, mulch, old hay, wood chips, etc) as practical or just **liming** (2 tons per acre without a soil test) and fertilizing (250 pounds of 12-24-24 per acre without soil test). Individual trees can be limed and fertilized mostly at the limb extremities in a donut pattern at the same rates for square feet treated particularly to help walnuts, white and red oaks, persimmon, etc. Soil tests can make exact recommendations (contact the UT Agr. Ext. Service). The average annual DBH growth could be about 1 / 4 " or up to 4 % volume but is less dependent upon soil than weather, species, **spacing** (competition) of trees, and management practices. Dense stands (Basal Area exceeding Site Index) are stressed and more susceptible to insect and disease attack particularly after periods of drought and when red oaks exceed 80 years, white oaks exceed 100 years, or poplar is not growing in " sheltered " moister sites for example.

There is discrepancy from web soil survey, archived published numbers, and actual measurements in woods. The published book numbers show Mountview Site Index is about 90 for poplar and 70 for upland oaks. Bodine Site Index for poplar is 88 (too high), southern red oak is 72 (won't be here, northern is), black oak 70. Mimosa Site Index for southern red oak is about 70 (will not be present), cedar 50. Bodine - Sulphura is about 55 white oak, 35 cedar, elsewhere 70 black oak. Dellrose Site Index may be 98 poplar, 74 northern red oak, 75 walnut. Huntington Site Index is about 95 poplar, 80 northern red oak.

TREE PLANTING :

Management options are limited where slopes are steepest and natural regeneration should be preferred if desirable. Northern red oak, Shumard red oak, basswood (good pollen like poplar), even chinkapin oak may be hardwood timber species to plant on the lower open ground on about a 12 foot X 12 foot spacing - 305 per acre in FEB – MAR. Some maintenance of planted seedlings is expected to control competing vegetation mechanically or spraying according to the label (strips or 6 ft circles around seedlings) for success. Sawtooth oak (fast growth, acorn production, ornamental leaves, bark, form), burr oak, hybrid chestnut (Dunstan one variety) could be planted wider at 30 feet X 30 feet to form larger crowns and mast for wildlife.

The American Chestnut Foundation has some nearly pure American genetic crosses (blight resistant) from local sources available for landowners (not cheap) and asks landowners to keep some records of their performance. Chestnut once dominated much of the forest landscape before a fungus from asia wiped out most of our native

chestnuts. Its typical natural site was sandy uplands as well as coves and was somewhat shade tolerant.

One cheap method of starting walnut seedlings (along creek, some trees present) is collecting seed in the Fall from GOOD straight tall trees in the county or neighboring counties and planting (on their side) immediately < 2 " deep about 8 feet apart (in good soil, **open** ground). Site preparation before planting could include clearing, chemical / mechanical treatment, sowing a temporary cover, etc. Squirrel predation can be severe so Fall collected seed might be stored in plastic food bags in the refrigerator (NOT freezer) in the winter to plant about 1 MAR. Or bare root seedlings are an option. Some varieties of thinner shelled (for nuts) black walnut exist like Emma K, Football, Kwikrop. A Purdue timber selection also is available (try the Indiana state nursery first). Also Carpathian walnut varieties exist.

Other possibilities in full sun at 30 feet spacings are wild plum / hazelnut (American, actually somewhat shade tolerant) / elderberry (also ornamental and pollen, edible berries) which form small diameter thickets with abundant seeding. Hawthorne might have a property edge to produce pollen (therapeutic heart properties) and some ornamental value. Apple, pear, plum fruit trees must be very carefully selected by cultivar to match this region and a specific site. Apple does not do well because of cedar - apple rust disease (remove all cedar). Peach needs a warmer environment. Check online with private nurseries for expensive cultivars (Rock Bridge Trees, Burnt Ridge, Womack, Cumberland Valley, Turner and Sons, Hillis, Plantmegreen, etc) and state Divisions of Forestry (KY, MO, TN) websites for cheap bare root seedling availability and prices in SEP. Expensive stock needs protecting from deer with (translucent) plastic tree shelters. Supplemental watering may be needed for establishment. The UT Agr. Extension Service also can advise.

Pecan is possible on the lower ground too. Pecan needs the best bottomland with deep rich soil, water, but well drained, full sun. Picking the right cultivars is tricky both for seasonal weather, resistance to insect disease, and overlapping pollination for nut production. Mature spacing of pecan in orchards is about 40+ feet. There are numerous publications on pecan production from other states like the Georgia Agr. Ext. (Wells), Kansas-Missouri (Reid), Texas (the Texas Pecan Board), etc. But varieties that are planted in other states commercially are not necessarily their native sources but are specially cultivated with irrigation, multiple pesticide applications (insect and disease), are chosen for nut cracking characteristics, etc. Broadly speaking pecans either have " northern " characteristics or " southern " characteristics. Northern sources have smaller nuts, thicker shells, less productivity of nuts and tree growth, more foliar disease resistance, more frost resistance, stronger limbing. So for low

management and " yard " locations northern varieties make sense but micro site factors have dramatic effects. Key elements to nut production even when all site factors are favorable are correct soil ph (lime), correct fertilization (amount, not too much, timing, after mid April, specifically ZINC), period of pollen release / reception, etc. Pecans like most species do not self pollinate generally. So 3 or more cultivars (adding maybe one wild) on a site should be chosen. State nurseries can provide cheap wild seedling sources. Look at named northern cultivars like Green River, Oswego, Yeatts 68, Posey, Kanza, Hark, or Gafford (an Alabama choice), Syrup Mills, Gloria Grande, etc.

Simple treescaping concepts around a home are to place evergreens on north to northwest sides to block winter winds, large deciduous shade trees on the south and west sides for summer shade, and small showy trees at the front of and / or at angles to buildings. Recognize that tree roots spread 1.5 X the height of trees and can conflict with foundations, utilities, etc but also need to extend at least as far as limbs extend from a mature tree (the drip line). No trees should be closer to buildings (or any utilities, paving, etc) than 30 feet and short maturing.

OPEN LAND :

Permanent openings benefit and attract a variety of wildlife, greatly enhance hunting opportunities. Wildlife foodplots instead of trees could be planted on relatively wider level ridge sites where log landings " should " be. Recommendations for wildlife foodplots are detailed in books by Dr. Craig Harper PB 1874 Landowner's Guide to Wildlife Foodplots or PB **1769 A Guide to Successful Food Plots** in TN available on the internet from the UT Agr. Ext. Service to download all or parts or purchase. Another publication by Dr. Craig Harper to look at is Managing Early Successional Plant Communities for Wildlife in the Eastern US. Wheat and clover (ladino good bee pollen) though not native is about the cheapest and easiest to establish (1 - 2 bushels wheat and up to 4 pounds of clover per acre, good wildlife and bee pollen) or perennial rye (non native, but initially suppresses other vegetation) can also be considered. Check planting dates and various mixes. Simple small clearcut patch a half acre or 2X the height of surrounding trees in continuous woods provides browse and covers (breeding, nesting, predators) from explosive natural regeneration.

Some open area could be converted to prairie grasses (NWSG, formerly native, being reintroduced) for wildlife habitat. A mix of short and tall blue stem, Indian, switch grasses according to recommendations does not necessarily result in the same future stand compositions as the most suited variety that dominates cannot be predicted. The first year stand looks very weak but can be very impressive in the 3rd year. A common management practice is either strip bushhogging or controlled burning (might be too

risky here) at 3 year intervals. Refer to PB1752 Native Warm-Season Grasses: Identification, Establishment and Management for Wildlife and Forage Production in the Mid-South for an information to convert areas.

Pollinators like purple milkweed or other flowering mixes per NRCS recommendations maybe could also be established. Ladino clover is relatively cheap, a soil building legume, attractive to bees and many wildlife too. Bumble bees like purple flowering crown vetch also a legume. Site preparation might include ripping (CAUTION with underground utilities), spraying, liming / fertilizing, sowing.

WATER and ACCESS :

A permanent water source is usually recommended at one mile intervals for wildlife which the creek provides. Building a pond could encourage more residence but be difficult with the topography, soils, and needs permitting (with help from the USDA - NRCS) on the creek. A marginal pond site might be in the side drain. If a pond is built it should be well above or below wherever a wet spring head emerges so as not to affect normal clean flow. Success of a pond holding water depends upon sufficient CLAY in the dam and bottom, knowledge of soils and dam construction by the dozer operator, and adequate watershed runoff, etc. Importing clay is not often a justifiable expense (nor is lining with impervious materials). The dam has to be cored, built highest in the center, about a dozer blade wide on top, a 3 : 1 slope ratio on the backside. A concrete core dam is another expensive consideration. A proper ground **spillway** is critical with a continuous 1 % slope, about a dozer blade width from head to toe, at a stable corner with an additional tower piped outlet (large ponds, expected frequent overflow, shut off valve, etc). The USDA – NRCS can assist to locate, design the dam and spillway correctly. TWRA and the UT Agr. Ext. Service can advise about fish stocking and maintenance. A few cheap vernal pit pond pools that may not stay full year round might be scooped out in several places about a dozer blade wide, 10 feet plus long and 4 - 6 feet deep. The water and small aquatic life produced could benefit deer, turkey, etc.

Because of steep slopes, any activity affects the sensitive nature of the property and BMP's – Best Management Practices MUST be followed to protect water quality. State BMP manuals are available on line with diagrams. Access improves all uses of a property (for policing, emergencies, management, recreation, removing wood, etc) and should connect openings, decks, viewpoints, other sites of interest but is THE major threat to water quality and site degradation (by erosion, siltation, compaction, etc). Access may be impossible to stay within or close to recommended guidelines from road to ridge. The north aspect will stay damp longer also (good for tree and plant growth though). Sometimes a pond dam can be used for crossing a drain. Where necessary

and possible to get a machine in place, pockets of rock can be rock drilled and the holes filled with a water activated slurry of DEXPAN (powder like Portland) according to manufacturer's instructions (on line, you tube, holes 12 – 18 " apart, 2 - 3 feet max deep). Rock can be fragmented overnight.

Access from Egypt Hollow Road crosses the creek in about the best location with solid rock slab bottom and good little bridge. The existing farm road is excessively steep, INsloped, UNarmored and UNvegetated, culverted, etc all which make it unstable and will be constant problems. Grade " SHOULD " be under **10 %** (no restrictive lip on the lower side) " with " the contour, on " **shoulders** " of ridges,. Changing the location to angle right and then " switch back " to the ridge (where another trail follows the property line – old fencing visible) might work. OUTsloping **3 %** eliminates ditching which is a continuous maintenance problem that washes and gullies and cross culverting (additional expense) almost always fails because they are placed wrongly, at wrong depth, wrong angleS, wrong size, opening not slanted, , clog without constant attention, outlet not rocked etc. Water bars / broad based dips installed at about 8 feet changes in elevation work better than culverts. Talbott's Table should be used to size culverts based on soil, slope, vegetation, acres, etc and an additional 4 " added to diameter. A road base of 3 " diameter (and **larger**) sized gravel or equivalent creek gravel (cheaper but harder to spread) should be used. Even larger rock is needed for wet areas.

After regrading, the surface can be limed, fertilized, mulched, sown to get some kind of cover growing (could be a mix of prairie grasses, fescue, clovers, lespedeza, perennial rye, wheat, etc.).

New locations can be estimated on a topo map to later scout for non negotiable control points and **feasibility**, flag (centerline and upper bladed edge) before building. Correctly done, maintenance is minimized and durability maximized. If at footslopes, access should be AT LEAST 25 feet away from water increasing with the steepness of slopes and cross streams at right angles. Access and slopes strongly affect logging which here should be in summer with dry stable soil.

SPECIES of INTEREST :

No threatened and endangered species were observed but a list is available from the TN Department of Environment and Conservation and the TN Wildlife Resource Agency websites. Ginseng, yellowroot, and other wild plants may be present but difficult to cultivate, police, slow growing and like fairly heavy shade, need adequate moisture and

organic matter, limited at the lowest shaded slopes of the drain. Refer to a book by Scott Persons Green Gold about ginseng as well as the TN Dept. of Environment and Conservation for guidance. Rocky outcrops are other micro sites for some unusual plants. Pencil sized paw paw trees found in the woods can be encouraged to grow bigger and produce more fruit (edible for human and wildlife value, wood very brittle) by giving them more sunlight, liming and fertilizing.

For a list with some pictures and descriptions of wildflowers (woodland and not, annuals and perennials, called ephemerals) you might check a web site like this : US Wildflower's Database of Wildflowers for Tennessee. Check this site for fern identification Basic Fern Identification / Trek Ohio Trekohio.com/2014… or Ferns and Fern Relatives of TN – Master Gardeners.

One native pest species spicebush is an invasive understory plant indicating some moisture but spreads fast and outcompetes desirable hardwood regeneration. NON native privet**,** multiflora rose, bush honeysuckle, and **ailanthus** (tree leaves similar to walnut but smell like rotten peanut butter, bark and wood soft like sumac) are exotic invasives from asia. A little of each is likely present. They can aggressively take over disturbed ground and choke out native tree species. Controlling them can be accomplished by cutting with a chainsaw or saw bladed " weedeater " (maybe just before or after full leaf out occurs) then applying a foliar herbicide like glyphosate according to the label before sprouts get knee high, with annual Spring follow up as a seedbank persists a few years. Hacking or girdling and squirting herbicide also is an option. Radnor Lake and Percy Warner State Parks have been fighting exotic invasives intensively for several years and might be contacted about their progress. Wild grape vines can kill limbs or trees, particularly target walnut but can be easily severed at ground level for initial control.

Emerald ash borers may attack ash trees (few) in the future. This exotic pest from asia has killed lots of ash in northern states and is migrating southward so it is wise to cut and sell all the ash if ever there is a sale (or use for firewood). Also federal / state " quarantines " uselessly imposed by government agents cannot halt the natural development of the pest's damage but quarantines affect movement of logs and markets. They are over reacting to outcomes while negligent in preventing the pests initial introductions from other countries. Ash produces abundant seed and seedlings are somewhat shade tolerant so regeneration should be expected if more sunlight is increased by thinning.

Thousand cankers disease / insect is a complex first identified in the Rockies in the 1920's after migrating up from mexico with human traffic. Now this complex has been

transported east of the Mississippi and can slowly kill walnuts (varying sizes along the " creek ", highest potential VALUE) so be vigilant for signs of distress but the beetle can hardly fly so these walnuts may not be affected for many decades. Liming, fertilizing, cutting competition around a tree can make it stronger and grow faster. Check internet sites for identification and more information about these and other pests.

FIRE :

Some study of " **firewise** " principles of landscaping - materials - design can be applied to reduce wildfire risks to buildings surrounded by combustible natural fuels. One principle is keeping at least 30 feet (further better) of surrounding ground vegetation well mowed for example. Metal roofing and stone / brick high foundation walls are 2 other firewise features. An outdoor frost free water hydrant marked with available hose is another precautionary element. Closed eaves is recommended. Roads / trails provide emergency access and also can act as partial barriers to wildfire. Plenty more information about landscape and construction tips is available online from www.firewise.org or www.burnsafetn.org as well as the TN Division of Forestry.

Pruning can be partly a " firewise " practice but is usually for the health and future timber value of a tree. General pruning guidelines for any quality hardwood (specifically for walnut, different for fruit trees) are simplistically prune dead limbs, up to half the height of the tree, develop a 17 **+** feet long limbless trunk, don't prune everything in the same year or short few years. Try to prune limbs before they are 4 " in diameter and late winter is the best season. Apply the Arbor Day Foundation 3 step pruning procedure to undercut, a foot or so away from the trunk, then cut limb off just barely past that undercut, angle cut off the remaining stub just outside the limb swell. Bobbing off limbs 4 feet from the trunk and waiting a few years to prune back to the main trunk can be advised when several limbs all radiate close together which allows the trunk to get bigger before creating pruning wounds. Do not paint wounds.

Controlled burning common in most " southern yellow " pines and prairie grass management can be a tool in POOR hardwood stands as one step for site preparation or to increase grasses, forbes, sprouting which provides a different wildlife habitat. But burning woodlands has NOT been a consistent successful practice for regenerating hardwoods. So burning is NOT recommended in QUALITY hardwoods. Note that chestnut oak has very thick bark and has a little more fire resistance and would grow in these woodlands but was not observed. Undesirable stems are greatly reduced but oak stems are also reduced so controlled burning has to be done with certain weather and fuel conditions based on the purpose of burning. Firing techniques and fire control lines and other considerations should be made by a qualified expert and crew. The TN

Division of Forestry contracts to doze control lines and burn in the dormant season and requires burning permits between 15 OCT and 15 MAY. Fire use here is too risky with topography and should be carefully done if burning brush piles (water, equipment, people on site, under right weather fuel conditions). Alternative (and expensive) site preparation of acres may be by machine mulching, dozing, ripping, bushhogging, spraying, discing, sowing, planting (maybe feller buncher clearcutting).

FOREST MANAGEMENT PRESCRIPTIONS :

Descriptions and recommendations for management of forest resources are presented below**.** 10 inventory plots BAF 10 were sampled to provide woodland stand characteristics**.** A Schedule of Recommended Practices provides actions to consider during the 10 year management cycle (2022 - 2032). Discrepancy can be found in the tax assessors area calculations, deed, and digitized map estimates or an actual survey.

Stand Data Summary

Woodland	22.14	acres
Open land	10.1	acres
Total	32.24	acres

UNIT I

22.14 Acres

The woods can essentially be separated into 2 stands, one older sawtimber woods around the south boundary ridge together with the east drain and the second old fields with scattered small sawtimber trees but dominantly poles of undesirable species – stems grown up in the last 30 years. A weak old terrace

and plow lips define some of the edge of old field and old woods. Most field natural regeneration is under 8 " DBH – Diameter at Breast Height, full of hornbeam, poplar, elm, sassafras, locust, persimmon, cedar, a little oaks, etc.

The overall average tree stocking is fair (average Basal Area maybe 79, using the "penny" method about 7.9 trees per plot) but the old field part is hardly 60 while the old woods is up to 130. There are about 38 sawtimber trees per acre (range 15 in the old field to 50 in the old woods, includes 12 " DBH though 14 " is normally minimum sawmills accept); average volume per acre is moderate about 3400 board feet (range under 1000 old field to 5500 old woods, the average in TN is about 3800). The average tree DBH is under 16 " (old growing up fields under 8 " to older mature sawtimber, some smaller trees shade tolerant undesirables in the understory, average in TN about 16 "). There are a few down large old trees from storms. The composition of species is overall about 32 % poplar (important for bee pollen), 12 % sassafras, 10 % red (black and northern) oaks, 9+ % hickory (some shagbark, potential bat habitat, natural mosquito control), 7 % locust, 4 % sweetgum, 4 % ash, 4 % blackgum, 4 % persimmon (good wildlife mast), 4 % white oak (also chinkapin), 2 % sycamore, 2 % **walnut**, 1 % + elm, the balance maple, ironwood, cherry, beech, etc. The undesirables are more prevalent in the old fields.

Livestock get no nutritional value in woodlands but cause damage to soil (compaction, erosion,) and vegetation (browse regeneration) and habitat, so grazing woods should be avoided. But any cherry should be removed as eating wilted leaves can poison livestock (cyanide).

The cleared lower areas could be planted partly in foodplot, pollinator plot, fruit trees, timber species, walnut / pecan (along the creek), and garden and home agricultural uses as mentioned previously.

FOREST MANAGEMENT PRESCRIPTION :

" Mature " hardwood stands are about 80 – 100 years old, average about 20 " DBH, volume upwards from 4000 board feet, even 7000 or more per acre. These characteristics are only present on upper slopes. Classical forest management from year zero at regeneration has about 4 decision points. After year 10 as many as 10,000 stems per acre may have sprouted from seed, stumps, and roots following a clearcut. About 150 of the best stems and best species per acre can be identified and competition

around them cut down so that the " crop " stems are free to grow. At about age 40 to 50, trees should be at minimal sawtimber size to thin out the worst 1 / 3. Then again at about age 60 to 80 another third – the worst should be thinned out again. At age 80 – 100 a woodland reaches it's optimums and is time to regenerate. Regeneration methods for hardwoods include clearcutting, seedtree, and shelterwood (difficult anywhere but the BEST stands). Shelterwood requires several steps including cutting / controlling undesirable understory non commercial stems, removing about half the stand in the initial harvest and removing the rest 5 – 10 years later when some regeneration has been established. Clearcutting any level ground gives the option of creating foodplots, " enrichment " plantings of absent species, or creating early succession regeneration and habitat.

To maintain some seed and perches for wildlife mast, some natural regeneration, and minimum aesthetics, a " SEEDTREE " regeneration method may also be best in the future. About 5 trees per acre of the best white (some red) oaks, persimmon, poplar, active den trees, even a good shagbark hickory could be counted in trees to leave for seedling germination, wildlife mast, some visual structure. The seedtrees could be marked (painted) at head and stump levels to make sure the buyer – logger doesn't cut or damage these trees. Or the trees for sale are usually painted at head and stump levels, a volume summary of those trees calculated to be sent with a draft sale contract to solicit competition and potential buyers so both buyer and seller know what is for sale. Marking the trees for sale can accomplish a desired spacing for regeneration or crop tree release and exclude trees for other wildlife, biological, management reasons (but not practical here). It should **not** be a " diameter limit harvest " (DLH) which takes the biggest and best, leaves the rest but leave desirable species of good conditions. Sale and property boundaries must also be properly flagged. When a sale is pursued logging should be during dry stable soil conditions. Hopefully a fuelwood market for any species can be developed particularly cofiring with coal if TVA can overcome the druid political misinformation or the pulpwood market is strong and steady so that tops of sawtimber trees and undesirable small trees can be sold. The pulpwood market is good right now but unpredictable and pulpwood is not a high value product but a by product of the sawtimber tops or otherwise unsellable stems. Get professional forestry assistance to conduct a sale. Numerous publications can be found at the UT Agr. Ext. Service website.

When evaluating individual trees for sale, ALL <u>UN</u>desirable species at least 14 " DBH should be removed but desirable species optimally should be at least 18 " unless damaged, poorly formed, or in a dense cluster. Pulpwood from sawtimber tops or smaller undesirable trees might be sellable. All ash should be cut because of the threat of emerald ash borer. Also match species to their suited site (poplar to north – east

lower slopes, walnut to drains, chinkapin - white oak to drier slopes for example). Buyers theoretically have market interest in sales with about 2500 board feet per acre, 10 + acres of high quality, or may need 50,000 total board feet of smaller lower quality stands so a sale here is still a challenge (especially with topography and access). BMP's – Best Management Practices should be followed in any harvest. State BMP's are available online to address landings, skid trails, roads, SMZ – Streamside Management Zone, etc. A tractor trailer hauls about 4000 board feet of sawlogs or 30 tons of pulpwood.

Some research says white oak (chinkapin is A white oak) can regenerate in 40 % sun whereas red oaks are stimulated in 60 % sun. White oaks produce seed annually though not consistently whereas red oaks take 2 years to mature an acorn (mast important in white oak weak years, particularly when one considers only a third of trees in a stand produce dependably anyway). Poplar regenerates mostly from seed that remain viable for 6 years on the ground waiting for full sunlight exposure (north to east facing slopes). Trees left in the midstory or understory still shade regeneration and compete with the desirable " crop " trees for water and nutrients through root systems. So removing trees in the mid and understory which are shade tolerant and undesirable species can have the additional benefit of reducing unwanted seed sources, create an open and more aesthetically parklike appearance as well as helping to establish regeneration. Chemical application to cut stumps prevents resprouting of undesirable species.

If a sale is not anticipated for 10 years thinning out the **worst** " quarter " of trees and particularly all UNdesirable junk improves vigor and value on the best crop - mast trees. Firewood could be one limited use. Cutting " junk " trees down (**safely**) is a practice called TSI - Timberstand Improvement or CTR - Crop Tree Release which take about 5 hours more or less per acre with skilled chainsaw use. TSI is cutting all the UNdesirable trees like cull hickory, maple, elm, hackberry, blackgum, locust, beech, sassafras, hornbeam, dogwood, sycamore, boxelder, sweetgum, ailanthus, etc. (with no sale or wildlife value) that compete with the desirable trees. Large UNdesirable species with large crowns may be better to girdle (4 " wide band around trunk with ax or 3 bands with a chainsaw 2 " apart into solid wood) and spray the wound with glyphosate or appropriate herbicide according to the label. This avoids some hazards of chainsaw operation and creates a snag (be aware of this HAZARD) for vertical wildlife benefits instead of dropping the tree which could wipe out good standing trees. CTR is less intense as only the main competing junk trees are cut around 50 to 150 " crop " trees (the oaks, poplar, ash, walnut, shagbark hickory, etc) per acre usually in young stands. **Vines** damage or kill some trees so **sever all vines** at ground level. One or 2 active den

trees per acre can be retained and special wildlife trees like persimmon should particularly be free from competition to grow.

A rule of thumb formula can help decide if a crop stem has optimal spacing to grow free from a competing tree. **Multiply 1.75 times the DBH** (numeric) to give the feet distance a tree should have to the next dominant crop tree for proper sunlight and growing space. For example a 10 " DBH tree X 1.75 needs 17.5 feet radially free of competition to the next tree, a 20 " DBH tree needs 35 feet. Full stocking is assumed when Site Index and Basal Area are equal. Basal Area is the sum of square feet of cross sections of live trees on an acre at DBH. When Basal Area exceeds the Site Index, the stand is overstocked. When Basal Area is less than Site Index, the stand is understocked.

TSI or CTR may restore some health and extend the life of mature trees for a short time. But mature stands and individuals have a lifespan and will be replaced (with usually shade tolerant undesirable species) either by an unplanned event such as a fire, storm, mortality often following a period of drought with insect / disease or can be thoughtfully initiated with reasonable expectations.

Targeted cutting has other positive wildlife habitat effects by stimulating sprouting forbs, browse, regeneration at ground level. Residual debris provides some non game habitat and decaying organic matter is returned to the soil. Piling slash has longer lasting effects (not practical on steep ground) providing nesting and covers for salamanders, rabbits, birds, etc and insects attracting a diverse foodchain. Piles should not be close to desirable trees as insects may attack otherwise healthy trees. Also released seed trees have more available sun, moisture, nutrients to add more trunk diameter and volume as well as produce more seed.

MISCELLANEOUS

OLD barbed wire indicates grazing many decades ago and roughly defines some boundaries. Putting more metal fence T – posts at the corners and on the known line with additional tree painting between the posts can make boundaries more defendable and identifiable by neighbors as well as the owner long term. Marking boundaries also should be done is leased hunting is done for some income. To get the best rates a leasing company might be used and agreeable hunters might help with some management activities.

A timber sale process takes several months to facilitate but logging could follow any time within a contract period. The actual " gain " or profit from a sale would be subject to capital gains tax rates (when owned over one year). The gain or profit is that income above the cost basis of the timber and any sales expenses. The cost basis is the value of the timber stumpage on the day the property was acquired which could vary greatly as a percentage of the price paid per acre. Here the cost basis is not real high. Value is based on volume data but also site conditions, markets, access, etc. Stumpage might be assumed at a rate of half the delivered at mill price of averages (middle TN region). Check with an accountant or the USFS publication " Forest Landowners Guide to the Federal Income Tax ". **PB 1756** from the UT AGR. Ext. Service is a tree ID book available on the web written by Mike Williams who was a forester with the TN Division of Forestry. The free phone app SEEK can identify trees, plants, insects, etc from leaves, flowers, fruit, shape, etc. The phone app USGS topo Free is also a good tool for identifying and navigating the landscape anywhere in the USA remotely or on site. **PB 1867** " A Glossary of Common Forestry Terms ", Forest " A " Syst, as well as many other management and marketing topics are available on the UT Agr. Ext. Service and state Divisions of Forestry websites. A good beginner book on chainsaw use and safety is **To Fell a Tree** by Jeff Jepson.

Update this plan in 2032 or if major changes in objectives or forest activities occur.

FOREST MANAGEMENT PLAN PREPARED BY :

Michael B. Huddleston
3312 HWY 48
931Cunningham, TN 37052
Forester.MichaelH@gmail.com

B. S. and M. S. Forestry, University of TN
Retired Forester State of TN, 30+ years service
National/International/Family Wood Supply Business, 8+ years experience
Consultant, 7 years

SCHEDULE of RECOMMENDED PRACTICES from 2022 TO 2032

Unit No.	Prescription Summary	Year Flexible
I	Mark boundaries	2022+
I	Improve access as practical (maybe swap some acres)	2022+
I	Release crop or mast trees (especially **oaks, walnut,** poplar, persimmon, shagbark hickory**,** ash) from competing undesirable trees, cut vines and spicebush	2022+
I	Plant foodplot, grassland, desirable trees in any openings	2022+
I	Build a pond (IF practical)	2022+
I	Control exotic invasive plants (ailanthus and any others)	2022+