Timber Resources Working Paper
Buttermilk Hill - Talbott Hollow Blowdown Project

Mississippi Bluffs Ranger District
Shawnee National Forest

Prepared by: Ronald E. Moore, Assistant Ranger, Forestry Date: December 16, 2008

Introduction and Description of the Proposed Project

The Mississippi Bluffs Ranger District of Shawnee National Forest (Forest) proposes to burn approximately 5650 acres of private and National forest lands in the Buttermilk Hill - Talbott Hollow Blowdown Project. It also proposes about 25 acres of chipping and mastication on private land near at risk structures to reduce fuel loads prior to burning. This paper describes the expected direct, indirect, and cumulative effects to timber resources of implementing both the proposed action and the "No Action" Alternative.

On September 22, 2006, a tornado crossed parts of Jackson County, Illinois, affecting approximately 3800 acres of private land and Shawnee National Forest land in T8S, R3W, Sections 19 and 28-33, T8S, R4W, Sections 20-29, 33-36, T9S, R3W, Sections 5-6, and T9S, R4W, Section 1 (see associated maps). Minor tree damage resulted over much of the area, but in several places moderate and severe canopy damage (areas estimated to have greater than 50% of the ground covered in trees) was sustained, totaling approximately 900 acres. These areas have high fuel loadings that would make it more difficult and more expensive to fight fires that occur in the area.

The Mississippi Bluffs Ranger District of the Shawnee National Forest proposes to burn approximately 5650 acres of Forest Service land and private land in the Buttermilk Hill - Talbott Hollow Blowdown Project Area to reduce fire risk and restore healthy ecosystems. Burns would be conducted on both public (4375 acres) and private land (1256 acres) under agreement. The project area would be subdivided to make burns more manageable while keeping the unit size large enough to mimic presettlement fire regimes and keep per-acre costs down. The Forest identified 19 blocks of land to be treated. The project area includes most of the impacted area, as well as some adjacent undamaged areas. Undamaged areas were included due to intermingled ownership patterns, steep, dissected topography, or existence of features (e.g. roads, streams) that could be used for firelines.

Burns would be conducted between September 1 and May 1 with a combination of ground-based and aerial ignition methods. First entry on all units should be made within two years. Successive burns would be made after 2-5 years. Burn frequency may be adjusted if monitoring shows that the desired future condition is already reached or is not going to be reached within 10-15 years. Three burns would likely be implemented for each burn unit within 10 years, subject to weather and funding constraints.

Other connected actions include fireline construction and mowing, chipping, or rearranging downed wood near certain structures prior to burning.

One key issue directly relates to timber resources: The need of restoration of native plant species and communities, especially the impending loss of oak dominated stands on many sites as they convert to mesophytic (maple, beech, poplar) stands.

- **Key Issue:** The project area needs restoration of native plant communities and species:
  - **Indicator:** Changes in abundance of non-native plant species.
  - **Indicator:** Predicted changes in oak reproduction and recruitment.

Monitoring is included in the project design. For timber resources, the following should be monitored to gauge the success of the proposed action in slowing or reversing the conversion to mesophytic stands:

> Monitor overstory and understory advanced regeneration (stocking, species composition, stand structure, and age distributions) during and after the burn sequence. This monitoring would ideally be combined with other vegetation monitoring for NNIS, fuels, or other vegetation resources.

Existing Conditions

Site specific stand data is only available for stands under Forest Service ownership, and most stands have not been inventoried since the middle to late 1980's. Still, this data and other reports are valuable in describing the existing conditions of timber resources within the project area.
In general, project area timber stands have been heavily modified by clearing for agriculture and development and by timber harvesting. Likely all stands are second or third growth. Often these were clearcuts, selective harvests, or old fields that regenerated to something other than oak. Sometimes these stands were planted, and the planted trees have become the dominant overstory today. Sites are generally dry-mesic and will support a variety of timber types. The majority of the area is classified as mixed oak, especially on slopes, reflecting the disturbance history of the time that these stands originated. Project area stand characteristics are shown in Table 1.

Data available from the Forest Inventory and Analysis (FIA) online database indicates that in the West Deep Loess Land Type Association (LTA1), the majority of timbered stands (17 of 23) are comprised of large diameter stems with greater than 50% of stocking of medium and large diameter trees, with stocking of large diameter trees greater than medium diameter trees. This relationship holds whether considering FS only (79%) or all timbered stands (74%). The average diameter-at-breast height (dbh) in FS stands in 11.25 inches, while in other ownerships was 10.5 inches. The majority of stands were oak-hickory (White Oak-Red Oak-Hickory or Yellow Poplar-White Oak-Northern Red Oak) with most stands between 50 and 90 years old. Net annual growth was quite variable, with FS stands ranging from 394 cubic feet to -89 cubic feet. Total basal area ranged from 20 ft^2/ac to 148 ft^2/ac, and averaged 90 ft^2/ac. The majority of basal area came from trees >5 inches dbh, on average 76 ft^2/ac. Stand structure shows the classic reverse J curve, with many more trees in smaller size classes. There were on average 506 trees per acre greater than 1 inch dbh, while only 106 trees per acre greater than 5 inches dbh. Quadratic mean diameter averaged 6.28 inches.

These values are similar to those found by Tikusis (2008). In the Greater Shawnee Hills (all LTAs combined) he found current stands to have a BA of 100 ft^2/ac and 220 stems/acre over 5 inches dbh. In the ecologically similar Illinois Ozarks, he found 254 trees/acre and basal areas of 113 ft^2/ac. Mesophytes still comprised a minority of the overall importance value, but had far more stems per acre in the smaller size classes, indicating near total domination of the understory and midstory.

This data agrees with earlier forest-wide assessments. In a study of Shawnee National Forest data, Haugen (2003) found the total growing stock of white oak trees in the 1.0 -2.9 inch and 3.0-4.9 inch dbh categories decreased from 5.2 million to 3.7 million trees between 1985 and 1998. Species of the

red oak family in particular are rapidly declining. Suggested causes include drought, disease, defoliation, intense competition stemming from closed forest conditions, and natural senescence since they are shorter-lived and reaching the end of their natural life cycle (most were recruited during a period of high disturbance in the late 19th century). In Haugen's study (2003) red oak trees in the 1.0-2.9 inch dbh size class increased 6%, while red oaks in the 3.0-4.9 inch dbh size class decreased by 60%. Conversely, black and sugar maples increased by 19% in the 1.0-2.9 inch dbh size class and 79% in the 3.0-4.9 inch dbh size class in the same time period. In a study of data collected in 1980 and 2000 from the Illinois Ozarks Ecological Subsection, an area of similar deep soils and immediately south and southwest of Greater Shawnee Hills LTA1, Ozier et al found decreases in all but the largest size classes for white oak, red oak, and hickory species, and in all size classes for black oak. Most strikingly, black oak decreased 93% and 99% in density and basal area, respectively, in the 7.6 cm to 17.7 cm size class. Maple and Beech importance also increased dramatically in the study:

> *Acer saccharum* basal area increased in every size class and increased in density in all but >43.2 cm. *Acer saccharum* increased most in density and basal area in the 17.8-27.9 and 28.0-43.1 cm size classes with 191% and 183% density gains, respectively, and >160% increases in basal area for both size classes. Density and basal area in the 7.6-17.7 cm size class increased by 58 and 60%, respectively, and had the highest density among both 7.6-17.7 and 17.8-27.9 cm size classes in 2000… *Fagus grandifolia* and *Acer saccharum* were the most numerous among saplings, accounting for 39% and 21%, respectively, of this size class. Overall, *Quercus* spp. accounted for 10% of all seedlings, but only 1% of all saplings.

The invasion of maples and other mesophytic species and the subsequent decline in oak importance is both widely and thoroughly documented throughout the east (Brose and Van Lear 1998, Abrams 2003, Abrams 2005, Abrams 2006), including the project area (Shotola et al 1992, Zaczek et al 2002, Haugen 2003, Parker and Ruffner 2004). Without some management intervention, conversion to a mesophytic forest (i.e. one where oak is a minor or absent component) is expected to be complete by 2045-2055 for the Illinois Ozarks Ecological Subsection (Fralish et al 2002). Similar conversion timeframes could be expected for the project area.

Abrams (1992) discusses the importance of fire in the ecology and development of oak forests. Parker and Ruffner (2004) give a good description of the current and historical forest conditions and disturbance regimes in the Hoosier-Shawnee Ecological Assessment (pp. 23-58), and how those disturbances have lead to the present oak-hickory forest on the Shawnee N.F. The EA and the working papers for Forest Resources, and Fire and Fuels are replete with references for scientific papers explaining the importance and relevance of fire and prescribed burning in relation to oak-hickory regeneration. The Final Environmental Impact Statement for the Shawnee National Forest Land and Resource Management Plan, to which this EA is tiered, also explain the importance of fire in relation to oak-hickory regeneration (pp. 90-96, 113-117). Lorimer et al. (1994) found that tall understory trees of *Acer, Ostrya, Tilia*, and other species are a major obstacle to the development of oak seedlings, and that disturbances such as fire that reduce this understory layer can probably improve the prospects that oak will be self-perpetuating. However, the development of competitive natural oak seedlings is a slow process that may take several decades (Lorimer et al. 1994). Ruffner and Groninger (2006) review the evidence for fire as an ecosystem process and discuss an emerging strategy for the widespread reintegration of fire management across the midwestrern landscape. Fire's importance in the development and maintenance of oak forests has been well established across the eastern deciduous biome (Ruffner and Groninger 2006).

Deer browsing has been shown to impact forest regeneration in other parts of the country. In a review of white-tailed deer browse studies, Russell et al (2001) indicates that all of the studies that documented failures of recruitment of seedlings into larger classes were conducted on sites with deer densities above 8.5 deer per sq. km (22 deer per sq. mi.). If this is a potential threshold, then it is possible that deer herbivory could have some effects on oak regeneration on the Shawnee National Forest. Although we do not have accurate estimates of deer densities in southern Illinois, it is possible that there may be 22 deer per square mile. If deer are having an impact on oak regeneration in southern Illinois and on the Shawnee National Forest, then it is even more important to try to implement whatever activities are needed to increase the amount and proportion of oak-hickory regeneration in the forest understories. More oak and hickory seedlings are needed to develop into adequate advance regeneration, which is needed to be able to replace the present oak-hickory overstory. Prescribed burning is one such activity that has been shown to play an important part in the regeneration of the oak-hickory forest type.

The values found by Fralish et al (2002) for presettlement forests are far different than what is currently found on most sites in the Shawnee National Forest, including those in the project area. Tikusis (2008) found startling increases in density and compositional shifts for current forests in the Greater Shawnee Hills when compared to the Fralish et al's presettlement data (Table 2). There was a threefold increase in stem density, while volume remained nearly the same. White and black oaks showed serious declines in importance values, while red oaks and hickories increased. Age classes showed a significant shift as well. Though oak importance values remained similar, most of this figure came from the few large, remaining individuals left in dominant canopy positions. There was almost no advanced oak regeneration.

Within the moderate and severe damaged areas, most of the timber is either downed or standing with structural defects such as broken tops or twisted or fractured boles.

Within the light damage areas, most of the windthrown trees were larger trees, often of mixed oak species. These trees may have been more susceptible due to their increased leaf surface area, advanced age, or both.

Effects Analysis

This section predicts the effects of the proposed action and no action alternatives on certain aspects of the timber resource. As stated above, a critical concern is the lack of oak advanced regeneration to replace the overstory as it dies from windthrow or senescence. I use species composition and stand structure to describe the effects of each alternative.

Alternative 1 – No Action

Direct and Indirect Effects

The spatial boundary used to evaluate direct and indirect consequences was the project area, totaling 9582 acres. This area adequately analyzes the consequences and the project area is large enough to get an idea of whether the project is moving the area toward the desired conditions described in the *Forest Plan*. Effects to the vegetation resource are analyzed here for 10 years because that is the expected lifespan of the project. Thus the analysis period for project effects is from 2008 to 2018.

Under the no action alternative, no management actions would be applied that would affect timber stand composition or structure. This is not to say that there would be no effect. In the "No Damage" areas, stands currently typed as oak-hickory would continue their slow conversion toward mesophytic dominance. Over time, the forest would continue to evolve, toward more shade tolerant, late successional forest types. Shorter-lived species such as black and red oak would fall out of the stand. The understory would become increasingly shaded, preventing oaks and other shade-intolerant species from germinating and growing into advanced regeneration pools. Stem density and average tree size would increase toward the maximum basal area the site could support. As the canopy dominants (primarily oak) die, they would be replaced by shade-tolerant trees that have grown into the midstory. The effect may be similar in the light damage areas, as canopy gaps created by the scattered treefall are not likely enough to stimulate regeneration of shade-intolerant species. In stands already typed as mesophytic, there would be no change, since these stands have an understory and overstory dominated by shade-tolerant species. In heavily damaged pine stands, grapevines and other woody and herbaceous invaders rapidly recolonized the site after the tornado event. Little tree regeneration was noted in the understory. Oak regeneration is possible if a seed source is nearby, but heavy surface litter and competition from other species may limit acorn germination and recruitment into the advanced regeneration pool. Eventually, these stands will convert to mesophytic dominance, but this will be outside the time frame of this analysis. In heavily damaged hardwood stands, there has been an increase in sunlight reaching the forest floor because of the tornado. Brush and shrub species may be prominent in the short timeframe, but many pioneer hardwoods such as tulip poplar, sugar maple, and ash will likely regenerate. By prescribed burning the area, it is likely to add an oak regeneration component, while reducing competition (telephone conversation with Tom Thake, Hoosier NF silviculturalist). Grapevine encroachment, if present, could limit tree regeneration. Any existing advanced regeneration has an opportunity to rapidly gain height with the increase in height. Where oak seedlings and saplings existed prior to the tornado, these species have a chance to grow into the midstory and eventually canopy positions. However, certain mixed mesophytic species may grow faster. Except on the driest sites, these stands will eventually become dominated by mesophytic species, though oaks may in fact make up at least part of the canopy. In areas without grapevine encroachment or existing mesophytic competition, oaks may succeed into the midstory. The near total lack of oak regeneration indicates that the latter scenario is unlikely on most locations. By 2028, most project area stands will have converted to mesophytic dominance. Only the heavily damaged areas will be in early or middle seral stages without further disturbance such as wildfires or another tornado. The elevated fuel loadings would likely increase the risk of fire (see Fire and Fuels Working Paper). A high intensity wildfire likely would damage residual trees, scarring boles and inducing mortality, both of which would reduce the merchantability of future harvests.

Cumulative Effects

The cumulative effects discussion assesses the combined effects from past, present, and reasonably foreseeable future actions from activities on Federal and non-NFS land within the cumulative effects area. The spatial boundary used to address cumulative impacts was the project area, totaling 9582 acres. Expanding the geographic scope to include National Forest and private lands outside the project analysis area could dilute the potential cumulative effects of the project because the lands around the project area have not been significantly managed (other than for agriculture) in the cumulative effects timeframes considered below. When combined with past, present, and reasonably foreseeable future actions on all lands this area gives a good picture of the cumulative impacts as there are 4136 acres of non-NFS lands in the analysis area. Past activities completed within the last ten years will be analyzed for cumulative effects. Thus the analysis period of past actions will be 1998-2008. Cumulative effects are not expected to last beyond 20 years because the proposed action alternative would be completed

by then and the resulting vegetation changes would be significantly complete. Thus, analysis of reasonably foreseeable future actions will be from 2008 to 2028.

Past Actions - Some actions have occurred in the project area during 1998-2008 but have not affected timber resources: land acquisition, recreation (hunting, fishing, hiking, horseback riding, boating, mushroom and berry collecting, recreational facility maintenance, recreation events), water treatment, fish stocking, road and trail maintenance and construction, artifact hunting and collection, and shoreline stabilization.

No known Forest Service timber harvests, thinning, or tree planting have occurred in the past 10 years within the project boundary.

Timber harvests have occurred on privately-owned lands within the project area in the last ten years. Known timber harvests: East Perry Lumber Company conducted a salvage harvest operation on company-owned lands within the project area shortly after the tornado occurrence damaged their forested land. Another landowner harvested approximately 30 acres by a diameter limit cutting, mostly oak selection, within the project area. Other harvests may have occurred, but are unknown to the Forest Service. Further in the past, the mouth of Talbott Hollow (the most severely damaged hardwood stand by the tornado occurrence) had been high-graded prior to Forest Service acquisition. Another private landowner harvested via a diameter limit cut 80 acres approximately 20 years ago, outside the 10 year consideration for this analysis.

Approximately 10 acres of grassy field were planted with loblolly pine on private land in the project area in 2007. This action will not increase native hardwood vegetation.

Approximately 1400 acres of the project area is currently in agricultural uses or in an “open” state. This keeps native timber stands from becoming established, but does not allow succession to mesophytic status either.

Wildfires may affect timber stand composition and structure, but these have been exceedingly uncommon in the past 10 years. Only two wildfires for a total of 3.5 acres have occurred in the project area (Fire and Fuels Working Paper). This has had a negligible effect of project area timber resources.

Approximately 28 acres of powerline rights-of-way have been maintained within the project area. This activity has kept the small, linear area perpetually at the stand initiation phase, and has not allowed for development of oak-hickory dominated timber stands.

Approximately 10 acres of NNIS has been manually pulled or torched in the project area. This has likely improved the overall native species composition, but it has not improved the regeneration capacity of native shade-intolerant tree species because of the very limited area of application and deep shade of the application area.

The majority of the project area is unaffected by any past action except fire exclusion. This has caused the most important change to project area timber stands.

Present Action - Present Actions are very similar to past actions, except there is currently no timber harvest or tree planting ongoing. Present actions would likely have the same effects as past actions.

Foreseeable Future Actions - In addition to present and ongoing actions, some actions are planned for

the future within the project area.

Forest Service Lands – No specific federal timber activities are currently scheduled for the project area in the next 10 years. Some NNIS removal will occur, but the affected area is so small it will have a negligible effect on native shade-intolerant tree regeneration or composition.

Non-Forest Service Lands – One landowner plans a partial (selection) harvest in 2-3 years; it is further assumed that East Perry Lumber Company will conduct some timber-related activities on company-owned lands within the project area in the next 10 years. Current stand composition and structure is unknown at this time but is believed not to have oaks in the midstory. Harvest actions may push these stands toward mesophication. 28 acres of powerline right-of-way will be maintained in the project area, which will keep them from becoming native shade-intolerant hardwood stands.

Determination - Taking into account all present, past, and reasonably foreseeable future actions in the project area including farming, timber harvesting, residential developments, prescribed burning, wildfire, NNIS treatments (pulling, cutting, torching, herbicides), road and trail construction and maintenance, and recreational use, I have determined that Alternative 1 will have an overall negative effect on native shade-intolerant vegetation, including oak-hickory timber stands.

Alternative 2 – Proposed Action

Direct and Indirect Effects

The spatial boundary used to evaluate direct and indirect consequences was the project area, totaling 9582 acres. This area adequately analyzes the consequences and the project area is large enough to get an idea of whether the project is moving the area toward the desired conditions described in the *Forest Plan*. Effects to the vegetation resource are analyzed here for 10 years because that is the expected lifespan of the project. Thus the analysis period for project effects is from 2008 to 2018.

Prescribed burning would have several effects on timber resources. The expected mortality of small stems would open the understory, reduce competition somewhat from shade tolerant/fire intolerant species, and stimulate a sprouting response from any extant oak seedlings and saplings. Because of oaks' competitive strategy of investing heavily in root development early in life, it gains a competitive advantage under a burning regime. Mesophytic stems that do resprout may use most of their energy reserves in shoot growth, so that a second or subsequent prescribed fire may effectively kill the stem. Studies have shown mixed results with periodic burning at various intervals (Huddle and Pallardy 1996, Barnes and Van Lear 1998, Alexander et al 2008). In general, stem density of all species declines after multiple burns, but relative abundance of oak stems increases (Brose 2006). Periodic burning yields slightly higher mortality than annual burning, likely due to the increased buildup of fuels between burns (Huddle and Pallardy 1996). The expected mortality would not likely be enough in undamaged and lightly damaged areas to allow sufficient light for oak seedlings to grow into advanced reproduction strata. Prescribed fire may limit new mesophytic recruitment and eliminate smaller stems, allowing existing oak seedlings to compete when a new canopy gap is created through fire-induced mortality, windthrow, or senescence. In areas with heavy canopy damage however, prescribed fire might induce such mortality in seedlings, saplings, and sprouts of mesophytes to keep succession at bay and give oaks a chance to grow into the vacated canopy gap. Where a mesophytic midstory existed prior to the storm, these species would take over the stand unless they were yet small enough to be killed by fire.

There is potential for damage to residual trees, including those that may be desirable for future harvest. About 4989 acres of the project area (52%) are in the EH management area, which is managed primarily for the production of high quality hardwoods. Previous experience has shown that while mortality is typically limited to trees less than 3-4 inches dbh, occasional overstory mortality is possible. The factors chiefly affecting mortality include fire intensity, residence time, and bark thickness (a function of species and tree size). Oaks and to a lesser extent hickories have relatively thick bark, which enables them to withstand fires better than mesophytic species such as maple and beech. Some timber value loss can be sustained even without mortality from tree scarring, especially for veneer quality logs. Areas with higher fuel loadings would experience higher fireline intensities, so greater damage to residual trees is expected in these areas. Pine stands have the highest average fuel loading (Fire and Fuels Working Paper), but are not considered highly desirable in this management area so damage to residual stands is not detrimental to timber resources. In fact, killing pine trees would have beneficial effects to wildlife and would help move the area toward the desired condition of high quality hardwoods.

Another effect of the prescribed fire would be the consumption of leaf litter and some larger fuels. This would decrease shading for seedlings and saplings. It would also create pockets of thinner leaf litter and mineral soil that would aid in native plant seed germination. First Order Fire Effects Model (FOFEM) 5.2.1 runs suggest a maximum of 9.1% mineral soil would be exposed during even the “very dry” scenario in stands of pine slash, and none in any hardwood stands under any moisture scenario. Leaf litter consumption approaches 100% in many instances. Prior experience on the Shawnee NF indicates that frequently the lower litter layer(s) retain enough moisture, particularly in spring, to resist burning (Fire and Fuels Working Paper).

Prescribed fires may help native vegetation by reducing fuel loads during moderate burning periods. This decreases fire potential if a wildfire were to occur in the same area. Wildfires, frequently occurring under extreme conditions, have been shown to be much more capable of causing mortality than typical prescribed fires (Fire and Fuels Working Paper).

Prescribed burning can also volatilize nutrients, which could increase their availability in the short term. Mature trees may be able to use some of these nutrients as they leach deeper into the ground.

Fireline construction may affect timber resources in fewer ways. They may create small openings and increase light to the forest floor, but this effect would be very slight. Line construction, especially with heavy equipment, may cause damage to residual trees by disturbing roots, scarring trunks, or by direct, intentional removal.

Mowing, chipping and cutting are only prescribed for 25 acres in the project area. Changing the fuel arrangement in this way would lead to lowered fireline intensities and flame lengths (and hence less direct mortality). If chipped materials are allowed to accumulate, they may inhibit new plant germination and growth, or may serve as a smothering blanket and kill small plants. Any piles created would also inhibit new plant growth by intense shading and may heat the soil to levels where soil organic matter is killed and soil structure changes, further decreasing potential for new native shade-intolerant plant establishment.

Cumulative Effects

The cumulative effects discussion assesses the combined effects from past, present, and reasonably foreseeable future actions from activities on Federal and non-NFS land within the cumulative effects area. The spatial boundary used to address cumulative impacts was the project area, totaling 9582

acres. Expanding the geographic scope to include National Forest and private lands outside the project analysis area could dilute the potential cumulative effects of the project because the lands around the project area have not been significantly managed (other than for agriculture) in the cumulative effects timeframes considered below. When combined with past, present, and reasonably foreseeable future actions on all lands this area gives a good picture of the cumulative impacts as there are 4136 acres of non-NFS lands in the analysis area. Past activities completed within the last ten years will be analyzed for cumulative effects. Thus the analysis period of past actions will be 1998-2008. Cumulative effects are not expected to last beyond 15 years because the proposed action alternative would be completed by then and the resulting vegetation changes would be significantly complete. Thus, analysis of reasonably foreseeable future actions will be from 2008 to 2023.

Past Actions - Some actions have occurred in the project area during 1998-2008 but have not affected timber resources: land acquisition, recreation (hunting, fishing, hiking, horseback riding, boating, mushroom and berry collecting, recreational facility maintenance, recreation events), water treatment, fish stocking, road and trail maintenance and construction, artifact hunting and collection, and shoreline stabilization.

No known Forest Service timber harvests, thinning, or tree planting have occurred in the past 10 years within the project boundary.

Timber harvests have occurred on privately-owned lands within the project area in the last ten years. Known timber harvests: East Perry Lumber Company conducted a salvage harvest operation on company-owned lands within the project area shortly after the tornado occurrence damaged their forested land. Another landowner harvested approximately 30 acres by a diameter limit cutting, mostly oak selection, within the project area. Other harvests may have occurred, but are unknown to the Forest Service. Further in the past, the mouth of Talbott Hollow (the most severely damaged hardwood stand by the tornado occurrence) had been high-graded prior to Forest Service acquisition. Another private landowner harvested via a diameter limit cut 80 acres approximately 20 years ago, outside the 10 year consideration for this analysis.

Approximately 10 acres of grassy field were planted with loblolly pine on private land in the project area in 2007. This action will not increase native hardwood vegetation.

Approximately 1400 acres of the project area is currently in agricultural uses or in an “open” state. This keeps native timber stands from becoming established, but does not allow succession to mesophytic status either.

Wildfires may affect timber stand composition and structure, but these have been exceedingly uncommon in the past 10 years. Only two wildfires for a total of 3.5 acres have occurred in the project area (Fire and Fuels Working Paper). This has had a negligible effect of project area timber resources.

Approximately 28 acres of powerline rights-of-way have been maintained within the project area. This activity has kept the small, linear area perpetually at the stand initiation phase, and has not allowed for development of oak-hickory dominated timber stands.

Approximately 10 acres of NNIS has been manually pulled or torched in the project area. This has likely improved the overall native species composition, but it has not improved the regeneration capacity of native shade-intolerant tree species because of the very limited area of application and deep shade of the application area.

The majority of the project area is unaffected by any past action except fire exclusion. This has caused the most important change to project area timber stands.

Present Action - Present Actions are very similar to past actions, except there is currently no timber harvest or tree planting ongoing. Present actions would likely have the same effects as past actions.

Foreseeable Future Actions - In addition to present and ongoing actions, some actions are planned for the future within the project area.

Forest Service Lands – No specific federal timber activities are currently scheduled for the project area in the next 10 years. Some NNIS removal will occur, but the affected area is so small it will have a negligible effect on native shade-intolerant tree regeneration or composition.

Non-Forest Service Lands – One landowner plans a partial (selection) harvest in 2-3 years; it is further assumed that East Perry Lumber Company will conduct some timber-related activities on company-owned lands within the project area in the next 10 years. Current stand composition and structure is unknown at this time but is believed not to have oaks in the midstory. Harvest actions may push these stands toward mesophication. 28 acres of powerline right-of-way will be maintained in the project area, which will keep them from becoming native shade-intolerant hardwood stands.

Determination - Taking into account all present, past, and reasonably foreseeable future actions in the project area including farming, timber harvesting, residential developments, prescribed burning, wildfire, NNIS treatments (pulling, cutting, torching, herbicides), road and trail construction and maintenance, and recreational use, I have determined that Alternative 2 will have an overall positive effect on native shade-intolerant vegetation, including oak-hickory timber stands.

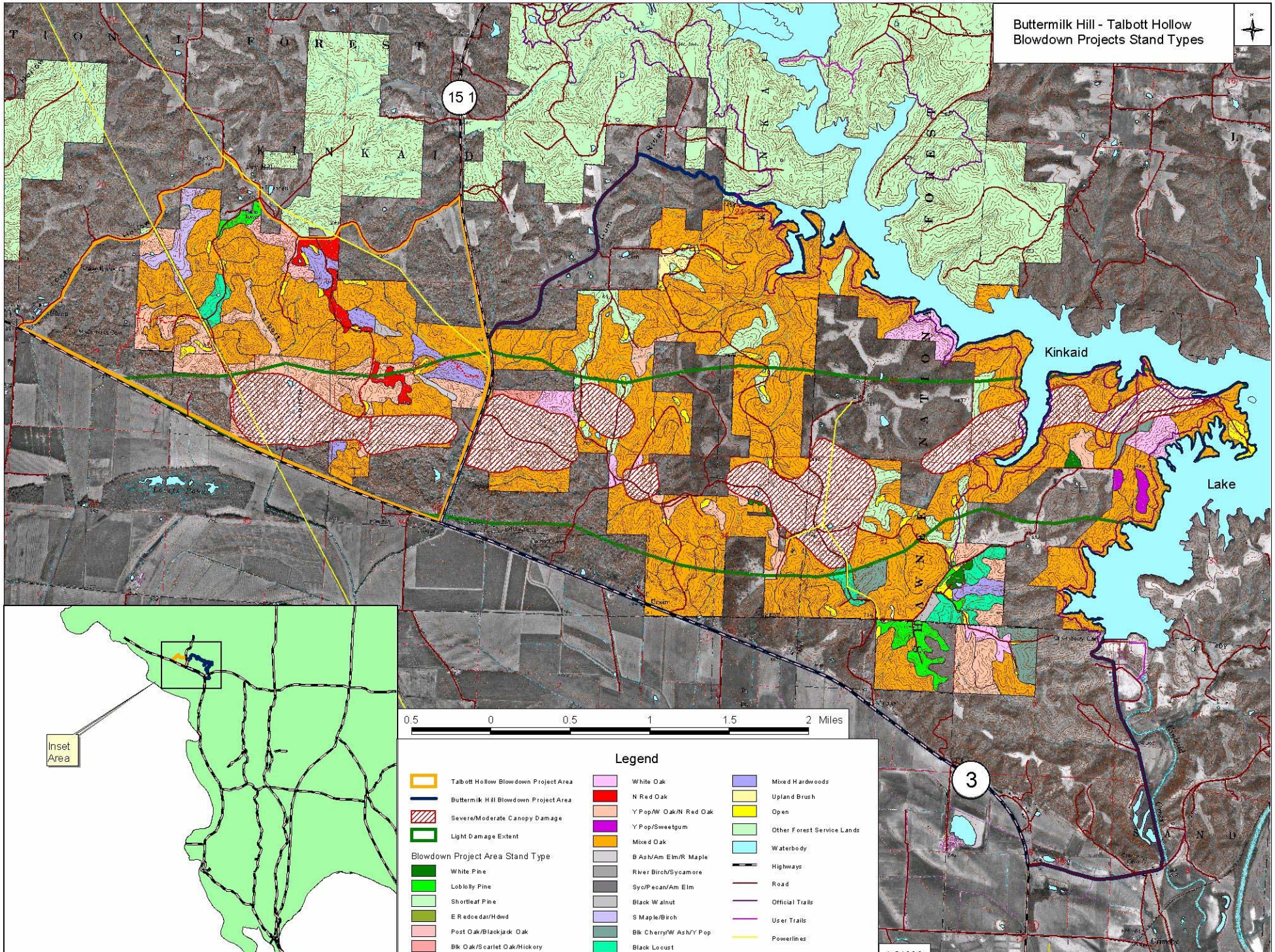
Buttermilk Hill - Talbott Hollow
Blowdown Projects Stand Types
Kinkaid
Lake
15 1
3
Inset Area
0.5 0 0.5 1 1.5 2 Miles
Legend
Talbott Hollow Blowdown Project Area
Buttermilk Hill Blowdown Project Area
Severe/Moderate Canopy Damage
Light Damage Extent
Blowdown Project Area Stand Type
White Pine
Loblolly Pine
Shortleaf Pine
E Redcedar/Hdwd
Post Oak/Blackjack Oak
Blk Oak/Scarlet Oak/Hickory
White Oak
N Red Oak
Y Pop/W Oak/N Red Oak
Y Pop/Sweetgum
Mixed Oak
B Ash/Am Elm/R Maple
River Birch/Sycamore
Syc/Pecan/Am Elm
Black Walnut
S Maple/Birch
Blk Cherry/W Ash/Y Pop
Black Locust
Mixed Hardwoods
Upland Brush
Open
Other Forest Service Lands
Waterbody
Highways
Road
Official Trails
User Trails
Powerlines

Table 1. Timber stand characteristics for the Buttermilk Hill – Talbott Hollow Blowdown Project Area

Stand Type	Acres in Project Area	Percent of Project Area	Acres of Project Area in Sawtimber	Percent of Project Area in Sawtimber	Acres of Project Area in Pole timber	Percent of Project Area in Pole timber
White Pine	53	4.4	0	0.0	36	15.5
Loblolly Pine	69	0.0	0	0.0	0	0.0
Shortleaf Pine	237	2.6	21	3.9	0	0.0
Pine Totals	358	7.0	21	3.9	36	15.5
Post Oak/ Blackjack Oak	34	0.0	0	0.0	0	0.0
Black Oak/ Scarlet Oak/ Hickory	23	1.5	12	2.2	0	0.0
White Oak	167	4.1	29	5.3	4	1.7
N Red Oak	49	0.0	0	0.0	0	0.0
Yellow Poplar/White Oak/N Red Oak	455	21.7	164	30.1	11	4.7
Mixed Oak	3072	52.3	280	51.4	130	56.0
Oak-Hickory Totals	3765	79.5	485	89.0	145	62.5
Yellow Poplar/Sweetgum	29	1.6	0	0.0	13	5.6
Blue Ash/ American Elm/ Red Maple	6	0.0	0	0.0	0	0.0
Sycamore/Pecan/American Elm	33	0.0	0	0.0	0	0.0
Black Walnut	16	0.0	0	0.0	0	0.0
Sugar/Maple Beech	45	0.0	0	0.0	0	0.0
Black Cherry/White Ash/Yellow Poplar	80	1.5	0	0.0	12	5.2
Black Locust	134	5.2	19	3.5	23	9.9
Mixed Hardwoods	116	2.8	20	3.7	3	1.3
Mesophyte Total	430	11.1	39	7.2	51	22.0
Upland Brush	15	0.0	0	0.0	0	0.0
Open	119	2.3	0	0.0	0	0.0
Open Totals	134	2.3	0	0.0	0	0.0
Project Totals	**4687**	**100**	**545**	**100**	**232**	**100**

Appendix A Presettlement Forest Data and Rationale for Native Tree Species Restoration Goals

A 2002 report, entitled 'Presettlement, Present, and Projected Forest Communities of the Shawnee National Forest, Illinois' prepared for the Shawnee National Forest by Fralish (et al) of Southern Illinois University and Anderson (et al) of Illinois State University, compiled several other studies to their research to develop data that described the presettlement forest community of the Shawnee National Forest. This objective was reached by examining overstory composition, basal area, and density for presettlement and present forest communities and future composition for each of the three major Subregions. Presettlement forest information was generated for the site types from witness tree data reported in 1806-1810 original land survey.

The Buttermilk Hill – Talbott Hollow Project Area is within the Greater Shawnee Hills Subsection and further categorized as West Deep Loess Land Type Association (LTA1), with the majority of the tornado damage occurring in three Ecological Land Types (ELTs) – Southwest Slope, South Slope, and Ridgetop Sites. The underlying bedrock of the Greater Shawnee Hills is composed of massive Pennsylvanian sandstone with some interbedded siltstone and shale; the region is unglaciated. Within the project area, stable stands of white oak in combination with black oak and pignut hickory were found to be moderately closed on west to south to southeast slopes; on high mesic north slopes, stands were largely composed of northern red oak, pignut hickory and shagbark hickory, but were slowly being encroached by sugar maple; on lower slopes, stands were up to 50% sugar maple.

Data has shown that the presettlement forest of the Shawnee Hills was strongly dominated by white oak, black oak, several other oak species, and hickory; examination of the data for ELTs in LTA1 show that the forest communities of all sites from the driest southwest and south slopes and ridgetops to mid to high north slopes to the mesic low slopes were strongly dominated by white and black oak and hickory. Timber harvesting and fire in the late 1800's removed much of the original forest and continued the existence of high quality but successional white oak stands presently found on mesic site. A 1978 study by Harty found that these successional stands, in the absence of continued disturbance (cutting or fire), that the white, black, and red oak stands on low south slopes, north slopes and terraces were being invaded by sugar maple and other mesophytic species. The succession of oak to maple and other mesophytic species on mesic sites began soon after major disturbances (particularly fire, were stopped in the 1930s. Ultimately, the dense shade created by the multi-layered mesophytes will eliminate oak and hickory seedlings. When the large overstory oak and hickory die over the next century, conversion will be complete. Even in the sites in the North, Low, and Alluvial ELTs that support the highest quality white oak stands, if left unmanaged, most, if not all, of these stands will be lost over the next 50-75 years. Where mesophytic species area below 2" dbh within these sites, periodic prescribed fire will shorten the successional process, but will not necessarily stimulate oak and hickory regeneration as the multi-layered canopy of the present overstory usually is sufficiently dense to restrict adequate light penetration for seedling survival. To develop oak regeneration, a thinning or shelterwood-type cut would be necessary.

Appendix B References

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