Vegetation Report

Boswell Creek Healthy Forest Initiative Project
Sam Houston National Forest
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Background

The Sam Houston National Forest (NF) is proposing management activities in Compartments 69, 70, 72, 73, 74, 75, 76, 77, and 83 within the Boswell Creek Watershed to participate in President Bush's Healthy Forest Initiative (HFI) for Wildfire Prevention and Stronger Communities. Proposed treatments are planned to further the goals of reducing the threat of catastrophic wildfires to protect communities, firefighters, and wildlife and also promote forest health. The Sam Houston NF's proposal is for:

- Implementing dormant and growing season prescribed burning on approximately 8,650 acres every two to five years to reduce risk from destructive fires; and
- Thinning approximately 4,800 acres of pine stands to reduce Southern Pine Beetle (SPB) hazard.

This report addresses Boswell Creek Watershed Project vegetation issues.

Affected Environment

The Boswell Creek Project encompasses approximately 8,650 acres of the Sam Houston National Forest (NF). Approximately 8,360 acres fall within Management Area 2 (MA-2), Red-Cockaded Woodpecker (RCW) Emphasis, while about 290 acres consist of streamside management zones (MA-4), primarily Boswell, Briar, Brandy, and Pea Creeks, Thicket Branch, and intermittent streams feeding them.

Forest Plan Direction

The 1996 Revised Land and Resource Management Plan (the Plan) describes general desired future conditions for the National Forests and Grasslands in Texas that considers a number of biological, physical, and social factors (p. 43-45). Within MA-2, the Plan describes a specific desired future condition and management emphasis for each forest community (p. 98-102). The desired future condition and management emphasis are open pine forests with large older trees, while offering a wide range of compatible multiple uses, but primarily for the recovery of the red-cockaded woodpecker. This management area is managed for maintenance of habitat components favorable to the RCW, including restoration and regeneration of the upland pine forest communities.

Other desired future conditions for MA-2 include:

- Protect and improve habitat for threatened and endangered animal species (the Plan, p. 45).
- Manage for a healthy, productive, and sustainable forest (p. 47).
- Minimize losses to insects and diseases (p. 48).
- Use silvicultural strategies to reduce Southern Pine Beetle (SPB) hazard. Thin to maintain tree vigor and reduce SPB hazard in stands where SPB hazard is moderate or higher (p. 65 and 119).
- Maintain open forest structure through regular prescribed burning. Establish a burning cycle of two to five years HMA-wide (p. 98 and 110).
- Maintain a pine BA of 60-80 square feet and maintain a minimum spacing of 20-25 feet between dominant and co-dominant trees (p. 119).

The desired future condition for MA-4 would provide hardwood dominated stands with some pines mixed in the overstory (p. 146-151).

Table 1 shows the forest types found in the Boswell Creek Project Area, based on current inventory.

Table 1 – Forest Types in Boswell Creek Project

Forest Type	Acres
Loblolly Pine	6,964
Shortleaf Pine	400
Loblolly-Hdwd	43
Bottomland Hdwd-Pine	24
Swamp Chestnut Oak-Cherrybark Oak	12
Sweetgum-Nuttall Oak-Willow	74
White Oak	13
White Oak-Red Oak-Hickory	1,104
Total	8,634

Upland Vegetation (MA-2)

Species composition – Loblolly pine (*Pinus taeda*) dominates most stands in the Boswell Creek Project, interspersed with various amounts of shortleaf pine (*Pinus echinata*) and a mixture of hardwoods. Very few stands are dominated by shortleaf pine. Hardwood tree species common to the overstory in these stands include white oak (*Quercus alba*), southern red oak (*Q. falcata*), post oak (*Q. stallata*), sweetgum (Liquidambar styracuflua), hickory (*Carya sp.*), and ash (*Fraxinus sp.*).

Structure – The even-aged pine forest communities in the Boswell Creek Project contain three layers – overstory, midstory, and understory. The midstory and understory vegetation and densities are typical of those found in the East Texas Pineywoods and consist primarily of oaks, pines, hickories, elms (*Ulmus sp.*), ironwood (*Ostrya virginiana*), blackgum (*Nyssa sylvatica)*, sweetgum, dogwood (*Cornus florida)*, cherry (*Prunus sp.)*, red maple (*Acer rubrum)*, magnolia (*Magnolia sp.)*, mulberry (*Morus rubra)*, hawthorn (*Crataegus sp.)*, and chinquapin (*Castanea pumila*). The understory consists of yaupon (*Ilex vomitoria)*, Carolina buckthorn (*Rhamnus caroliniana)*, and vines as well as seedlings and saplings of the species found in the midstory and overstory. Grasses and other herbaceous vegetation are also typical of forests in East Texas.

About 50 percent of these pine forest communities are less than 20 years old. During the mid-1980s, Southern pine beetle (SPB) decimated the pine-dominated forests in this area. Following salvaging logging, site preparation and planting re-established these areas. In the last 15 years, the pine trees have grown into thick stands of saplings and larger trees, with heavy accumulations of pine needles, small limbs, small dead pine trees, and flammable understory shrubs such as yaupon.

Snags and coarse woody debris loadings are constantly changing, as trees break off or die, and as decomposition takes place. In general, snags are more common in hardwood and riparian stands. Most snags fall within a decade or less in the southern U.S. Decomposition rates are higher in the southern U.S. than other parts of the country, because temperature and moisture conditions are more favorable for microbes and invertebrates (Van Lear, 1993).

While the exact number of snags and amount of coarse woody debris has not been quantified for this project, both snags and coarse woody debris are present in all stands. Snags and coarse woody debris are more abundant in the older forest communities.

SPB Risk – The Southern pine beetle is one of the most destructive pests in the southern US. One of the most common factors related to SPB infestation is slow radial growth, which is related to high stand density (Belanger, 1996).

According to an evaluation conducted in cooperation with Texas Forest Service, the entire Boswell Creek Project is considered to have a high SPB hazard rating.

SPB outbreaks are episodic and generally grow to epidemic proportions on 7-10 year cycles. The last epidemic on the Sam Houston NF occurred in 1992-1993. Historical return intervals indicate that the Sam Houston NF can reasonably expect SPB to reach epidemic levels within the near future.

Reducing basal areas in dense pine stands not only removes the smaller, slow-growing trees most susceptible to SPB infestation; it also reduces competition and increases residual tree growth (Belanger, 1996).

Riparian Vegetation (MA-4)

Species Composition – Riparian vegetation varies along Boswell, Briar, Brandy, and Pea Creeks and Thicket Branch, as well as several intermittent and ephemeral tributaries. Hardwood tree species dominate in some areas, while pines prevail in other places. Some ephemeral and intermittent streams reside in pine-dominated uplands, for example. Hardwoods now dominate several stands, once dominated by pine, as shown in aerial photographs taken in 1970, 1980, and 1995. SPB killed the pine trees in many of these stands, which released the hardwoods already growing in the midstory.

Structure – These areas are similar to the upland forests in Boswell Creek Watershed: even-aged with three layers. In some places, a young hardwood forest has grown in place of the mature pines killed by SPB.

Snags and coarse woody debris are present in all stands, although the majority of this type of material resides more in older stands. Snags are most common in hardwood stands and riparian zones (Van Lear, 1993).

Under the proposed actions, no logging would take place within MA-4, but prescribed fire would be allowed to back in, extinguishing naturally.

ECS

According to the Ecological Classification System (ECS) for the National Forests of the West Gulf Coastal Plain, the Boswell Creek Project lies within the Raven Hills Landtype Association. Several Landtype Phases occur in this Landtype Association and the project area:

1. Shortleaf Pine-Blackjack Oak/*Schizachyrium* Sandy Arenic Dry Uplands
2. Shortleaf Pine-Post Oak/*Callicarpa-Chasmanthium* Loamy Dry-Mesic Slopes and Uplands
3. Loblolly Pine-Southern Red Oak/*Callicarpa* Loamy Mesic Lower Slopes and Terraces
4. Water Oak-Loblolly Pine/*Bignonia-Arisaema* Loamy Mesic Stream Bottoms
5. Cedar Elm-Hackberry/*Justicia* Loamy Wet-Mesic Stream Bottoms (Turner, 1999).

These Landtype Phases have an overstory that is highly variable, but usually consist of mixed pine and hardwood species. In the pine-dominated stands, the desired future condition is to maintain the open understory, provide habitat for RCW recovery, and maintain an overstory dominated by large pine trees with hardwoods scattered throughout.

Old Growth

No virgin stands occur in the Boswell Creek Project. Stands proposed for treatment currently exhibit no unique old-growth characteristics, other than natural succession associated with second-growth forests as they mature. Stands designated to provide old-growth values would need to experience the aging, natural processes, and management techniques necessary to develop old-growth characteristics. While age is not the sole criterion used to designate old growth, older stands are priority candidates for consideration since they may provide old-growth character sooner than younger stands.

The Plan designates MA-4 (Streamside Management Zones), MA-7 (Wilderness Areas), and MA-8 (Scenic Areas) as potential old growth. These management areas make up approximately nine percent of the forested lands on the Sam Houston NF. While older forest conditions will develop in numerous areas throughout MA-2, no allocations for old growth are to be provided (the Plan, p. 103).

Even though no allocations are to be provided in MA-2, the Plan requires an evaluation of all stands that are 95 years or older using the Continuous Inventory of Stand Conditions (CISC) data (the Plan, Appendix I). The CISC report for Compartments 69, 70, 72, 73, 74, 75, 76, 77, and 83, shows that several stands are 95 years old, or older. A list of these stands and their evaluations can be found in Appendix A. Field evaluations showed that no stand in the Boswell Creek Project currently meets the minimum age criteria for old growth.

According to the Plan, Appendix I, shortleaf pine is the only forest type in which old-growth designations are to be considered. However, no shortleaf pine stand within the Boswell Creek Project boundaries is old enough (95 years or older).

A concern for protecting future old-growth characteristics in the following compartments and stands has been raised by the Houston Sierra Club: C-69, std. 12; C-70, std. 10; C-72, std. 15; C-73, std. 2; C-74, stds. 2, 7, and 9; C-75, stds. 5-10, 14, 15, 20, and 47; C-76, stds. 1, 3, 8, 9, 10, 14, 15, 18, 19, 20, 23, and 24; C-77, std. 3; and C-83, std. 21. These stands are also addressed in Appendix A.

Cumulative Effects Area

The Boswell Creek Project is part of a larger portion of the Sam Houston NF known as the Big Woods, which houses a sub-population of the RCW, and is the area to be considered for cumulative effects to vegetation. Big Woods stretches east from Interstate 45 and north of Highway 150 and includes nearly 34,400 acres in Compartments 60-87. The reason this area will be considered for cumulative effects is because RCW in this sub-population could potentially use parts of Boswell Creek Project.

More than 27,300 acres of the Big Woods consists of loblolly pine, 10,600 acres of which are thirty years old or younger. A complete age class distribution by forest type is included in Appendix B.

Table 2 shows the various forest types found in the Big Woods and Boswell Creek Project.

Table 2 – Forest Types in Big Woods

Forest Type	Acres
Loblolly Pine	27,331
Shortleaf Pine	3,524
Slash Pine	153
Loblolly-Hdwd	740
Bottomland Hdwd-Pine	238
White Oak	13
White Oak-Red Oak-Hickory	1,483
Swamp Chestnut Oak-Cherrybark Oak	12
Sweetgum-Nuttall Oak-Willow	663
Sugarberry-American Elm-Green Ash	13
Laurel Oak-Willow Oak	198
Total	34,368
Non-forest (blackland prairie)	174

Private Land

While the Big Woods area is defined by the National Forest land, most of the land east of I-45 and north of Hwy. 150, in Walker and San Jacinto Counties is privately owned. This private land is composed of farms, residences, church camps, training facilities, and managed forest land owned by private and industrial landholders.

Roughly 20-30 percent of the private land east of the Boswell Creek Watershed area is in pasture, according to 1995 aerial photographs. The rest (70-80 percent) of the privately owned

land east of the project area to Lake Livingston, is wooded. The opposite of this occurs west and south of the Boswell Creek area: 70-80 percent of the private land is in pasture or developed subdivisions. Generally, National Forest land will be the only mature forest in the area, with the exception of small blocks of non-industrial forest owned by individuals.

It is impossible to predict future management actions on private land. The exception to this rule is industrial forest: Champion and International Paper owned some of the larger blocks of forested land. These blocks have since been sold (purchased by investment companies). Consulting foresters now manage the timber on these lands on a short, 30-40 year rotation (Gage, pers. comm.).

Effects of Implementation-Proposed Action

Proposed management activities include prescribed burning about 8,650 acres every 2-5 years to reduce risk from destructive fires and thinning to reduce SPB hazard on approximately 1,440 acres of older pine-dominated stands and 3,360 acres of young (15 to 20-year old) pine stands in compartments 69, 70, 72, 73, 74, 75, 76, 77, and 83.

Direct and Indirect Effects

Upland Forests (MA-2)

Species Composition – Prescribed burning and thinning will not really change the species composition of the overstory. Prescribed burning top kills hardwoods, but they resprout because the rootstocks are not killed (FEIS-VM, p. IV-30).

A 43-year study of prescribed burning's effects on the Santee Fire Plots in South Carolina showed that plants' fire tolerance and competitive vigor produce differences in species composition of understory plant communities. Four fire regimes studies, annual summer burns, annual winter burns, periodic burns, and no burns produced distinct plant communities influenced by fire frequency and season. Variability in species composition within a community type decreases as the level of burning increases. Periodic burning is the type of prescribed fire anticipated in the plan, implemented in the past, and likely to continue in the future. Plots that were burned periodically had two distinct classes of understory hardwoods develop, those greater than five inches and those less than two inches in diameter at breast height with herbaceous species, most of which were grasses (Waldrop, 1992).

Analysis of species diversity and richness on the Santee plots determined that understory species richness was not significantly affected by treatment. Woody species richness was significantly higher for the no-burn and periodic burn than for either of the annual burn treatments. Herbaceous species richness increased as the burning frequency increased. Diversity, as measured by Shannon's index, was greatest for annual winter burns, followed by periodic summer burns, the no-burn control, annual summer burns, and periodic winter burns (Waldrop, 1992).

Data from experiments in three different southern forests showed that short intervals (three years or less) promote high diversity in grass and forb-dominated understory (Hermann, et.al., 1998). Conclusions of this study: fire is vital to conservation of natural diversity in pine uplands of the Coastal Plain. Long periods without growing season burns could eventually affect natural biodiversity (Hermann, et. al., 1998).

Historically, fire has always been part of the ecosystems in the Gulf Coastal Plain. Tree ring chronology from 1755-1995, using stumps of loblolly and shortleaf pines blown over in the February, 1998 windstorm on the National Forests in Texas, showed a fire frequency of

1.5 years. Dendrochronological analysis shows long-term establishment of fire dependent ecosystems in Texas (Jurney, et. al., 2000).

Pine species react differently to fire. Shortleaf, loblolly, and slash pine all become resistant as they mature. Shortleaf pine is the most susceptible to fire during the first ten years of establishment. Trees greater than five inches in diameter seldom die (FEIS, 2000). Young shortleaf pines sprout vigorously at the root collar if the crown is badly injured or killed (Lawson, 1990).

Loblolly pine becomes resistant to fire after age 10, as tree diameters increase and bark thickens. Moderate fire could kill loblolly pine that is two inches in diameter. Loblolly pine is less resistant to fire than shortleaf pine (FEIS, 2000). Low intensity fire would favor shortleaf pine over loblolly pine (Williams, 1997).

White oak, post oak, and hickories are all well adapted to periodic fire: they all sprout from the stump or root collar. Many of the hardwoods found in the midstory and understory of the upland forests, such as red maple, dogwood, ash, blackgum, and blackjack oak, are well adapted to fire. Trees may be top-killed by fire, but all have the ability to sprout from the stump or roots (FEIS, 2000).

Some hardwoods in the transitional zones and on lower slopes of the uplands are less resistant, or more susceptible to fire. Magnolia is fire intolerant, partially because of its thin bark. Still the species does possess the ability to sprout from the stump. Elm is easily damaged by fire but can sprout. Sweetgum is highly susceptible to top-kill, but also has the sprouting ability. Holly, yaupon, cherry, eastern hophornbeam – all are susceptible to fire and can be top-killed. All possess the ability to sprout (FEIS, 2000).

Thinning will provide several benefits including increased residual tree growth; improved vigor of residual trees; improved stand quality, as damaged and poorly formed trees are removed; increased diversity within stands; and improved ability of the stands to withstand stresses such as drought and pests other than SPB (Smith, et. al, 1997). Tree vigor is the single most important factor to good tree health. High tree and stand vigor provide the best resistance to bark beetles in southeastern North America (Nyland, 1996).

Thinning will remove many of the smaller and poorly formed pine stems from the stands, which will allow the residual trees to reach a larger average size and above average quality. The SPB hazard will be reduced on the thinned areas in the long term; however, during the first year after thinning, the disturbance of thinning may increase secondary bark beetle risk. The benefits from reducing SPB risk are far greater than temporarily increasing secondary bark beetle risk.

Structure – Prescribed burning will partially reduce structural diversity of the understory by eliminating some vegetation in the lower layers. At the same time, it will result in a mosaic of understory conditions, since not all areas will burn and some will burn with different intensity. It will encourage herbaceous growth at the expense of woody growth (FEIS-VM, p. IV-39). The potential for scorching in the midstory and overstory does exist. Light amounts of scorch may increase growth and moderate crown scorch does not affect the growth of unthinned loblolly pine trees of dominant or co-dominant crown classes (FEIS-VM, p. IV-37).

Prescribed burning affects snags and coarse woody debris in two ways - simultaneously killing live trees and consuming dead trees. Prescribed burning's effects on snags and coarse woody debris will also depend on conditions such as fuel moisture, weather, and firing techniques (Van Lear, 1993). Prescribed burning only occurs under certain fuel and

weather conditions to minimize risk of resource damage. Within these self-imposed parameters, consumption or scorching of fallen logs should be minimal, although degrees of consumption/ scorch will vary according to topographic position. In other words, snags and coarse woody debris in the uplands would be more likely to be partially consumed than those located closer to streams.

Thinning would decrease the density of the dominant cover and result in herbaceous plants, such as grasses, brackenfern, and partridge pea. It will also stimulate new woody growth in the understory.

Some residual trees, both pine and hardwoods, could receive some damage from tree removal operations. Skidders can crush or wound some ground vegetation and understory species. Protecting mast producing hardwoods in the overstory and midstory of pine stands during thinning operations will ensure retention and development of this component in the pine stands. No more than 30 square feet per acre of basal area will be removed from the dominant or co-dominant trees.

Hunter suggests that biologists studying forest types from nearly every region of the country have arrived at the consistent recommendations of retaining 2-4 snags per acre (1990). While equipment used in thinning has the potential to knock over snags and break up existing coarse woody debris, snags and recognizable den trees will be retained and protected (the Plan, p. 55).

Controlling removal of dead, dying, and decayed trees, emphasizing tree species that are most likely to be recruited into the snag population, and thinning stands to create habitat conditions favorable to cavity-dependent birds are some of the management actions proposed to maintain adequate densities of snags in southern forests (Lanham and Guynn 1993). These suggested activities are consistent with the proposed action.

The Interdisciplinary (ID) Team used the Forest Vegetation Simulator computer model (FVS) to compare stand development in young forest communities. The computer model projected stand development results in a young stand with 150 square feet per acre of basal area. The team ran scenarios to compare stand development in areas to be thinned, as in the Proposed Action, to stand development in areas that will not be thinned, as proposed under Alternative 1. Appendix C contains a description of FVS and assumptions used for this project; the results of individual computer simulations are maintained in the project file.

Appendix C displays three-dimensional views of the development of a representative stand in the Boswell Creek Project. The data used came for field measurements collected in the winter of 2003, in Compartment 73, stand 21. FVS projected stand development and the Stand Visualization System (SVS) generated a graphic display. Each view represents the trees found on the average acre. SVS draws new trees for each period, so the same trees are not represented in each display.

Stand 21 of Compartment 73 is a 15-year old loblolly pine stand, with 150 square feet per acre of basal area. FVS predicts current mortality for stand 21 at about 19 trees per year. Thinning to 70 square feet of basal area would decrease mortality to 2 trees per year. According to the model, in 10 years stand 21 will have 196 square feet of basal area, if left to grow, and mortality will be at 34 trees per year. If the stand is thinned, it will have 109 square feet per acre of basal area and mortality will be at 21 trees per year. The differences in the thinned versus unthinned become even greater as the stand ages. Mortality continues to climb at a faster rate in the unthinned scenario.

Riparian Forests (MA-4)

Species Composition – No logging would take place within MA-4, but prescribed fire would be allowed to enter from adjacent uplands, extinguishing naturally as conditions become moister.

Some hardwoods in these areas, such as magnolia, elm, sweetgum, holly, yaupon, cherry, and eastern hophornbeam are susceptible to fire and can be top-killed. All possess the ability to sprout (FEIS, 2000). Hardwood composition would change very little, if at all.

Structure – A transition zone will develop in these areas as fire backs, and due to the site's moister conditions, goes out. Where fuels exist in streamside zones to carry the fire, some vegetation would be top-killed, but as fire moves downslope or into moister areas, fire intensity would decrease and less of the existing vegetation would be affected. Generally, pine needles would provide fuel that would carry the fire better than hardwood leaves; where pine exists in these moister, lower slopes, the potential exists for fire to top-kill shrubs and small hardwoods.

The effects on snags and coarse woody debris from prescribed burning would be minimal in these moister areas. Snags are most common in hardwood stands and in lowlands and riparian zones (Van Lear, 1993). In fact, it is the wet conditions associated with riparian areas and the high moisture content of rotting material that helps extinguish the fire as it backs into these zones. Some snags and fallen logs could be scorched, depending on moisture conditions.

ECS

Prescribed burning is considered a natural disturbance for the upland landtype phases. It was an important environmental factor in determining the structure and distribution of upland communities on the pre-settlement landscape (Turner, 1999). Similarly, prescribed burning planned in the Proposed Action will result in a mosaic of understory conditions, since not all areas will burn and some will burn with different intensity. Fire will back into riparian areas and extinguish naturally. This mosaic effect is not inconsistent with ECS, which describes variable intervals for landtype phases (Turner, 1999). In addition, the Plan directs prescribed burning on a two to five year rotation as the preferred method to control midstory vegetation and enhance RCW habitat in MA-2 (the Plan, p. 110).

Thinning will not affect species composition in the overstory, and will have minimal effects on species composition in the midstory and understory. Thinning will alter structure somewhat, encouraging development of herbaceous plants and also stimulating new woody growth. None of these effects are inconsistent with the ECS.

Old Growth

Evaluations conducted in all stands 95 years and older showed that none of these areas are actually old enough to be considered old growth. In accordance with the Plan, older forest conditions will develop in numerous areas throughout MA-2, but no allocations for old growth are to be provided (p. 103). Vegetation management activities, such as commercial thinning and prescribed fire, maintain characteristics consistent with old growth (The Plan, Appendix I).

Cumulative Effects

Several vegetation management activities have taken place in the Big Woods and the Boswell Creek project area. About 340 acres immature and mature pine forest communities have been thinned, with over 2,000 additional acres under contract to be thinned between now and 2005. Approximately 90 acres of young pine forest communities have been pre-commercially thinned. Wildlife habitat improvements, including 464 acres of midstory reductions and 15,681 acres of prescribed burning have taken

place in the last several years in the Big Woods.

Within the nine compartments in the Boswell Creek project area, about half of the pine forest communities are less than 20 years old, following the SPB epidemic of the mid-1980s. After the pine timber was salvaged, mechanical site preparation and planting re-established most of these areas as they were before the SPB epidemic: pine-dominated. Approximately 20-30 percent of the SPB-killed forest communities, mostly riparian areas, once dominated by pine, were allowed to regenerate naturally. Hardwoods now dominate these areas, as shown in aerial photographs from 1970, 1980, and 1995.

Roughly 25 percent of the Big Woods area, including the Boswell Creek area, consists of pine-dominated stands that are less than 20 years old. The majority of these young forest communities were re-established after SPB had killed mature pines. About 2,000 acres of these areas affected by the SPB epidemic are not included in the Boswell Creek Healthy Forest Project, but are directly adjacent to the project area.

As a result of the SPB epidemic and the actions that followed, the Big Woods area, including the Boswell Creek area, contains a mosaic of young and old forest communities. Vegetation management activities such as thinning, prescribed burning, and midstory reduction, help to keep the forest communities healthy and growing towards the older conditions preferred by RCW.

Another activity taking place in this area is oil and gas development. Six oil and/or gas wells are currently in use. Three additional wells are proposed in the Big Woods area. This development could affect vegetation by not only clearing of one to three acres for the well itself, but also in the development of pipelines to transport the oil or gas. At this time, it is unknown whether additional pipelines will be developed in this area.

Prescribed burning and thinning proposed in the Boswell Creek Healthy Forest Initiative Project would result in the development of open forest conditions in the uplands, as overstory density (thinning) and the woody understory vegetation (prescribed burning) are reduced. No fragmentation or change in the distribution of acres in various age classes will occur in the implementation of these actions.

The actions proposed in the Boswell Creek Healthy Forest Initiative Project are similar to those that have taken place in the last several years in and around the watershed. The end result is an open forest that provides quality habitat for the red-cockaded woodpecker and moves the Sam Houston NF towards the desired future condition for MA-2. Cumulatively, MA-4 would not be affected.

Effects of Implementation-No Action

No activities would be implemented under the No Action Alternative.

Direct and Indirect Effects

Upland Forests (MA-2)

Species composition - This alternative will allow vegetation to continue to grow. Species composition will change due to natural occurrences such as insect and disease outbreaks, wildfires, floods, tornadoes, and hurricanes. Tree mortality would increase as older stands mature and become predisposed to insects and disease. The incidence of diseases such as red-heart, butt-rot, root-rot and others would rise.

Increasing rates of tree mortality can be expected as loblolly pine stands exceed 80 years of age. Southern pine beetle hazard and the potential for loss of large areas to SPB infestation would remain high for much of the

forest communities in the Boswell Creek Project. If SPB did infest this area, species composition would shift to more tolerant hardwood species as pine trees die. Hardwoods are already present in all layers of the forest. These hardwoods have a competitive advantage over pine regeneration because their root systems are already well established.

The young pine forest communities in the Boswell Creek Project would also decline under this alternative. These younger stands are more disposed towards insect infestation than disease. Growth would slow, which increases susceptibility to SPB. Mortality would increase, as would SPB hazard.

Lack of prescribed burning will affect the midstory and understory vegetation. As time passes and fire is kept out of the project area, the fire intolerant species, such as magnolia, sweetgum, elm, holly, mulberry, and cherry will increase in diameter and height; the fire dependent species, like shortleaf pine, will decrease in quantity and may cease to exist. This has already happened in the west Gulf Coastal Plain. Fire suppression and land clearing have greatly reduced the distribution of shortleaf pine (Williams, 1997).

Structure – Structure of the forest communities in the area will change more slowly over time than species composition. The potential does exist for some midstory and understory hardwoods to grow into the overstory, especially if SPB or other natural disturbances eliminate portions of the canopy.

Snags and coarse woody debris would increase in most areas, as the forest continues to age.

Riparian Forests (MA-4)
The No Action Alternative will have little effect on species composition and structure of riparian areas.

ECS
This alternative would allow vegetation to continue to grow. Natural succession and occurrences would slowly alter the species composition of the forest.

SPB could kill pine trees in both mature and younger stands, and hardwoods could quickly dominate. Lack of fire will help to increase fire intolerant species and fire dependent species such as shortleaf pine could cease to exist. Long-term changes, such as species extirpation would not be considered consistent with ECS.

Old Growth
Older forest conditions will develop in numerous areas throughout MA-2, but no allocations for old growth are to be provided (the Plan, p. 103).

Cumulative Effects
Lack of thinning and prescribed fire in the Boswell Creek Project would result in a stagnated, declining, over-mature forest, likely to be destroyed by insects and disease. The understory would continue to grow, and would become impenetrable, particularly where the overstory has ceased to exist. The No Action Alternative will have no cumulative effects on vegetation in MA-4.

Young forest communities would continue to grow also, and mortality would continue to increase. Insects and disease would likely destroy these stands.

Conclusions
The proposed management activities, including prescribed burning about 8,650 acres every 2-5 years and thinning approximately 1,440 acres of older pine-dominated stands and 3,360 acres of young pine stands in compartments 69, 70, 72, 73, 74, 75, 76, 77, and 83, would help to reduce risk from destructive fires and reduce the risk of SPB infestations.

Effects to vegetation would consist mainly of altering the structure in the understory. Species composition and structure of the overstory would not change. The proposed actions would help to improve the health of the forest communities and move the forest toward the desired future conditions described for MA-2.

The proposed actions or the No Action Alternative will have no cumulative effects on vegetation in MA-4.

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