Analysis of Other Alternatives

Introduction

The Forest Service received several responses to the May 9, 2003 scoping letter inviting comments on the proposed actions for the Boswell Creek Watershed HFI Project. Two of these responses contained suggestions for the development of alternatives to the Proposed Action. The following discussion documents the ID Team's review of the potential alternatives. The first section describes the potential alternative actions as proposed by the respondent. The second section discusses the actions in the context of the Purpose and Need for the project, the Plan's Desired Future Conditions (DFCs), and the Plan's Management Area direction.

Potential Alternative Actions

A. Sierra Club Alternative Actions

1. The Houston Sierra Club's response to scoping states that "(t)here are 'reasonable alternatives' to the proposed action. For instance, the FS, Texas Forest Service, and others could provide educational, technical, and grant assistance to adjacent private property owners and in-holders in the BCW to treat their property and structures so that they are fire-proofed."

2. The Sierra Club also suggests an alternative that manages for a denser forest canopy. The rational for this alternative is that the denser canopy "shades the ground and forest fuels from elevated temperatures due to sunlight." The dense canopy would, in the Sierra Club's view, increase moisture to fuels through transpiration and would reduce wind movement, resulting in fire hazard reduction.

3. The Sierra Club states that the "thin logging proposal opens up the canopy so that additional fine fuels will grow which causes more evaporation of moisture and reduces relative humidity. The thin logging reduces shade so temperatures are higher and vegetation and fuels are drier. The thin logging also allows more wind movement through the forest."

4. Another alternative suggested by the Sierra Club is one that increases the percentages of hardwoods in both the young and mature pine stands that dominate the Boswell Creek Watershed. The Sierra Club states that "(h)ardwoods provide more shading and cooling due to a denser crown. Hardwoods transpire more water making relative humidity and overall moisture content greater in the forest. Hardwood leaves and twigs do not burn as readily as pine needles and twigs thus lowering fire hazard on the forest floor. Hardwoods reduce SPB hazard by acting as visual and scent barriers to SPB prey search images."

5. The Sierra Club states that there is "no alternative that protects older and larger trees in the scoping letter. Large trees are more fire resistant and provide more shade and thus reduce fire risk. This type of fire hazard reduction is a reasonable alternative by itself or in combination with other fire reduction strategies."

6. Finally, the Sierra Club states that what is needed is "an alternative that addresses restoration of the original Loblolly Pine, Shortleaf Pine, and Mixed Hardwood

Ecosystems. The HSC has proposed a set of principles for restoration of SHNF. The principles could be developed into an alternative to help restore the BCW to its former biological diversity and health." The Sierra Club's principles are attached as Appendix A of this report.

B. Other Alternative Actions

In addition to the Sierra Club "alternatives", Larry Shelton suggested that the Forest Service consider an alternative that relied upon uneven-age management in the existing loblolly pine plantations. Mr. Shelton described it as follows:

7. By reducing the overall homogeneity of loblolly and promoting an appropriate level of mast producing hardwoods a more resilient forest will result with respect to fuels and SPB. This could be accomplished through uneven aged management using group selection. At the very least the FS should consider variable spacing rather than the uniform spacing routinely practiced on all NF timber sales.

Analysis of Potential Alternatives in Relation to Purpose and Need, Plan DFCs, and Management Area Direction

Purpose and Need –

The project actions were designed to meet two specific needs in the Boswell Creek Watershed:

1) **To reduce fuel accumulations and the resulting fire behavior** to protect potential habitat for the endangered red-cockaded woodpecker (RCW) and reduce the potential for wildfire spreading to adjacent private lands.
2) **To reduce the southern pine beetle hazard in pine-dominated stands** to protect potential RCW habitat and reduce the potential for SPB infestations spreading to adjacent private land.

Plan DFCs and Management Area Direction –

The project lies within two Management Areas (MAs) established by the Plan – MA-2, Red-Cockaded Woodpecker Emphasis and MA-4, Streamside Management Zones. About 95 percent of the forest land in the Boswell Creek Watershed lies within MA-2. The focus of MA-2 is to produce habitat for the endangered red-cockaded woodpecker (RCW). The Plan describes the desired conditions in MA-2 as open, pine forests mixed with some hardwood species.

Management Area 4, comprising about 5 percent of the NF land in the watershed, located adjacent to intermittent and perennial streams, is managed to maintain the role and function of aquatic, riparian, and wetland ecosystems. The types of forest communities desired in MA-4 are generally mixed hardwoods and pines.

Potential Alternatives Raised in Scoping

A. Sierra Club Alternative Actions

1. Provide educational, technical, and grant assistance to adjacent private property owners and in-holders in the BCW to treat their property and structures so that they are fire-proofed.

Response – In addition to protecting national forest resources including potential RCW habitat, the protection of adjacent private ownership is one need identified for the proposal. Creating another alternative in this proposal that includes specific actions to achieve protection of private property would duplicate existing programs and, by itself, does little to meet the desired conditions and Forest Plan objectives. Educational and technical assistance is already available to adjacent property owners through the Firewise program implemented in The National Fire Plan as well as through programs coordinated by the Texas Forest Service. Design criteria will, however, be included in the proposed action to re-emphasize the Forest Service commitment to work with the local agencies to distribute and promote these programs.

2. Manage for a denser forest canopy to increase fuel moisture and reduce wind movement, resulting in fire hazard reduction, and

3. Do not thin stands because it will increase fire hazard due to increased temperatures, lower humidity, and more wind movement in the thinned areas.

Response – An alternative that includes these actions would not address the one of the immediate needs for action, to reduce fuels and resulting fire behavior. The hypothesis that denser forest canopies would reduce fire hazard is not supported by current research on the effects of fuels treatment on fire behavior. Omi and Martinson investigated the severity of four recent wildfires that burned into existing fuel treatment areas. They included one example from the Southern U.S., a slash pine forest in Mississippi. Their results are applicable to the pine-dominated forests of east Texas. Their report concluded:

> *"Theoretically, fuel treatments have the potential to exacerbate fire behavior. Crown fuel reduction exposes surface fuels to increased solar radiation, which would be expected to lower fuel moisture content and promote production of fine herbaceous fuels. Surface fuels may also be exposed to intensified wind fields, accelerating both desiccation and heat transfer. Treatments that include prescribed burning will increase nutrient availability and further stimulate production of fuels with high surface-area-to-volume ratios. All these factors facilitate the combustion process, increase rates of heat release, and intensify surface fire behavior. Fuel treatments may therefore seem nonsensical and ill-advised to some, especially when objectives include conversion of a fuel model 7, 8, or 9 to fuel model 2 (Anderson 1982): a condition predicted to be more hazardous by fire behavior models that ignore crown fire potential. But crown fire potential cannot be ignored. While surface fire intensity is a critical factor in crown fire initiation, height to crown: the vertical continuity between fuel strata, is equally important. Further, crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels. Thus, treatments that reduce canopy fuels increase and decrease fire hazard simultaneously. With little empirical evidence and an infant crown fire theory, fuel treatment practitioners have gambled that a reduction in crown fuels outweighs any increase in surface fire hazard. Our research demonstrates that their bets have been well placed." (Omi and Martinson 2002, p.22)*

The actions identified in Sierra Club 2 and 3 would not meet the desired conditions and Forest Plan MA goals for MA 2. In fact, they appear to be similar to MA 4 goals applied to the entire Boswell Creek watershed area, consideration of which is beyond the scope of this proposal. This amounts to an alternative purpose and need, as opposed to an alternative to the proposal.

Actions 2, 3 and 4 below also interrelate to affect the structure and composition of the forest in ways inconsistent with the Purpose and Need for Action and the *Plan's* desired conditions. Denser forest canopies created by increasing the hardwood percentages and not thinning would

result in SPB mortality, creating an open dead canopy with extremely high dead fuel load, increasing fuel hazards.

4. Increase the percentages of hardwoods in both the young and mature pine stands to provide more shading and cooling, increase the amount of fire-resistant fuel, and reduce SPB hazard.

As discussed previously, increasing the amount of hardwood composition in pine-dominated stands does not affect the existing fuel loading or fire behavior that would result. Alternatives that promote increases in hardwoods without decreasing the existing fuels would not meet the purpose and need for action.

Increasing hardwood composition in pine-dominated stands will not decrease SPB hazard. Total basal area is a factor often used In SPB hazard-rating systems developed for loblolly or shortleaf pine types (Lorio 1980), and high stand density is directly related to increased incidence of new infestations (Lorio 1968, Coulson et al. 1974). In addition, once infestations are initiated, total basal area is positively correlated with spot expansion and trees killed per day (Hedden and Billings 1979). Increasing hardwood composition without a concurrent reduction in pine basal area reduction would increase SPB hazard.

In addition, increasing hardwood percentages on upland sites in Management Area 2 would result in the development of forests inconsistent with the Desired Future Conditions described in the Plan.

5. Protect older and larger trees. Large trees are more fire resistant and provide more shade and thus reduce fire risk.

The scoping letter for the proposal did not include specific marking guidelines for the areas to be thinned. The Purpose and Need and desired conditions for MA-2 and MA-4 would promote and maintain larger trees. We agree that, generally speaking, older and larger trees should be low priority for removal because they are more resistant to fire and usually provide habitat components desirable for the endangered red-cockaded woodpecker. Some larger trees may need to be removed to provide for spacing requirements to reduce SPB hazard. Incorporating measures to protect older and larger trees does not, however, require the preparation of additional alternatives. Project design criteria will be incorporated in the EA to provide for protection of older and larger trees in thinning areas. Conversely, it is unclear how the other "hardwood" alternative components identified in #4 above would accomplish this – i.e. the actions to increase hardwoods appears to promote younger smaller hardwoods at the expense of the larger trees.

6. An alternative that addresses restoration of the original Loblolly Pine, Shortleaf Pine, and Mixed Hardwood Ecosystems using the HSC principles for restoration of SHNF. The principles could be developed into an alternative to help restore the BCW to its former biological diversity and health.

Response – The HSC lists thirteen principles for restoring the SHNF (see Appendix A). Several key components of these principles include:

- Manage for only native plants and animals; remove exotic species gradually.
- Allow natural regeneration to dominate reforestation, and where planting is necessary, do not plant monocultures. Use only native seed gathered from the area when artificial regeneration is necessary.
- Leave streamside zones alone.

- Protect habitat structural components such as cavity trees, snags, downed trees, and small ponds.
- Obliterate linear openings (e.g.- roads, trails, firelines, utility rights-of-way) to prevent disturbance to restoration areas and limit introduction of exotic species.
- Allow natural disturbances (described as including windstorms, ice storms, floods, lightning strikes, natural fire, tornadoes, hurricanes, insect attacks, and disease attacks), to shape the forest. Do not salvage.
- Reintroduce fire as it would have been experienced on the landscape prior to the arrival of Anglo-Saxon settlers. Do not use fire until research has been conducted on the natural fire regime, frequency, seasonality, rate, evenness, start locations, duration, and intensity.

The principles enumerated by the Sierra Club appear to provide primarily for natural events to shape the composition and structure of the forest. Their principles describe fires and insect attack as natural disturbance processes that should be allowed to determine the management and ultimate composition of the forest. Based on the past history of the forest, fires and southern pine beetle infestations, given enough time, will occur. Regeneration of the forest was not identified as a need for action, so the principles related to reforestation do not apply to this proposal. Therefore, the no action alternative is consistent with the HSC principles.

The only action that could be undertaken under the HSC principles would be prescribed fire, but only if it is conducted in some manner that is “natural”. The determination of what is “natural” and the mimicking of “natural” fire is problematic in the South. Research on historical fire occurrence and characteristics is hampered by the lack of suitable sites from which to gather data. Unlike western forests that, in many places, contain evidence of centuries of fire occurrence, the forests in the South have changed considerably due to past land uses and other human influences. Frost (1992) has postulated that fire was once widespread and frequent across most of the southern United States, including east Texas. Fire occurred at the landscape scale, often covering many thousands of acres due to the lack of barriers to its spread. Even if we could, with certainty, fully describe the “natural” fire regimes in east Texas, it is very unlikely that prescribed fire could be implemented completely consistently with those historic regimes. Fuels have changed due to fire suppression and humans are much more prevalent on the landscape. “Natural” fire regimes have little meaning or application to modern landscapes that bear no resemblance to what was “natural” centuries ago.

The overriding factor to consider is the development of the forest as described in the Plan. The Plan’s direction for the application of prescribed fire was designed to move the structure and composition of the forest nearer the DFCs.

In accordance with The Plan (p. 54, 104), the Roads Analysis Report for the Boswell Creek Watershed (p. 22-23) recommends the following design criteria for linear openings, or roads:

1) 9.24 miles of low standard or temporary roads will be closed after use
2) 14.4 miles of unclassified roads will be closed.

B. Other Alternative Actions

7. Use group selection (uneven-age management) in loblolly pine plantations to reduce pine basal area and promote the development of mast-producing hardwoods.

Group selection is an uneven-age management method of regeneration. The scoping letter does not identify regeneration as one of the needs for action in the Boswell Creek watershed. Extensive regeneration was done in the late 1980s as the result of large southern pine beetle infestations. Regeneration is outside the scope of the proposal.

The proponent of this alternative action also promotes group selection to shift the vegetation in the young loblolly pine stands toward a more mixed pine-hardwood composition. This is based on his interpretation of the application of the Ecological Classification System – that the vegetation that exists in these pine plantations is inconsistent with the ECS and must be changed. Our interpretation of the ECS is that it provides for a wide variety of vegetation conditions on these sites, including loblolly pine-dominated stands. The use of group selection as proposed would result in vegetation inconsistent with the Plan's desired future conditions for these upland pine forests.

References

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