# Appendix I. Assessment of Issues (Step 4)

This section addresses issues associated with the management of forest roads serving the Sam Houston NF. To complete the assessment, the IDT addressed the 71 questions from Appendix 1 of FS-643 report "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System"(USDA 1999) as well as 11 other questions. The questions from FS-643 focus on the ecological, social, and economic concerns associated with roads. The other questions focus on other concerns raised during the analysis of the Sam Houston NF forest roads system.

FS-643 describes the questions as,

> "…example questions that might be used for roads analysis for both existing and proposed road system. Not all of these questions will be relevant in all places, but these types of questions are expected to be relevant in many of the analysis areas. Some of the questions will be best addressed at the local scale; others will be more appropriate at a regional or multiforest scale. In addition, some of the questions require consideration at several regional, forest, and individual road scales. The questions and associated information are not intended to be prescriptive, but to assist analysis teams in developing questions and approaches appropriate to each analysis area."

Some of the questions are not relevant to the Sam Houston NF and are not addressed in this report. Some of the relevant questions can be adequately addressed in this forest-scale analysis and do not need to be addressed further during smaller-scale project analyses. However, some questions need to be addressed during project-scale analyses when the issues arise. The questions that should be addressed during project-scale analyses when the issues arise are listed in the Step 5. *Recommendations, Opportunities, and Priorities* section of this report.

The following questions are divided into the these categories: Ecosystem Functions and Processes; Aquatic, Riparian Zone, and Water Quality; Terrestrial Wildlife; Economics; Timber Management; Minerals Management; Range Management; Water Production; Special Forest Products; Special Use Permits; General Public Transportation; Administrative Use; Protection; Unroaded Recreation; Roaded Recreation; Passive-Use Value; Social Issues; Civil Rights and Environmental Justice; and Other Questions.

## 4.1 FS-643 Roads Analysis Questions

### 4.1.1 Ecosystem Functions and Processes (EF)

#### EF (1): What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?

There are four Inventoried Roadless Areas on the Sam Houston NF other than the Little Lake Creek Wilderness (LLCW). The LLCW is a congressionally designated wilderness area. The four roadless areas were designated as Inventoried Roadless Areas under the Roadless Area Conservation Rule. No forest roads will be constructed in the designated wilderness area; however, road construction and reconstruction is allowed in the four roadless areas. These "roadless" areas actually contain roads.

Few new roads will need to be constructed on the Sam Houston NF. Most of the major public roads on the Sam Houston NF originated over 70 years ago, before federal acquisition of the land. All arterial and collector roads are already in place. Most of these arterial and collector roads are under State or County jurisdiction and are open to public motorized traffic at all times.

Future Forest Service road development activities will probably be associated with short local or spur roads.

When the roading of Inventoried Roadless Areas is proposed, this issue will be further addressed during project-scale analysis.

### EF (2): To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?

Invasive species tend to enter natural communities along roads and trails. Roads provide recreation opportunities for the public, increasing the probability that out-of-region visitors may import pests into the forest. For example, gypsy moth (*Lymantria dispar*) egg masses deposited on cars or campers in the northeast U.S. could be transported to campsites or other visitor areas in the south. Exotic pest introductions can have significant impacts if not detected early.

In general terms, the greater the amount of traffic on a road, the greater potential for invasive plants to become established. The many State and County public roads that serve national forest and intermingled private lands are heavily traveled in comparison to the limited amount of traffic on Forest Service roads. Therefore, Forest Service roads should have minimal effects on the introduction and spread of exotic plant and animal species, insects, diseases, and parasites. Monitoring for exotic pests on national forest lands in areas of high visitor traffic would reduce their chance of establishment.

Non-native pests found on the Sam Houston NF are:

> **Red imported fire ant (*Solenopsis invicta*).** This species is well established in this area. The roadways provide avenues for dispersal of the ants. However, fire ants are generally limited to open areas adjacent to the roads and are less likely to colonize woodlands beneath closed canopies.

Invasive exotic plant species can create serious resource management problems throughout the Southern Region. The Southern Region began implementing a Regional Noxious Weed Strategy in June 1999. An important part of this strategy is the development of a regional list of invasive exotic plant species. The following plants are exotic plant species that are known to be invasive and persistent in the east Texas area. These plants can spread into and persist in native plant communities and displace the native plant species, and pose a demonstrable threat to the integrity of the native plant communities.

> **Tall fescue (Festuca arundinacea).** This is the most common roadside planting in the area. It has allelopathic properties and forms dense monocultures. The habitat it provides is unsuitable for most native wildlife. It tends to invade open areas, but does not do well in shaded conditions.
>
> **Chinese Tallow-tree (*Sapium sebiferum*).** This is a rapidly growing tree that can become quickly established in roadside ditches and fencelines as a result of seed dispersal by birds or water. Once established, this species can be costly and time consuming to control. This species is often found in streamside riparian areas near bridges.
>
> **Silktree, Mimosa (*Albizia julibrissin*).** This is a small tree that rapidly spreads through animal and water dispersal. This species colonizes from root sprouts, forming dense thickets if left uncontrolled.

**Sericea Lespedeza (Lezpedeza cuneata).** This species is a perennial legume that has been regularly planted along roadsides to control soil erosion and provide seed and forage for wildlife. The value to wildlife is considered minimal. Although effective in erosion control, this plant is very aggressive and will outcompete all other forms of native grasses.

**Chinese privet (*Ligustrum sinese*)** and **Japanese privet (*Ligustrum japonicam*).** Both these species are prolific seed producers easily establishing themselves along roadside openings. Their rapid growth allows them to form dense monoculture thickets thus quickly displacing all other native plant species.

**Kudzu (*Pueraria Montana* var *lobata*).** This woody vine made its first appearance in this country as an excellent forage and erosion control species. However, once established it will form dense roadside patches and restrict all other native plant species. If left uncontrolled, it can spread into the surrounding forest promoting plant mortality by blocking sunlight.

**Cogongrass (*Imperata cylindrica).*** This is an exotic grass whose range is rapidly expanding in Texas. The plant prefers sandy soils, but can readily establish itself in graded areas along roadsides. It grows in thick clumps, is very aggressive, and will out compete other natural plants. Early detection with treatment is essential in controlling this invasive species.

**Japanese Climbing fern (*Lygodium Japonicum*).** This fern is an invasive species which is considered a Category 1 weed on the May, 2001 Regional Invasive Plant Species list. The fern is found alongside roads on the Sam Houston NF, but is not presently a problem. It was mainly found along an old, unused Forest Service road in Compartment 75.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### EF (3): How does the road system affect ecological disturbance regimes in the area? To what degree does the presence, type, and location of roads contribute to the control of insects, disease, and parasites?

Early detection and suppression are important to reduce impacts of forest pests. The primary insect pest on the forest is the southern pine beetle (*Dendroctonus frontalis)*. A well-developed road system permits personnel to quickly access, monitor, and take action on expanding southern pine beetle spots. Roads facilitate the implementation of cut-and-remove, the most effective treatment for southern pine beetle spots. Roads also provide access for silvicultural treatments designed to reduce forest health problems, such as thinnings and species conversion.

The existing forest roads system was developed to facilitate timber harvest and provide access into management areas identified for potential timber harvest. While some Forest Service roads are closed to public use, the road prisms are still in place and the roads could be opened to facilitate additional management for control of insects and disease.

### EF (4): How does the road system affect ecological disturbance regimes in the area?

Fire is the primary ecological disturbance regime affected by the forest roads system. The forest has a low to moderate frequency of low intensity fire regime. The public forest roads and old woods roads allow easy access to national forest lands. The intermingled private and public land ownership and the associated forest roads system allows accidental and arson fires to occur almost anywhere when conditions are conducive to fire. The forest roads system also creates firebreaks and provides access to control wildfires in most of the forest outside of the wilderness.

Regardless of how roads are managed, wildfires will usually be suppressed because of their potential to damage valuable forest resources, such as wildlife habitat, and interspersed public-private resources, facilities, and structures.

### EF (5): What are the adverse effects of noise caused by developing, using, and maintaining roads?

Few new roads need to be developed. Most of the major public roads on the Sam Houston NF originated over 70 years ago, before federal acquisition of the land. All arterial and collector roads are already in place. Most of these are under State or County jurisdiction and are open to public motorized traffic at all times. Future Forest Service road development activities will be associated with short local roads and spur roads.

With the well-developed system of State highways and County roads serving the national forest and intermingled residential areas, private lands, and corporate timberlands, the more limited volume of traffic on Forest Service roads will, in comparison, have less adverse effects of noise.

Roads can also result in an increase in the amount of disturbance. Wildlife species have varying "flight distances" relative to their exposure to road disturbance (Hediger 1964). Animals prefer to stay beyond a distance that provides visual and auditory buffers. Nesting birds, including raptors and endangered red-cockaded woodpeckers, can be susceptible to disturbance that is unusual. However, other factors, such as availability of forage and familiarity to the disturbance can shorten this distance. Where roads have existed for years with constant traffic volumes, each resident species will reach a "comfort" distance from the road.

Disturbance and harassment of animal species may also result from off-road disturbances, including off-road all terrain vehicles (ATVs).

## 4.1.2 Aquatic, Riparian Zone, and Water Quality (AQ)

### AQ (1): How and where does the road system modify the surface and subsurface hydrology of the area?

Road surfaces and drainage ditches modify the surface hydrology by concentrating surface runoff and increasing runoff flows. Road cuts and ditches can modify or intercept subsurface hydrology; however, in east Texas, the flat to gently rolling terrain will not often require road cuts. The amount of modification occurring varies by geology and soils in an area.

Roads increase erosion and pollution to streams (USDA 2000a, USDA 2000b).

### AQ (2): How and where does the road system generate surface erosion?

Surface erosion is dependent on soils, the amount and type of road surfacing, the effectiveness and spacing of drainage structures, and the adequacy of streamside buffer strips.

Depending on the rainfall intensity and the gradient of the road surface and ditches, some amounts of sediment will be carried to streams. However, aggregate surfacing can significantly reduce the surface erosion on roads, especially on grades and on more erosive soils such as sands.

There are about 207 miles of maintenance level 3, 4, and 5 Forest Service roads on the Sam Houston NF. Most, about 75 percent (three-quarters), of those roads are surfaced with aggregate, about 19 percent (one-fifth) are surfaced with native soil material, and about 6 percent is paved.

Many of the forest roads addressed in this analysis are County roads. The counties often pave roads instead of using aggregate to surface roads. The pavement will prevent surface erosion. Generally, County roads have not been designed or maintained to divert surface runoff from flowing directly into streams.

Fine sediments tend to stay in suspension in a stream until encountering slow water, low water levels or a lake. So, fine sediments can be transported long distances and the effects of fine sediment can occur many miles from the point of origin.

The Sam Houston NF lies within the San Jacinto River Basin. The western half of the Sam Houston NF drains into Lake Conroe which is an impoundment of the West Fork San Jacinto River. The eastern half of the Sam Houston NF drains into the East Fork San Jacinto River.

At the forest scale, it is not feasible to estimate the surface erosion effects from roads. Where identified as an issue, this issue will be better addressed during project scale analysis.

### AQ (3): How and where does the road system affect mass wasting?

Mass wasting is not a significant concern on the Sam Houston NF. However, minor sloughing occasionally occurs on cut-slopes that are made in soils with a Lithologic Discontinuity (having different parent material). The geology and soils are relatively stable.

The Sam Houston NF lies within the Gulf Coastal Plains Physiographic Province. The topography is generally flat to gently rolling. The soils are derived from unconsolidated sandy and clayey sediments deposited when east Texas was covered by shallow seas.

Since,

- most of the forest roads addressed in this analysis are constructed, and
- the topography is generally flat to gently rolling,

there will not be significant mass wasting occurring during road construction in the future.

### AQ (4): How and where do road-stream crossings influence local stream channels and water quality?

Roads that cross streams can affect water quality and stream structure. The impact roads have on water quality and stream structure depends on numerous factors such as the type of stream crossing structure, the installation of the stream crossing structure, road composition and surfacing, road design and drainage, and road condition. Each stream crossing is a potential site for altering stream structure and introducing sediment and other contaminants.

Road crossing structures can change the stream channel and funnel streams through restrictive structures that increase water velocity and turbulence. This can cause stream banks to slough and down-cut, widening and deepening the streamcourse.

Culverts can change the velocity of the stream to the extent that water turbulence off the end of the culvert can create a cavity and eventually lower the stream bed. Such a culvert-created cavity can prevent fish passage back through the culvert.

Water quality can be affected by sediment from rain runoff and sloughing stream banks.

Where identified as an issue, this issue will be further addressed during project-scale analysis. The road stream crossings will be inventoried during more site-specific or project-scale analysis to identify sedimentation or fish passage problems.

### AQ (5): How and where does the road system create potential for pollutants, such as chemical spills, oils, deicing salts, or herbicides, to enter surface waters?

The potential for chemical contamination of surface water increases with road density and use. Chemical contaminants related to roads include herbicides, fertilizers, and a wide range of other chemicals transported on and use on forest roads. State and County roads are treated with a wide range of herbicides to control the growth of roadside vegetation; however, the use of herbicides is more restricted on Forest Service roads.

Other potential sources of chemical contaminants include:

- The aggregate surfacing on roads can contain chemical contaminants which can be released as the aggregate wears and is ground to dust.
- The use of creosote products in wooden bridge structures has been shown to be a source of contaminants for aquatic organisms.
- The illegal dumping of household and industrial chemicals at bridges including batteries, solvents, waste oil and caustic soda.
- The illegal dumping of excess saltwater from oil well production facilities on roads, road ditches, and at bridges. Such excess saltwater is usually disposed of thru injection wells drilled into subsurface saltwater aquifers.
- Old roads which contain reclaimed motor oil that was used in the past as a dust abatement treatment. Forest Service roads were not treated with reclaimed motor oil.

Chemicals spills resulting from accidents are a potential contamination source. Most of the arterial and major collector roads are in good condition. This should reduce the risks of chemical spills from over-the-road transports. However, some minor collector roads receive minimal maintenance or have been reconstructed using methods that allow contaminants to seep into the ground.

The forest has a Hazardous Spill Plan in the event an accident occurs that threatens national forest lands and waters.

### AQ (6): How and where is the road system "hydrologically-connected" to the stream system? How do the connections affect water quality and quantity?

The road system is "hydrologically-connected" to stream systems where roads cross streams and where roads enter the streamside riparian area. Stream crossings are primarily where roads and streams interact (USDA 2000a). Roads that cross streams can affect water quality and stream structure. Each stream crossing is a potential site for altering stream structure and introducing sediment and other contaminants.

Roads affect water quantity by concentrating rain runoff in cleared road corridors and ditches rather than dispersing rain runoff in sheet form over vegetated terrain. This allows runoff velocities to exceed the buffering capacity of the ground vegetation. Rills and gullies can form and stream banks can slough and down-cut. Road crossing structures can redirect and funnel streams through restrictive structures that increase water velocity and turbulence. This can also cause stream banks to slough and down-cut, widening and deepening the streamcourse.

Incised roads can expose soil layers, releasing sub-surface water into road ditches and causing more water to flow into streams, changing hydrologic regimes.

Water quality can be affected by sediment carried by rain runoff and from sloughing stream banks. The sediment from roads can cause the following biological effects:

- Sediment lowers the permeability of gravel beds, degrading habitat for spawning fish (Binkley and Brown 1993). However, gravel and gravel beds do not often occur in streams in east Texas.
- Increases in stream sediment reduce percolation and aeration in stream substrates, smothering fish eggs and fry and restricting fish emergence from nests. (Cordone and Kelly 1961, Sheldon and Pollock 1966, Hassler 1970).
- Sediment reduces the number and depth of pools, creating reaches with a uniform stream bottom contour. Such changes alter stream flow patterns and reduce pool:riffle ratios to the detriment of aquatic ecosystems. (Filipek 1986)
- Reductions in benthic macroinvertebrate density (Tebo 1955: Cordone and Kelly 1961; Leudtke et al. 1976) and shifts in species composition (White and Brynildson 1967 and Chutter 1969) were observed in situations where sedimentation increased. Many fish are dependent on these invertebrates for food.
- Sediment alters aquatic environments, chiefly by screening out solar radiation, by blanketing the stream bottom, and by retaining organic material and other substances which create unfavorable conditions at the bottom. Sediment acts as an opaque screen to all wavelengths of visible light and alters the rate of temperature change. (Ellis 1936).
- Layers of fine sediment from .25-1.00 inch thick, produced a very high mortality among freshwater mussels living in gravel and sand beds. (Ellis 1936).
- The Environmental Protection Agency (EPA) noted that 20 mg/m3 suspended solids caused behavioral anomalies and 200 mg/m3 caused death in fish (Little and Mayer 1993).
- Sediment can cause clogging and abrasion of respiratory surfaces, hinder foraging and spawning, induce hypoxia, smother benthic organisms, interfere with feeding and growth of filter feeders, and reduce resistance to disease (McDaniel 1993).

Although rare in our area, some streams have shown high pH values, possibly from runoff containing residue from limestone road aggregate.

The *Plan* FW-053 Standard says "to provide surface water drainage away from streams and into vegetated buffer strips or other filtering system." If this standard is applied as roads are constructed and reconstructed, the road system would become less "hydrologically-connected" to the stream system. To ensure our road contractors are aware of the specific road plans and specifications designed to implement this standard, the road plans and specifications should be reviewed during pre-work conferences with contractors.

We have developed standard road construction designs and specifications to drain rain runoff into filter strips or retention basins instead of directly into streams to reduce stream sedimentation. We can also,

- install oversized culverts below the existing stream bed to preserve the natural stream bed structure and slope, and
- use silt fencing or comparable barriers to reduce the sedimentation of streams during road construction.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### AQ (7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

The national forest lands serve hydrologically as a sponge that receives and stores water. Some water percolates down to underground aquifers and some is released into the streams and rivers. The Sam Houston NF lies within the San Jacinto River Basin. The western half of the Sam Houston NF drains into Lake Conroe which is an impoundment of the West Fork San Jacinto River. The eastern half of the Sam Houston NF drains into the East Fork San Jacinto River. Most stream courses crossing national forest and intermingled private or corporate lands flow into a tributary of the East Fork San Jacinto River. The quality of the water is of increasing importance to downstream municipal and industrial use.

We assume the demand for water from communities adjacent to the Sam Houston NF will increase as the population increases. However, with increasing water shortages during drought, the demand for water should also increase from urban areas downstream, such as Houston.

The pollutants originating from roads can impact water quality and aquatic organisms, and in turn affect fisheries and water users. However, about three-fourths (71 percent) of the forest roads addressed in this analysis are State and County roads serving the national forest lands as well as intermingled private lands and corporate timberlands. The FS does not monitor the effects of State and County roads on water quality or aquatic organisms.

### AQ (8): How and where does the road system affect wetlands (and riparian areas)?

Wetlands are those areas that are flooded for periods during the growing season, have hydric soils, and have vegetation dependent on wet ground conditions. The vegetation can be quite variable depending on frequency and duration of flooding.

Roads can affect wetlands and riparian areas by direct encroachment, by modifying the hydrology and by the introduction of sediment. Roads can modify both surface and sub-surface drainage in wetlands and riparian areas, causing changes in soil moisture regimes. Where roads cross or are located near wetlands, the effect on the form, process, and function of wetlands is dependent on the degree which the local hydrology is modified, in terms of flow quantity, timing, routing, and water quality.

The *Plan* FW-214 Standard says “Design roads according to Best Management Practices.” The Texas Best Management Practices says, “As mandated by Amendments to the Clean Water Act, forest roads in jurisdictional wetlands… must be constructed and maintained in accordance with the following Best Management Practices to retain Section 404 exemption status.”

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### AQ (9): How does the road system alter physical channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment?

Roads that cross streams can affect water quality and stream structure. Each stream crossing is a potential site for altering stream structure and introducing sediment and other contaminants.

Stream channels are dynamic. Streams transport and deposit large pieces of woody debris and fine organic matter, providing physical structure and diverse aquatic habitat to the channel. When roads encroach on stream channels, these processes can be modified.

- Wood and sediment can be trapped behind stream crossings, reducing downstream transport and increasing the risk of stream crossing structure failure during rains.
- The stream crossing structures can funnel streams through restrictive structures that increase water velocity and turbulence. This can cause stream banks to slough and down-cut, widening and deepening the streamcourse.
- Culverts can change the velocity of the stream to the extent that water turbulence off the end of the culvert can create a cavity and eventually lower the stream bed. Such a culvert created cavity can prevent fish passage back through the culvert.

Road alignment and road fills can isolate floodplains, constrict stream channels, constrain stream channel migration, and limit riparian and aquatic habitat.

### AQ (10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

Road crossing structures can become barriers to fish movement within drainages (USDA 2000b).

Culverts can change the velocity of the stream to the extent that water turbulence off the end of the culvert can excavate a cavity and lower the stream bed below the culvert. Such a culvert created pool can prevent fish passage back through the culvert. Pools created by culverts can entrap fish during drought or low water, cutting them off from refugia in lower order streams and subjecting them to possible hazards occurring at stream crossings, such as sediment, solar exposure and higher water temperatures, and chemical contaminants such as road aggregate residue or herbicides.

Box culverts can spread low stream flows to the point that the stream flows are no longer navigable by fish.

The *Plan* FW-055 Standard says, "Provide road… design and construction that allows unrestricted fish passage." The installation of oversized culverts below the existing stream bed can reduce risks to fisheries resulting from the construction of stream crossing structures.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### AQ (11): How does the road system affect shading, litter fall, and riparian plant communities?

Where roads cross steams or streamside riparian areas, roads can reduce vegetative cover and expose riparian zones to solar radiation. The reduction in vegetative cover due to roads can alter light regimes increasing water temperatures. Changes in light and temperature within an aquatic environment can alter breeding schedules and food availability; however, the effect of such changes in water temperatures at stream crossings will be brief if water flows on downstream under vegetative cover and water temperatures return to normal. The reduction in vegetative cover can have a significant affect if fish are entrapped in an unshaded culvert pool during drought or low water.

### AQ (12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

The road system is "hydrologically-connected" to streams where roads cross streams and where roads enter the streamside riparian area. Stream crossings are primarily where roads and streams interact (USDA 2000a). Each stream crossing is a potential site for altering stream structure, introducing sediment and other contaminants, and introducing non-native aquatic species.

The Sabine Shiner (Notropis sabinae) has been found in east Texas streams such as Peach Creek on the Sam Houston NF (Compartment 39). The minnow historically inhabited clear rivers with a sand and small gravel substrate. Sabine Shiners need 13 miles of uninterrupted sandy, silt-free habitat per population. A single fish passage problem can render an entire reach of suitable stream habitat unsuitable.

Although the Forest Service manages fisheries habitats on the Sam Houston NF, the Texas Parks and Wildlife Department (TPWD) regulates and manages sport fishing throughout the state.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### AQ (13): How and where does the road system facilitate the introduction of non-native aquatic species?

The illegal stocking of non-native species is of growing concern. Illegal stocking ranges from the simple releasing of a family pet to deliberate releases by individuals seeking to establish new fish populations. The bait bucket releases of aquatic species are the most common method of introducing non-native aquatic species in east Texas. The frequency of bait bucket releases is directly related to fishing frequency; therefore locations with high fishing frequency also have higher incidents of illegal stocking by bait bucket releases. Roads can provide access for illegal stocking (USDA 2000b).

### AQ (14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity or with areas containing threatened, endangered, or sensitive aquatic species or species of interest?

Areas of exceptionally high aquatic diversity or productivity and areas containing threatened, endangered, or sensitive aquatic species or species of interest will be identified during more site-specific project-scale analyses.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

## 4.1.3 Terrestrial Wildlife (TW)

### TW (1): What are the direct effects of the road system on terrestrial species habitat?

Roads can contribute to the mortality of slow-moving animals such as eastern box turtles (*Torrapine carolina*). Other reptiles and amphibians such as frogs and snakes also frequent roads near streams and ponds, especially after a rain. Moving vehicles easily kill these animals.

Vehicle collisions can cause mortality to other animal species including: white-tailed deer (*Odocoileus virginianus*), armadillo (Dasypus armadillo), raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), skunks (*Mephitis mephitis*), and squirrels (*Sciurus carolinensis*) among others. Collisions can also occasionally cause mortality among bird species that are inadvertently hit by rapidly moving vehicles.

Roads are used as a travel corridor by some animal species, especially predators. Some examples include: skunks, opossums, and bobcats (*Lynx rufus*). Roads are easy to travel along and may allow predators increased access to areas. As a result, increased predation may occur.

For some species, roads represent a barrier to dispersal and travel, instead of a travel corridor. Some of the species for which roads may be a barrier are reptiles, amphibians, and ground nesting avian species (females traveling with chicks unable to fly). The road width and type of surfacing determine how much of a barrier a road may be. For example, narrow vegetated dirt roads shaded by the adjacent tree canopy may not be a barrier.

The road width and type of surfacing determine the degree to which a road may fragment habitat. Roads can result in habitat fragmentation for some species of waterfowl, reptiles, amphibians, and neotropical birds. Some animals prefer largely undisturbed forest habitat. A road can divide potentially suitable habitat, making the area unattractive or unsuitable for some animal species, due to a decrease in the amount of contiguous habitat and an increase in the amount of edge or early successional habitat.

Roads can also result in an increase in the amount of disturbance. Nesting birds, including raptors and endangered red-cockaded woodpeckers, can be susceptible to disturbance that is unusual. Disturbance and harassment of animal species may also result from other sources, including off-road all terrain vehicles (ATVs).

The roadsides, with their exposure to direct sunlight, provide potential habitat for some plant species, such as the Slender Gayfeather (*Liatris tenuis*), which cannot survive in many of the infrequently burned or infrequently thinned forest stands because of a lack of sunlight at ground level in those stands.

Analysis of the effects of roads on terrestrial species habitat must consider processes and conditions across scales, so effects will be best determined during project-scale analyses.

### TW (2): How does the road system facilitate human activities that affect habitat?

Most of the major public roads on the Sam Houston NF originated over 70 years ago, before federal acquisition of the land. All arterial and collector roads are already in place. Most of these arterial and collector roads are under State or County jurisdiction and are open to public motorized traffic at all times. Only about one-fourth (29 percent) of the forest roads addressed in this analysis are Forest Service roads; about three-fourths (71 percent) are State and County roads.

The State, County, and Forest Service roads provide access for human activities that affect habitat on national forest lands as well as intermingled private lands and corporate timberlands.

Wildlife species have varying “flight distances” relative to their exposure to road disturbance (Hediger 1964). Animals prefer to stay beyond a distance that provides visual and auditory buffers. However, other factors, such as availability of forage and familiarity to the disturbance can shorten this distance. In urban areas where deer are accustomed to non-threatening human disturbance, deer can be seen in broad daylight calmly moving or grazing alongside busy roads. The reason is the disturbance familiarity.

Where roads have existed for years with constant traffic volumes, each resident species will reach a “comfort” distance from the road. Theoretical avoidance corridors can be determined for each species flight distance and cover. The corridor, for example, would be much narrower for an opossum than for a bobcat. New road construction could cause wider avoidance corridors due to the lack of familiarity with the disturbance. So, a corridor wider than the new road right-of-way can become unusable or degraded habitat due to disturbance. However, as each resident species becomes more familiar with the road disturbance, the avoidance corridor will become narrower.

Studies in heart rate telemetry have established flight distance and stress parameters in many wildlife species, including, reptiles, birds, ungulates and other mammals. Many animals can exhibit stress responses to various stimuli, without moving. The disturbance stimuli can be

auditory and/or visual. Roads with intermittent use, such as gated roads opened for hunting, can cause stress on wildlife due to the sudden increase in disturbance. Peterson (1987) showed that ungulate heart rates elevated 50 percent in response to a passing pickup on a seldom used road.

Wild Turkey numbers are shown to be reduced by vehicular disturbances and by high open road densities, especially during the nesting and brood-rearing seasons.

Section 9 of the Endangered Species Act does not permit the disruption of the "breeding, feeding or sheltering" of federally protected species. The familiarity to the disturbance appears to be the key to preventing such impacts in red-cockaded woodpeckers (RCW). Sudden disturbances, such as chain saws or loud stereos have caused RCW to abandon their nests, while others fledged healthy nestlings adjacent to military bombing ranges, where such activities were routine (Jackson 1983).

Roads also allow greater access for lawful hunting. Many hunters do not travel great distances from a road to hunt; therefore, the survival of game species found in proximity to an open road may be lower.

Traffic on State, County, and Forest Service roads may occasionally inhibit management activities that affect habitat such as preventing prescribed burning due to hazardous conditions created by smoke settling on nearby roads or highways.

### TW (3): How does the road system affect legal and illegal human activities? What are the effects on wildlife species?

Open roads facilitate access for legal hunting and trapping activities, but these legal activities do not adversely affect wildlife species populations. Legal hunting activities can beneficially affect wildlife populations by keeping the populations in check.

Hunters rely on the national forest hunting areas with good road access and good habitat maintenance programs. The entire Sam Houston NF has been designated as a Wildlife Management Area. The amount of hunting on national forest land and the influence hunters have will continue to increase as hunting on private lands becomes more restricted.

Unlawful activities, such as poaching, can be a problem in areas accessible by roads. White-tailed deer and wild turkeys (*Meleagris gallopavo*) are two species that are often observed near roads and are susceptible to poaching. While instances of illegal hunting activities on roads are known to occur primarily during big game hunting seasons, these activities do not often significantly affect wildlife species populations.

The illegal collecting of animals is another example of an unlawful activity facilitated by roads. Eastern box turtles are slow moving and often found on or near roads, which facilitates collection.

### TW (4): How does the road system directly affect unique communities or special features in the area?

Areas with unique wildlife communities or special wildlife features will be identified during more site-specific project-scale analyses.

Where identified as an issue, this issue will be further addressed during project-scale analyses.

### 4.1.4 Economics (EC)

#### EC (1): How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

The Sam Houston NF receives revenues from commercial permits and cooperative maintenance agreements associated with the use of Forest Service roads for private and corporate commercial activities, such as timber harvesting or oil/gas well drilling. The Sam Houston NF also receives road maintenance revenue from the purchasers of national forest timber as well as from road use permittees.

Generally, higher standard roads result in higher bids for national forest timber. For example, well surfaced roads accessing a timber sale area containing soils that can be logged during wet winter weather will usually result in higher bids for the timber.

The transfer of Forest Service roads heavily used by public traffic to the County or State could reduce road maintenance costs.

#### EC (2): How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The purpose of this question is to address economic efficiency from the societal point of view. Economic efficiency goes beyond financial efficiency. Economic efficiency analysis measures the net economic benefit to society in aggregate, including non-market values as well as external costs and benefits, without regard for who gains and who loses. The economic efficiency question asks whether a specific investment produces more aggregate economic value than it costs at the scale in question. Economic efficiency analysis may include consequences that we cannot express in dollars.

Examples of benefits included in economic efficiency analysis include the higher quality and value of water flowing from national forest lands, the value of recreation experiences provided free-of-charge, and passive-use values. Examples of costs include lower quality and value of water flowing from national forest lands, sedimentation of fish habitat, and fragmentation of species habitat resulting from management activities. Economic distribution effects such as employment, income, who benefits, and who pays are not included. They are the focus of distribution analysis as covered under EC (3).

About three-fourths (71 percent) of the forest roads addressed in this analysis are State highways and County roads serving the national forest lands as well as intermingled private lands and corporate timberlands. Since most of the roads addressed in this analysis not under Forest Service jurisdiction, the Forest Service does not have the information to determine how the road system affects the priced and non-priced consequences included in economic efficiency analysis.

Although passive-use value is a component of economic efficiency analysis, we address it after the recreation section below. Passive-use value in roaded areas can be lost with planned road decommissioning.

#### EC (3): How does the road system affect the distribution of benefits and costs among affected people?

When doing economic distribution analyses, we identify the distribution of benefits and costs in society. Distribution analyses can be either financial or economic. Financial distribution analysis includes only direct cash flows. Examples include job and income gains or losses by different sectors of the economy. Economic distribution analysis adds non-market values and external

values and costs. Examples of this type of distribution analyses include who incurs the positive effects on road-related recreation from enhanced scenic beauty or solitude or the negative effects of noise, air or water pollution.

About three-fourths (71 percent) of the forest roads addressed in this analysis are State highways and County roads serving the national forest lands as well as intermingled private lands and corporate timberlands. Since most of the roads addressed in this analysis not under Forest Service jurisdiction, the Forest Service does not have sufficient information to determine how the road system affects the distribution of benefits and costs among affected people.

The public road system managed by the Forest Service benefits rural and urban people of both sexes and of varying ethnic origins, ages, education levels, and incomes.

### 4.1.5 Timber Management (TM)

#### TM (1): How does road spacing and location affect logging system feasibility?

The majority of the lands (*Plan* Management Areas MA-1 and MA-2) on the Sam Houston NF are suitable for timber production. These flat to gently rolling lands are also suitable for ground-based logging equipment such as rubber-tired skidders. Ground-based logging equipment usually needs closer road spacing than cable or helicopter logging equipment.

The arterial and collector forest roads are in place and are composed mostly of State highways and County roads. Many of the County roads serving national forest timber sales have been improved under cooperative road agreements. The majority of the Forest Service roads serving the lands suitable for timber production have been constructed and reconstructed by many timber sales over the years. However, a few local or spur roads may have to be constructed to access small or isolated tracts of national forest lands.

#### TM (2-3): How does the road system affect managing the suitable timber base and other lands? How does the road system affect access to timber stands needing silvicultural treatment?

The current ML-3, 4, and 5 Forest Service roads provide adequate access for managing, monitoring, and providing silvicultural treatment to most of the national forest lands suitable for timber production.

### 4.1.6 Minerals Management (MM)

#### MM (1): How does the road system affect access to locatable, leasable, and salable minerals?

The public road system provides adequate access to federal minerals.

Mineral resources are available for exploration and development on selected areas of the forest. The *Plan* (1996 EIS Appendix C) includes the following description of the oil and gas potential:

> *"The National Forests in Texas… lie in what is known geologically as the East Texas Basin. The US Geological Survey (USGS)… divided the basin into 8 oil and gas plays."*
>
> *"Although the Sam Houston National Forest is not located within any of the eight major plays delineated by the USGS, there is production from private mineral estates within the Forest. These reservoirs are located within the sandstones of the Upper Wilcox Group and the*

*Yegua Formation. The traps are domal anticlines formed by regional growth faults of the Wilcox Fault Zone to the south of the Forest. The play is considered small and poorly known. There are currently four vertically drilled oil wells within the Coldsprings field that average 2.44 acres in pad size with 0.21 miles of access road built for each one. The average total depth for these wells is 12,200 feet.*

*The location of the following fields, Coldspring, Coline, Mercy SW, Morgas, Moroil, and Waverly, in addition to numerous KGS designations, indicates a high potential for development on the forest."*

Oil and gas well activity on the Sam Houston NF has been limited to the reworking of old wells with the occasional drilling of a development well or wildcat well. The lack of drilling on federal leases can be attributed to the fact that, until 1985, most of the minerals were privately owned. Additional mineral rights reverted to the U.S. in 1990. The *Plan* (1996 EIS Appendix C) says there were a total of 35 wells on the forest, mostly marginally economically producing "stripper" wells. Generally, this means that the wells produce less than 15 barrels of oil a day as well as a lot of very salty water with every barrel of oil.

As of September, 2003, there were a total of 67 wells on the forest.

The need for roads to access well sites should be addressed during project-scale analyses.

### 4.1.7 Range Management (RM)

#### RM (1): How does the road system affect access to range allotments?

There are no range allotments or range maintenance activities on the Sam Houston NF.

### 4.1.8 Water Production (WP)

#### WP (1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

This is not an issue on the Sam Houston NF.

#### WP (2): How does road development and use affect water quality in municipals?

Few new roads need to be developed because most of the forest roads system is in place. Future Forest Service road development activities will probably be associated with short local or spur roads to small or isolated tracts.

Road use in areas supplying domestic water may affect the water quality by introducing sediment and other pollutants into the water. The national forest lands border the northern stretches of Lake Conroe, an impoundment constructed on the West Fork of the San Jacinto River by the San Jacinto River Authority.

Analysis of the effects of roads on water quality must consider processes and conditions across scales. Where identified as an issue, this issue will be further addressed during project-scale analyses.

### WP (3): How does the road system affect access to hydroelectric power generation?

This is not an issue on the Sam Houston NF.

## 4.1.9 Special Forest Products (SP)

### SP (1): How does the road system affect access for collecting special forest products?

The collection of special forest products from the Sam Houston NF is a minor recreation activity. Fruits, nuts, and mushrooms are some of the more popular forest products collected on the forest. Pine cones are an often-collected "fruit." Forest products such as blackberries, raspberries, pecans, or other fruit may be collected.

Firewood may be collected in specific areas with a permit.

The Sam Houston NF has a well-developed system of State highways and County roads as well as Forest Service roads that make access to the forest to collect special forest products easy.

Where identified as an issue, the direct affects of the road system on collecting special forest products will be addressed during project-scale analyses.

## 4.1.10 Special Use Permits (SU)

### SU (1): How does the road system affect managing special use permit sites (concessionaires, communication sites, utility corridors, etc)?

There are a variety of roads on the Sam Houston NF under special use permit. It is important to ensure the roads are constructed and maintained to appropriate standards to minimize adverse environmental affects. It is also important to properly decommission a special use road when no longer needed. Proper rehabilitation of these roads will help minimize sedimentation of streams and permit the natural revegetation of the road.

Where identified as an issue, this question will be addressed during the project-scale analyses.

## 4.1.11 General Public Transportation (GT)

### GT (1): How does the road system connect to public roads and provide primary access to communities?

The numerous State highways and County roads on the forest roads system provide the primary access to rural communities. However, because of the intermingled nature of national forest lands, private lands, and corporate timberlands, some Forest Service roads provide access to residential areas and communities in addition to the State highways and County roads.

## GT (2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, in holdings, and so on)?

The national forest lands are scattered and interspersed with private lands and corporate timberlands. The national forest lands comprise only 33 percent of the lands within the proclaimed boundaries of the national forest. The Sam Houston NF is an urban forest located close to the Houston metropolitan area. There are numerous residential areas adjoining the national forest lands.

The road system on the Sam Houston NF is composed of State, County, and Forest Service roads and serves as access for private lands and corporate timberlands as well as national forest lands. Most of the major roads are under State or County jurisdiction and are open to public motorized traffic at all times. The State and County roads comprise about three-fourths (71 percent) of the forest roads addressed in this analysis (State, County, and ML-3, 4, and 5 Forest Service roads).

The *Plan* says (p136),

> "With State, County, and Forest Service routes, a transportation system now exists that meets the need for access into most areas."

However, the potential exists for the need to develop special-use roads across national forest lands to access leased minerals or private tracts.

## GT (3): How is the management of the roads system affected by shared ownership of roads or limited jurisdiction over roads? (RS 2477, cost share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?

The forest roads system on the Sam Houston NF is composed of State, County, and Forest Service roads. The State and County roads comprise about three-fourths (71 percent) of the road system addressed in this forest-scale analysis. Most of the major roads are not under the jurisdiction of the Forest Service and the Forest Service does not have any authority to manage those roads.

Most of the major roads serving the Sam Houston NF already existed before federal land acquisition began. The Forest Service authority to manage a small number of those roads comes from Resolution Orders of the respective County Commissioners Court. The Resolution Orders declared the roads to be public roads under the jurisdiction of the Forest Service. The actual statement in the orders is "maintenance jurisdiction," but that statement has been interpreted by the courts to include regulation of commercial hauling.

The State "Farm-to-Market" or FM roads are essentially highways. Some County roads are paved, but many County roads are surfaced with aggregate or native material. The traffic on County Roads can not be regulated because much of the traffic is public residential use (to work, to school, school bus route, mail route, etc.)

The Forest Service has entered into Road Cooperative Agreements (conversationally referred to as "Coop Maintenance Agreements", although not limited to road maintenance) with all the respective counties. The agreements include virtually all the County roads that serve or cross national forest land. With few exceptions, the Counties have allowed the Forest Service to perform whatever work was considered necessary and have often participated as well. The Forest Service has surfaced many miles of these County roads with gravel or crushed stone, and cooperated in other ways; however, much work remains to be done to bring all these County roads to a condition that will meet Forest Service standards.

"Prescriptive Rights" refers to those road-use rights that are acquired and held by a history of established use. There were, probably still are, numerous roads used by the public for which there is no documented easement. Many old Forest Service roads fell into this category. The right to use such a road derives from the common law and is similar to the acquisition of land title by adverse possession. A prescriptive right to use a road confers, by necessity, a right to maintain it, to keep it passable, but no right to improve it. The reconstruction of these roads was therefore stymied by the lack of documented easements. However, the State alleviated this problem with one simple expedient: The Transportation Code (Chapter 251) states that an old established road becomes a County Road by an order of the respective County Commissioner's Court. Thereupon, many of the restrictions of prescriptive rights become moot. Within the existing road alignment and within certain limits, a County road can be improved as necessary.

There is no shared ownership of roads on the Sam Houston NF.

RS 2477 is not applicable in Texas. This authority is applicable only to certain road right-of-ways in some western states.

There are no cost share roads (Forest Development Road Cooperative Construction and Use Agreements) on the Sam Houston NF. These Cost Share Agreements are usually made when Forest Service and private industrial timberland owners have intermingled lands where acreage, timber resources, and their respective road system needs are similar. Temple-Inland, International Paper, and Louisiana Pacific timberlands are intermingled with national forest lands in east Texas. However, where these Cost Share Agreements are used, there is usually limited access to areas. There are often only one or two feasible access routes to thousands of acres of timberlands in intermingled ownership. In east Texas, the incentive to cooperate in the construction and maintenance of a road system is negated by the prevalence of State and County roads and the number of access routes available.

FLPMA easements are not for roads. These are special use easements granted to private entities for private driveways, campgrounds, ski areas, etc.

Forest Road and Trail Act (FRTA) easements are usually issued to public agencies (Counties and Cities) to use FS roads. On NFGT, we usually grant special use permits for County roads, just like the special use permits we grant to private individuals or organizations. County roads crossing national forest land with no documented easement have, for all practical purposes, the same standing with the Forest Service as any other County road.

United States Department of Transportation (DOT or USDOT) easements are granted by FHWA to TXDOT (State of Texas) for highway right-of-ways. Farm-to-Market Roads are considered State Highways in this context.

Many roads on national forest lands are authorized by special use permits issued to individuals for access to adjacent private lands. Most of these roads are not within the scope of this forest scale analysis (ML-3, 4, and 5 FS roads), but are typically short driveways that could be typified as "woods roads." A few are residential driveways, but in those cases they are usually well maintained by the permittee and cause only minimal impacts.

### GT (4): How does the road system address the safety of road users?

The forest roads system is composed of State, County, and Forest Service roads. The State and County roads comprise about three-fourths (71 percent) of the forest roads system addressed in this forest-scale analyses. So, most of the major forest roads are not under the jurisdiction of the Forest Service and the Forest Service does not have any authority to manage those roads. The State and County have responsibility to provide for public safety on those roads.

However, the Forest Service has entered into cooperative agreements to improve forest roads not under our jurisdiction, but that serve national forest lands. For those roads under Forest Service jurisdiction, public safety is the most important concern for management.

Where identified as an issue, public safety on individual roads will be addressed during site-specific project-scale analyses.

### 4.1.12 Administrative Use (AU)

#### AU (1): How does the road system affect access needed for research, inventory, and monitoring?

People conducting research on the Sam Houston NF have not identified the forest roads system as an issue. We believe that the forest roads system, including State and County roads as well as Forest Service roads, provides adequate access for research, inventory, and monitoring.

#### AU (2): How does the road system affect investigative or enforcement activities?

Unlawful activities are often addressed as road issues. Illegal use of closed roads, unauthorized collecting of forest products, and indiscriminate trash dumping are just a few examples of these activities. However, the same roads that provide access for illegal activities also provide access for law enforcement to prevent and investigate these activities.

The forest roads system provides access to the forest for a variety of purposes. As long as there is adequate access to the forest, illegal activities will occur.

Where identified as an issue, individual roads will be addressed during project-scale analyses.

### 4.1.13 Protection (PT)

#### PT (1): How does the road system affect fuels management?

Roads are an invaluable asset in fuels management. The forest roads system provides access for personnel and equipment to treat hazardous fuels, serves as control lines for prescribed burns, and most importantly serves as an escape route and safety zone during prescribed burning and wildfire fighting operations.

#### PT (2): How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The most efficient and the safest way to get firefighters and firefighting equipment to a wildfire is on roads. It is the quickest way for fire departments to respond to fires in the urban interface with fire fighting equipment to suppress fires before homes and other structures burn.

The budget planning program used by the Forest Service for fire management is the National Fire Management Analysis System (NFMAS). This program relies heavily on road access to ascertain response times to certain areas and then formulates a staffing level and budget for the area. Closing roads or lowering road standards would have a detrimental impact on response times and the fire budget for a given area.

Roads serve as an important component of wildfire suppression. Roads provide access to areas, serve as control lines, and most importantly serve as an escape route and safety zone during wildfire fighting operations.

### PT (3): How does the road system affect risk to firefighters and to public safety?

A well-developed road system in an area improves access and reduces response times for firefighters to get to fires, thereby reducing risks to the public and firefighters.

Most importantly, roads serve as escape routes and safety zones for wildfire fighting operations.

### PT (4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

Road dust is a minor problem in east Texas.

The dusting of a road surface is a function of the road surfacing characteristics; the traffic volume, speed and weight; and, most dramatically, the moisture content of the road surfacing material and the ambient air.

The moisture content of the surfacing material is most important. The typical high humidity and associated road surface moisture reduces road dusting in east Texas. The traffic on Forest Service and County roads in east Texas does not normally generate enough dust to cause visibility problems. Any visibility problems will decrease as Counties continue to pave more of their higher-traffic volume roads.

The type of aggregate surfacing material affects the degree of dusting. Certain materials, such a crushed limestone, are more prone to dust than other materials such as sandstone.

Heavier trucks are many times more likely to cause dusting than passenger cars.

The ML-3, 4 and 5 FS roads and County roads serving the Sam Houston NF account for almost all the airborne dust particle emissions. The slower traffic speeds on lower maintenance level roads, even when used by heavy logging truck traffic, tends to reduce dusting to a minimum. The higher maintenance level roads are usually surfaced with crushed aggregate and are less prone to dusting at any given speed than the native or pit run surfacing material on the typical unpaved County road.

It is beyond the scope of this analysis to determine if airborne dust contributes to human health concerns. Deicing salts dusting off a road are considered to be more of a concern than regular mineral dust. However, deicing salts are not a concern, since the Forest Service and Counties in east Texas do not use deicing salts. The use of deicing salt is usually reserved for highway bridges, but the State seldom has occasion to use deicing salts in east Texas.

## 4.1.14 Unroaded Recreation (UR)

### UR (1): Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

The Little Lake Creek Wilderness and the four designated Inventoried Roadless Areas – the Big Creek Scenic Area, the Winters Bayou Scenic Area, a tract adjacent to the Little Lake Creek Wilderness, and the Big Woods Scenic Area are the only unroaded areas on the Sam Houston NF. Since such a small proportion of the State is public land, there is demand for and a diversity of opinions on how the public lands should be used.

Overall, there is an excess demand for all recreation opportunities in the State, including unroaded recreation. The Sam Houston is an “urban” forest located close to the Houston, TX metropolitan area. The Sam Houston NF is a popular day use and overnight recreation

destination for local residents and visitors from the Houston metropolitan area and other surrounding urban areas. The Sam Houston NF is located within some of the fastest growing counties in Texas. There is currently an excess demand for outdoor recreation opportunities of all kinds including unroaded recreation opportunities; this will increase in the future as the population increases.

### UR (2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

The Little Lake Creek Wilderness and the four designated Inventoried Roadless Areas – the Big Creek Scenic Area, the Winters Bayou Scenic Area, a tract adjacent to the Little Lake Creek Wilderness, and the Big Woods Scenic Area are the only unroaded areas on the Sam Houston NF. However, the Inventoried Roadless Areas actually contain roads. The construction and reconstruction of roads is allowed in these four "roadless" areas.

When the development or decommissioning of roads in Inventoried Roadless Areas is proposed, this issue will be further addressed during project-scale analysis.

### UR (3): What are the adverse effects of noise and other disturbance caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

Most of the unroaded recreation activities occur in the Little Lake Creek Wilderness area. There is diverse opinion on what constitutes an acceptable mix of roaded and unroaded recreation opportunities. Closing nearby roads may reduce the amount of noise and provide more opportunities for solitude in unroaded areas, but most of the nearby roads provide access to intermingled private lands and can not be closed. Closing nearby roads may also reduce opportunities for people to access unroaded areas to recreate.

### UR (4): Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?

Most of the unroaded recreation activities occur in the Little Lake Creek Wilderness area. Hikers, horse riders, and hunters utilize the wilderness area for unroaded recreation. Old abandoned roads exist in the wilderness area that were used before the area was established as wilderness. Some of these old abandoned roads are used as hiking and horse riding trails. A portion of the 128-mile Lone Star Hiking Trail passes through the wilderness area.

The Sam Houston NF has four designated Inventoried Roadless Areas – the Big Creek Scenic Area, the Winters Bayou Scenic Area, a 200-acre tract adjacent to Little Lake Creek Wilderness, and the Big Woods Scenic Area. These "roadless" areas actually contain roads.
The construction and reconstruction of roads is allowed in these four "roadless" areas.

### UR (5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

There are mixed feelings of what wilderness is. Many people view the wilderness area as a place to hike, ride horses, or hunt and don't understand the "wilderness" or "roadless" area designation. Other users understand what wilderness is and are seeking some form of solitude. There are other wilderness areas in the State on the Sabine, Davy Crockett and Sam Houston National Forests, as well as nearby wilderness areas in the state of Louisiana on the Kisatchie National Forest. Other roadless areas on federal lands exist in the western part of the State. Most users have strong feelings about the areas they frequent and, although alternative areas exist, would be hesitant to change.

### 4.1.15 Roaded Recreation (RR)

#### RR (1): Is there now or will there be in the future excess supply or excess demand for road-related recreation opportunities?

The current forest roads system is utilized by a variety of recreation users to access developed and dispersed recreation opportunities including wilderness and non-wilderness trailheads. Hunting is a popular recreation activity on the Sam Houston NF since the entire forest is a Wildlife Management Area. Due to the requirement that forest visitors camp at designated hunter camps during the hunting season, forest visitors occasionally try to drive large recreational vehicles down relatively primitive roads. In many areas, the forest roads system provides access to recreation opportunities on the forest, but is not used for road-related recreation. However, there are many scenic drives throughout the Sam Houston NF. Driving is especially popular during the Spring while roadside wildflowers, dogwood (*Cornus florida*) and redbud (*Cercis canadensis*), are in bloom and during the Fall when the hardwoods change color.

Since only a small proportion of the State is public land, there is demand for and a diversity of opinions on how public land should be used. The demand for all types of recreation, motorized and nonmotorized, is increasing. Overall, there is an excess demand for all recreation opportunities in the State, including road-related recreation. Due to the proximity of the Sam Houston NF to the Houston metropolitan area and other urban population centers, there is currently an excess demand for all recreation opportunities. This will increase in the future as the population increases.

#### RR (2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of road-related recreation opportunities?

The Little Lake Creek Wilderness and the four designated Inventoried Roadless Areas – the Big Creek Scenic Area, the Winters Bayou Scenic Area, a 200-acre tract adjacent to the Little Lake Creek Wilderness, and the Big Woods Scenic Area are the only unroaded areas on the Sam Houston NF. However, the Inventoried Roadless Areas actually contain roads. The construction and reconstruction of roads is allowed in these four "roadless" areas.

The current road maintenance activities associated with the Maintenance Level 3, 4, and 5 Forest Service roads on the Sam Houston NF are not causing substantial changes in road-related recreation opportunities.

When the development or decommissioning of roads in Inventoried Roadless Areas is proposed, this issue will be further addressed during project-scale analysis.

#### RR (3): What are the adverse effects of noise and other disturbance caused by developing, using, and maintaining roads, on the quantity, quality, and type of roaded recreation opportunities?

Most people dependent on roads for recreation accept the roadside noise and disturbance associated with road traffic. However, diverse public opinions exist on whether access should be provided for recreation opportunities or restricted for solitude. The Sam Houston NF, like the other National Forests in Texas, has a scattered land ownership pattern with numerous residential areas intermingled among national forest lands. Due to the proximity of the Sam Houston National Forest to large urban population centers, most users are looking for solitude and an escape from urban pressures. This will increase in the future as population increases.

### RR (4): Who participates in road-related recreation in the areas affected by building, maintaining, and decommissioning roads?

The forest roads system on the Sam Houston NF provides access for a variety of recreation activities. Many of the recreationists are not seeking road-related recreation opportunities, but utilize the forest roads system to access recreation sites on the forest. The roads serve as access to developed and dispersed recreation sites including wilderness and non-wilderness trailheads, as well as the Lake Conroe reservoir. Many visitors utilize the forest roads system to access dispersed camping and hunting areas. A wide variety of forest products are also gathered for recreation purposes.

Lake Conroe is a unique feature on the Sam Houston NF and a major focal point attracting visitors from the Houston metropolitan area and other surrounding urban areas.

The local rural residents are the primary users of recreation resources on the forest, particularly for dispersed recreation activities such as hunting. Most forest visitors from urban areas concentrate their recreation activities around Lake Conroe. More and more urban visitors are attracted by the proximity to urban population centers and the accessibility from Interstate 45 or State Highway 59. The forest has a rapidly increasing number of Hispanic visitors necessitating universal or bilingual signing.

### RR (5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

People who utilize the forest roads system have strong feelings about their right to access public lands. Major roads that access developed recreation areas are critical to the recreation program and will be managed to provide for public safety as use increases. In most cases, the less used "back roads" provide the greatest interest and contention from participants in road-related recreation opportunities.

At the forest scale, road-related recreation users have strong feelings for roads.

It will be easier to identify public attachments to specific roads at the project-scale. Where identified as an issue, this issue will be further addressed during project-scale analysis.

## 4.1.16 Passive-Use Value (PV)

### PV (1): Do areas planned for road building, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species (see TW 4)?

Few new roads need to be constructed. All arterial and collector roads are already in place. Most of these arterial and collector roads are under State or County jurisdiction and are open to public motorized traffic at all times. Most of the Forest Service roads (ML-3, 4, and 5) addressed in this analysis are already in place. We anticipate that future Forest Service road development will be associated with local or spur roads (ML-1 and 2) addressed in subsequent project-scale analysis.

Specific proposals to construct new roads or to close and decommission existing roads will be addressed during project-level analyses. The analysis will address unique physical or biological characteristics if those are issues.

Any new roads will be analyzed for impacts to protected, endangered, threatened and sensitive species. The *Final Environmental Impact Statement (FEIS) for the Management of the Red-*

*cockaded Woodpecker (RCW) and its Habitat on National Forests in the Southern Region* (RCW FEIS) does not permit the construction of new roads within one-fourth mile of active RCW clusters where the Sam Houston NF is managed under Management Intensity Level 3 or 4 guidelines.

Where identified as an issue, the effects on passive-use values should be addressed during project-level analyses.

### PV (2): Do areas planned for road building, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

Determinations of cultural, traditional, symbolic, sacred, spiritual, or religious significance will be made during project-scale analyses after identification of and consultation with those user groups who may attach such significance to the areas to be affected by road building, closure or decommissioning. This especially applies to sovereign tribal groups who have an ancestral claim to the lands to be affected by a decision to build, close, or decommission roads.

### PV (3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for areas planned for road entry or road closure?

Such groups would include, but not be limited to, rural congregations, residents of unincorporated communities (who are often members of large extended families), and Tribal groups for whom the subject areas may constitute an ancestral homeland. This is difficult to determine at the forest scale and should be addressed during project-scale analyses if the issue arises in scoping.

### PV (4): Will building, closing, or decommissioning roads substantially affect passive-use value?

Few new roads need to be developed. All arterial and collector roads are already in place. Most of these arterial and collector roads are under State or County jurisdiction and are open to public motorized traffic at all times. Most of the Forest Service roads (ML-3, 4, and 5) addressed in this analysis are already in place. We anticipate that future Forest Service road development will be associated with local or spur roads (ML-1 and 2) addressed in subsequent project-scale analysis.

The effects of building, closing, or decommissioning a road on passive-use values is best addressed during project-scale analyses if the issue arises during scoping.

## 4.1.17 Social Issues (SI)

### SI (1) and SI (2): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

Roads provide public access. To be enjoyed, used, protected, monitored, and managed the national forest lands must be accessible. Many of the State and County roads that provide access to national forest lands also provide access for residents to communities where they live, work and purchase goods and services.

How road management affects people's dependence on, need for, and desire for roads was addressed during land management planning when the desired condition for access in management areas was established during revision of the *Plan*.

Public attitudes toward the national forest lands and roads on national forest lands are diverse and often contentious. In general, the local rural residents oppose road closures and urban residents promote road closures.

Many people, particularly local residents, seem to have strong feelings of entitlement about using old established roads on the Sam Houston NF. Some people believe that the use of these roads causes little environmental damage. Another common sentiment is that closing or eliminating roads would deny the public use and enjoyment of public lands

In contrast, comments received from urban areas are different. Many comments from urban areas focus on the perceived environmental damage caused by roads, such as road kills, destruction of wildlife habitat, habitat fragmentation, introduction and dispersal of exotic plant and animal species, soil erosion, sedimentation, and harm to fisheries.

### SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?

This question deals with the ease or difficulty of getting to the particular sites. Obviously, an improved road system can improve access to paleontological, archeological and historical sites. Whether this access affects a site positively or negatively depends on the effectiveness of the site protection measures used.

At this time, there are no known sites with access issues. Most sites have adequate road access.

### SI(4): How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

There are no known American Indian treaty rights on the Sam Houston NF. However, federally recognized tribes have a sovereign right to access sites of traditional, spiritual, and cultural importance on their ancestral homelands. This includes access to areas for the purpose of gathering resources necessary to conduct religious or cultural practices. Very few places on the national forest are less than a mile from an open public road. However, we often gate local roads; therefore, people may have to walk to reach their favorite areas for hunting, mushroom picking, and other traditional uses. Any decisions concerning the closure or decommissioning of roads on the Sam Houston NF can occur only after consultation and agreement with the appropriate federally recognized tribe regarding their sovereign rights to access their ancestral homelands.

Where identified as an issue, this issue will be further addressed during project-scale analysis.

### SI (5): How are roads that constitute historic sites affected by road management?

At this time, there are no roads on the Sam Houston NF that have been documented as historic sites or trails. There are roads on the forest that generally follow the routes of the early 1900s logging railroads; however, these roads are not normally treated as historic sites if the roads have been continuously used since the abandonment of the logging railroads.

### SI (6) and SI (7): How is the social and economic health of communities affected by road management and management of unroaded areas (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

A legacy of historical factors, including the corporate logging operations in the early 1900s and the economic depression of the 1930s, partially explains why the Sam Houston NF was

established, why the national forest land is scattered and interspersed with private land, and what socioeconomic and cultural factors shaped the local communities.

Across east Texas, access to national forest lands is important to different lifestyles. These lifestyles include work activities such as logging and recreation activities such as hunting, horseback riding, hiking, and fishing.

The economic welfare of the local communities depends on a well-managed public roads system. We believe the existing arterial and collector roads under State, County, and Forest Service jurisdiction provide an adequate road system to support most public needs. However, the management of specific Forest Service roads, if any, that provide access to residential areas and communities should be addressed during project-scale analyses if the issue arises.

The Little Lake Creek Wilderness and the four designated Inventoried Roadless Areas – the Big Creek Scenic Area, the Winters Bayou Scenic Area, a tract adjacent to the Little Lake Creek Wilderness, and the Big Woods Scenic Area are the only unroaded areas on the Sam Houston NF. However, the Inventoried Roadless Areas actually contain roads. The construction and reconstruction of roads is allowed in the four "roadless" areas.

### SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

Due to the relatively small size of the Little Lake Creek Wilderness and the proximity of public roads around the perimeter, it is difficult to escape all road noise. However, most wilderness users are conditioned to this and not bothered by minor road noises.

Hikers using the Lone Star Hiking Trail may be more sensitive to road noise issues

### SI (9): What are traditional uses of animal and plant species in the area of analysis?

Where identified as an issue, this issue will be further addressed during project-scale analysis.

### SI (10): How does road management affect people's sense of place?

This question relates to specific locations on the forest. These places can be identified by the public as to their location and what it is about the specific location that provides an attachment.

"Sense of place" encompasses the character of an area and the significance people attach to it. It integrates the sense of a geographic place, considering the biophysical setting, psychological influences (memory, perception, emotion), and social and cultural influences. Changes in road management can affect access to these places or change the biophysical setting, affecting their attachment or "sense of place".

We have not identified any place where this is an issue.

## 4.1.18 Civil Rights and Environmental Justice (CR)

### CR(1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?

Usually environmental justice is not an issue unless the percent of the minority population or low-income population exceeds twice the state average. Based on the 2000 U.S. Census Data, Texas has 47.6 percent minority[1] and 15.4 percent low-income[2] populations. Each of the four counties comprising the Sam Houston NF has less than twice the State averages.

**Table 18. Percentages of Minority and Low-Income Populations (SHNF)**

| | Percent Minority | Percent Low-Income |
|---|---|---|
| **State of Texas** | 47.6% | 15.4% |
| **Walker County** | 39.9% | 18.4% |
| **Mongomery County** | 18.6% | 9.4% |
| **San Jacinto County** | 19.2% | 18.8% |

This demographic information indicates that these counties do not meet the criteria to trigger environmental justice issues. Therefore, we believe the road system has no more or no less affect on any group of people than on other groups of people. All groups of people use the road system. Changes in road management such as closing or decommissioning any of the roads would have the same effect on all people regardless of ethnic culture or economic class.

## 4.2 Other Questions

### 4.2.1 Does the existing system of roads create an unacceptable risk to ecosystem sustainability?

Most of the existing system of forest roads addressed in this analysis already existed before national forest lands were purchased and most of those forest roads are State or County roads that the Forest Service has no jurisdiction over – regardless of whether or not the roads create an unacceptable risk to ecosystem sustainability. However, the Forest Service does have coop agreements with Counties that can be used to remedy any risks to ecosystem sustainability created by County roads.

The existing ML-3, 4, and 5 Forest Service roads addressed in this analysis do not present an unacceptable risk to ecosystem sustainability. However, there are documented cases where specific sites on roads present risks that should be remedied. The highest risk areas are in the vicinity of road stream crossings where sedimentation and fish passage are of concern. See Appendix J *Assessment of Road Impacts on Streams* for more information.

### 4.2.2 Are there opportunities to relocate, reconstruct, close, or decommission roads on the forest roads system to solve problems or be more consistent with *Plan* direction?

Most of the ML 3, 4 and 5 FS roads on the Sam Houston NF are consistent with *Plan* direction. However, some of the roads do not meet the following *Plan* Standards and Guidelines:

- FW-053: Design and construct roads and trails to minimize siltation and maintain to provide surface drainage away from streams and into vegetated buffer strips or other filtering system.
- FW-055: Provide road and trail design and construction that allows unrestricted fish passage.

[1] Minority is other than “white persons, not of Hispanic or Latino origin”.
[2] Below poverty level.

- FW-057: Maintain Forest Development Roads to appropriate maintenance level standards for the planned use and traffic.

Some stream crossing structures that cause stream channel erosion or restrict fish passage have been identified. See Appendix J *Assessment of Road Impacts on Streams* for more information.

There are also State and County roads on the forest roads system that do not meet the *Plan* Standards and Guidelines. There are opportunities to use cooperative agreements to improve those roads. These road improvement opportunities will be identified and addressed during project-scale analyses.

Some ML-1 and ML-2 roads may not meet the following *Plan* Standards and Guidelines.

- FW-058: Obliterate existing roads not needed for current or future use and have vegetative cover reestablished on all disturbed areas.

ML-1 and ML-2 Forest Service roads, as well as unclassified roads, will be reviewed and issues addressed during more site specific project-scale analyses to determine which roads are needed for current and future access.

### 4.2.3 Can the maintenance requirements of the existing forest roads system be met with current and projected budgets?

Generally, FS road maintenance budgets on the NFGT are inadequate. The road maintenance funds available are only approximately 14 percent of the amounts needed.

Between 1999 and 2002, the NFGT conducted road condition surveys on ML 3, 4, and 5 FS roads to determine annual and deferred maintenance needs based on existing conditions.

Approximately $1.0 million dollars are needed annually to fully maintain the ML-3, 4, and 5 FS roads based on the condition surveys conducted. This is the average annual funding needed to maintain the roads at the “objective” maintenance level, not at the current “operational” maintenance level. See the Appendix L *Glossary* for an explanation of terms. The costs include road maintenance activities such as surface blading, ditch cleaning, culvert cleaning, road surfacing repair and replacement, signing, vegetation removal, hazard tree removal, down tree removal, and road closure device repair. The costs also include other direct project costs, such as project management, contracting, and contract administration, and other indirect project costs.

Approximately $8.1 million is needed to complete the backlog of deferred maintenance to bring the ML-3, 4, and 5 Forest Service roads system to a standard that meets the “objective” maintenance levels.

Deferred maintenance is work that can be deferred without loss of road serviceability until such time as the work can be economically or efficiently performed. Deferred maintenance is most often associated with road surfacing replacement and drainage maintenance, followed by roadside brushing and signing maintenance for public safety. Based on the recent condition surveys, Forest Service roads have culverts to be replaced, culverts to be cleaned, and ditches to be cleaned and reshaped.

The Forest Supervisor and District Ranger have authority to take different actions to deal with inadequate road maintenance budgets, such as reprogramming funds, entering cost-sharing agreements, transferring roads to other public agencies, reducing road maintenance levels, and closing or decommissioning roads.

### 4.2.4 Are there opportunities to change road maintenance practices to provide for public safety or better care for natural resources?

It is desirable to institute road maintenance practices that provide for public safety and protect natural resources. Opportunities to change road maintenance practices to provide for public safety or better care for natural resources will be identified during the review of *Road Management Objectives* for roads. For example, blading ditches with a motor grader disturbs stabilized soils and releases soil sediment into streams. Such unnecessary blading could be discouraged.

Where identified as an opportunity, this issue will be further addressed during project-scale analyses.

### 4.2.5 Are there opportunities to change road design standards to provide for public safety or better care for natural resources?

Opportunities to change road design standards to provide for public safety or better care for natural resources will be identified during the development of *Road Management Objectives* for roads.

Establish standard road construction designs, drawings, and specifications to implement the *Plan* FW-053 Standard:

> "Design and construct roads… to minimize siltation and maintain to provide surface drainage away from streams and into vegetated buffer strips or other filtering system."

Consider using silt fencing to prevent sedimentation of streams during road construction work.

Establish standard road construction designs, drawings, and specifications to implement the *Plan* FW-055 Standard:

> "Provide road… design and construction that allows unrestricted fish passage." Culverts should to be designed and installed that will, not change the stream substrate, not increase stream flow velocity to the extent that turbulence creates a cavity at the end of the culvert, and not spread low stream flows to the point that the streams are no longer navigable by fish."

### 4.2.6 Are there opportunities to improve County roads on the forest roads system under cooperative agreements?

In 1974, the Forest Service first discussed road maintenance responsibilities with Walker, Montgomery, and San Jacinto Counties. A cooperative agreement concerning road maintenance was proposed. In 1977, the first cooperative agreements were signed by the counties.

The concept of cooperative road maintenance and the existing cooperative agreements should be emphasized and discussed with County Commissioners. County Commissioners are not always aware of the existing agreements. The Forest Service needs to periodically discuss the existing cooperative agreements with County Commissioners.

Where identified as an opportunity, this issue will be further addressed during project-scale analyses.

### 4.2.7 Are there opportunities to transfer the jurisdiction of Forest Service roads to the County?

There are roads under the jurisdiction of the Forest Service that are primarily maintained by the County. These roads should be considered for transfer to the County.

Forest Service roads that provide access to residential areas or rural communities; serve as school bus routes or mail routes; or have other features that require regular and emergency maintenance may be more appropriately managed under County jurisdiction by public agencies with adequate road maintenance expertise, personnel, and equipment. Consider transferring those roads to the County.

The conveyance of these roads is often facilitated by road improvements, such as resurfacing. A County may require the road be paved, such as a chip'n'seal pavement, before accepting a road into the Country road system.

The conveyance of a road right-of-way to a County should be documented. In Texas, there is little impetus for a County to require documented easements, but the Forest Service has a policy of documenting easements across national forest lands. This is usually done by easement or by permit, but the conveyance of roads is not always documented pursuant to a survey that would describe the right-of-way in terms of acreage conveyed.

Table 19 displays the roads under Forest Service jurisdiction that are maintained by the County.

**Table 19. FS Roads Maintained by the County (SHNF).**

| ROAD NUMBER | ROAD NAME | LENGTH (Miles) | COUNTY | ML |
|---|---|---|---|---|
| 204 | Caney Creek | 2.5 | Montgomery | 3 |
| 204A | Dunlap | 0.8 | Montgomery | 3 |
| 204E | | 0.4 | Montgomery | 3 |
| 2043 | Little Sam Forest | 0.6 | Montgomery | 3 |
| 2045 | Bear Canyon | 0.3 | Montgomery | 3 |
| 206 | Phelps | 2.0 | Walker | 3 |
| 208 | County Line | 1.5 | Walker | 3 |
| 209 | Farris | 0.3 | Montgomery | 3 |
| 212 | Scotts Ridge | 1.2 | Montgomery | 5 |
| 2135 | Flamingo Lake | 0.5 | Montgomery | 3 |
| 219A | Perry Williams | 1.3 | Montgomery | 3 |
| 224 | Corral | 1.7 | Montgomery | 3 |
| 246 | Watergate | 0.8 | Walker | 3 |
| 274 | Mercy | 1.8 | San Jacinto | 4 |

Where identified as an opportunity, this issue will be further addressed during project-scale analyses.

### 4.2.8 Should any roads be considered for designation as Forest Highways? Are there opportunities to transfer the jurisdiction of any Forest Service roads to the State?

Our review of the Forest Highways on the forest roads system generated two recommendations.

- Forest Highway 207: The 2.9 mile segment of the old Dodge Road across private lands south of US-190 is no longer on the Walker County road system. It may be impassable to public use. The 5.0 mile segment of the old Dodge Road from US-190 south to FS 246 should be deleted from Forest Highway 207 and the FS 246 road should be added. This route change will provide interconnected Forest Highways open to public use between TX-150 and US-190.

- Consider adding the 16 miles of FM 2025 between Cleveland, TX and Coldspring, TX to the Forest Highway system. The addition of FM 2025 to the Forest Highway system would interconnect the Forest Highways on the eastern side of the Sam Houston NF.

Where identified as an opportunity, this issue will be further addressed during project-scale analyses.

### 4.2.9 Are existing Forest Service roads no longer needed to meet future access needs?

None of the existing ML-3, 4, or 5 Forest Service roads were identified as not needed.

However, these ML-3, 4, and 5 roads, as well as existing ML-1 and 2 roads and unclassified roads, may be identified as no longer needed during project-scale analyses.

### 4.2.10 Are road improvements or additional roads needed to provide adequate access for forest users, resource management, or protection?

No new ML 3, 4, and 5 FS roads are currently proposed for the Sam Houston NF, however, if additional roads are proposed in the future, the road proposals will be addressed during project-scale analyses.

The reconstruction of existing ML 3, 4, and 5 Forest Service roads may be required, but those roads would also be identified during project-scale analyses.

### 4.2.11 Are road right-of-ways needed to provide access to national forest lands for use, management, or protection?

Road right-of-way needs will be identified during more site-specific project-scale analyses.