Lands

MA-8a-51 **Continue to honor rights-of-way easements and utility corridors existing before RNA establishment. Discourage any upgrading of these that would compromise the objectives of the RNA.**

MA-8a-52 **Retain all lands as public lands.**

MA-8a-53 **Acquire private inholdings, if any, where necessary to enhance values of the RNA.**

Minerals

MA-8a-61 **Prohibit surface occupancy for hard rock ores or other non-liquid deposits, subject to valid existing rights.**

MA-8a-62 **U.S. oil and gas mineral rights may be leased with a no surface occupancy stipulation.**

Hand laying of geo-phones for seismic data collection may be permitted.

MA-8a-63 **Reserved and outstanding mineral rights will be honored and managed according to Forest-wide standards and guidelines.**

Planning

MA-8a-71 **Permit and encourage research and educational use.**

Educational use of the RNA should generally be directed toward the graduate level, but may be permitted at any level. Ecological responses to management activities or natural disturbances on or adjacent to RNAs should be measured when appropriate Studies may be prioritized based on the significance of the potential impact

MA-8a-72 **Issue written authorization in advance of all scientific activities.**

Range

MA-8a-81 **Permit livestock grazing only as part of approved scientific investigation.**

Where grazing is needed to establish or maintain vegetative communities, define objectives for grazing and RNA.

MA-8a-82 **Initiate fencing or other methods of livestock control when incidental or casual livestock grazing exceeds 25 percent of annual desirable forage production.**

MA-8a-83 **Do not implement structural or non-structural range improvements within the RNA.**

Recreation Management

MA-8a-91 **Design management practices to result in a physical setting that meets or exceeds the ROS class of Semi-Primitive Non-Motorized.**

MA-8a-92 **Discourage recreation activities and uses within RNA's.**

Exclude overnight camping, recreation use within 200 feet of lakes, ponds, and streams; and pack and saddle stock grazing

MA-8a-93 **Prohibit all recreation off-road vehicle (ORV) use.**

MA-8a-94 **Discourage hunting and trapping in RNAs.**

MA-8a-95 **Institute closures or permits if recreation use threatens research or educational values.**

MA-8a-96 **Prohibit on-site interpretive or demonstrative facilities.**

MA-8a-97 **Avoid publicity that would attract the general public to the RNAs**

Trail Management

MA-8a-98 **Limit trails to those needed for access to conduct research and for educational purposes.**

Existing trails may be allowed to remain as long as the RNA objectives are not compromised.

Scenic Resources

MA-8a-101 **Design any proposed practices to meet the visual quality objectives (VQO) of preservation.**

Silviculture Practices

MA-8a-111 **The area is classified as unsuitable for timber production**

Soil and Water

MA-8a-121 **Initiate watershed restoration where erosion is damaging the RNA if this activity is consistent with the RNAs Establishment Report.**

Wildlife Management

MA-8a-131 **Do not permit management practices specifically designed to improve wildlife habitat.**

Cross Timbers Research Natural Area

Location

The Cross Timbers Research Natural Area (RNA) is in the LBJ National Grasslands, Unit 31 within Wise County, about ten miles north of Decatur, Texas

Description

This is an area maintained in a natural condition by allowing physical and biological processes to operate without human intervention and managed for non-manipulative research, observation and study

The Cross Timbers RNA was established in 1977 The RNA when established encompassed 370 acres, during this Plan revision process boundaries were re-adjusted and surveyed making the new allocation 380 acres This natural area lies in the western cross timbers ecological region Two NFGT landtypes, limestone mesa and cross timbers, are found in this RNA Three TNHP exemplary plant communities Bluestem Tallgrass Prairie, Western Post Oak-Blackjack Oak Woodland, and Texas Oak Woodland are found in the area

Desired Future Condition

The area will have a natural appearing landscape accessible only by cross-country foot or horseback travel Some evidence of activities associated with scientific or research studies may be apparent from time to time Access is limited to existing non-motorized trails that do not compromise the objectives of the RNA Few roads were ever in this area, but those that were have been closed and revegetated with native vegetation

Plant and animal communities native to the area evolve with little or no impact from humans The oak savanna and woodlands appear as a mix of many species of some young, but primarily old trees You also see areas of native tallgrass prairie Late seral or climax plant communities predominate

Some areas may show signs of recent wildfires or insect or disease outbreaks In these areas you will see dead standing and down trees. These trees may have cavities and small holes that are the signs of woodpeckers or other animals and insects

If you stop and look for wildlife, you discover several species What you find depends on whether you are in the woodland or grassland Most of the species you see will be associated with mature habitat conditions The areas provide some, but probably not optimal habitat, for most game species such as deer, turkey and quail

While traversing the RNA, you will not see any tree harvesting, extraction of locatable minerals, or construction of new roads, trails or other facilities. Where the RNA Establishment Report determined prescribed burning or grazing are needed to establish or maintain vegetative communities, you may see these activities. You may see oil and gas operations near the area, but there will be no surface occupancy within the RNA, subject to valid existing rights.

Management Emphasis

Research natural areas are part of a national network of field ecological areas designated for research and education and/or to maintain biological diversity on National Forest System lands. Research natural areas are managed for non-manipulative research, observation, and study. RNAs serve as control areas for comparing results from manipulative research, and for monitoring effects of resource management techniques and practices. Management is designed to maintain the areas in a natural condition by allowing physical and biological processes to operate without human intervention. This area is used for:

* Comparison with those lands influenced by man;

* Provision of educational and research areas for ecological and environmental studies; and,

* Preservation of gene pools for typical as well as rare and endangered plants and animals

Cross Timbers Research Natural Area Standards and Guidelines

Biological Diversity

MA-8a-A1 **Ensure the protection and perpetuation of the Western Cross Timbers and Grand Prairie Vegetative zones.**

U. S. Forest Service specialists and research station personnel will involve the Texas Natural Heritage program and The Nature Conservancy when developing strategies to address hardwood encroachment which has occurred in the last 30-50 years.

MA-8a-A2 **Manage fire to maintain and enhance the two vegetative types featured here.**

Recreation Management

MA-8a-A3 **Fence historic access areas to prevent unauthorized use.**

Range Management

MA-8a-A4 **Manage the range program to ensure that the quality and sustainability of the Western Cross Timbers and Grand Prairie plant communities are maintained.**

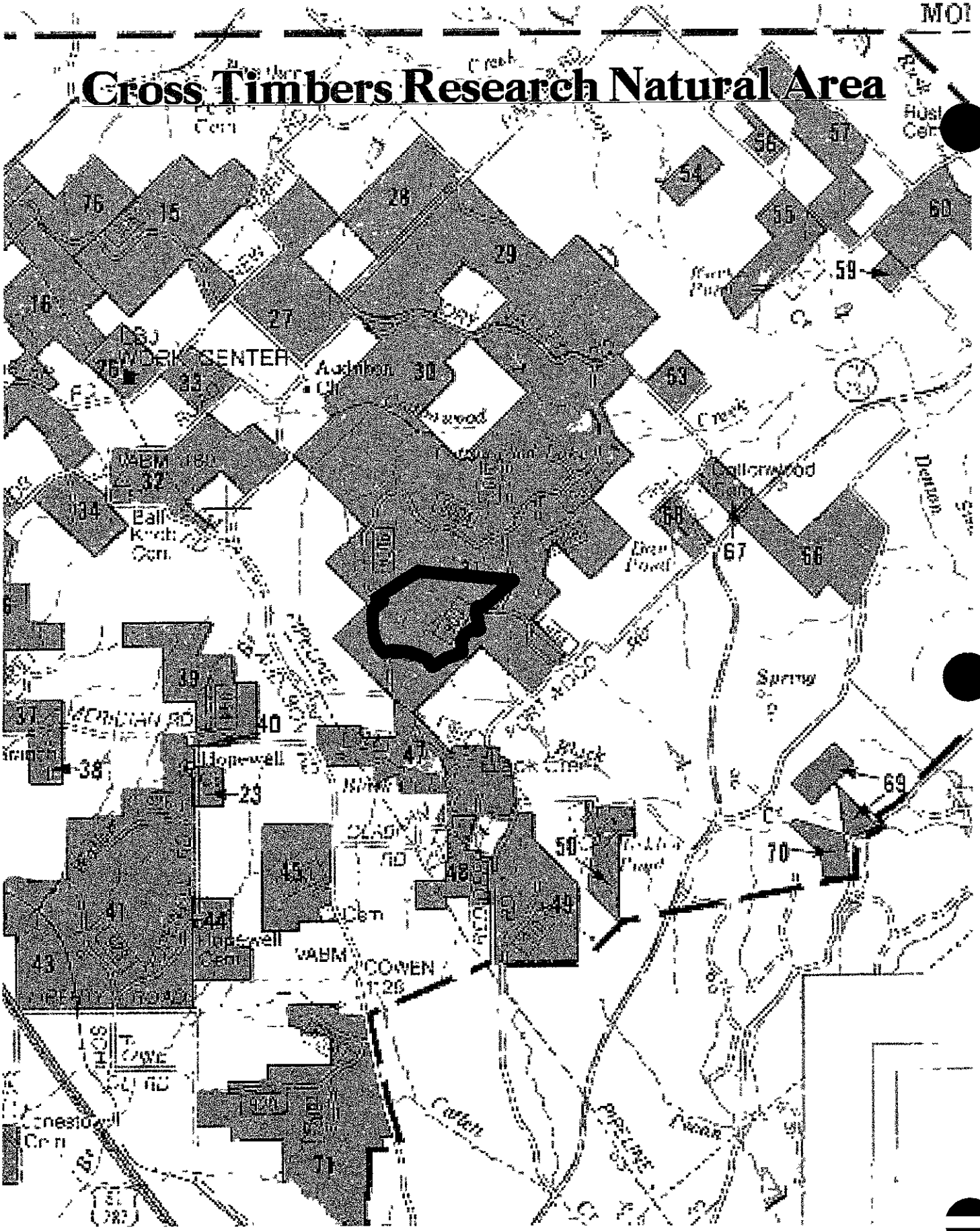
The Texas Natural Heritage Program and The Nature Conservancy should be consulted to review range management guidelines

Soil and Water

MA-8a-A5 **Monitor all erosion control structures annually. If maintenance is needed, use the least intensive methods possible.**

Consult with the Forest RNA Coordinator prior to initiating maintenance

Cross Timbers Research Natural Area



Mill Creek Cove-Recommended Research Natural Area

Location

It is on the Sabine National Forest, Compartment 79 within Sabine County, about 12 miles northeast of Hemphill, Texas

Description

This is an area maintained in a natural condition by allowing physical and biological processes to operate without human intervention and managed for non-manipulative research, observation and study

Mill Creek Cove is on the Yellowpine Ranger District of the Sabine National Forest It consists of two peninsulas of old growth Beech-Magnolia community along the western shore of Toledo Bend Reservoir The area has been described as the highest quality example of this community in the west gulf region by the Texas Natural Heritage Program

Desired Future Condition

The area will have a natural appearing landscape accessible only by cross-country foot or horseback travel Some evidence of activities associated with scientific or research studies may be apparent from time to time Access is limited to existing non-motorized trails that do not compromise the objectives of the RNA. Few roads were ever in this area, but those that were have been closed and revegetated with native vegetation

Plant and animal communities native to the area evolve with little or no impact from humans The forest appears as a mix of many species of some young, but primarily old trees Late seral or climax plant communities predominate

Some areas may show signs of recent wildfires or insect or disease outbreaks In these areas you will see dead standing and down trees with patches of bark and branches missing and brown leaves These trees may have cavities and small holes that are the signs of woodpeckers or other animals and insects

If you stop and look for wildlife, you discover several species Most of the species will be associated with mature habitat conditions The areas provide some, but probably not optimal habitat, for most game species such as deer, turkey and squirrels

While traversing the RNA, you will not see any programmed timber harvest, extraction of locatable minerals, or construction of new roads, trails or other facilities You may see oil and gas operations near the

area. but there will be no surface occupancy within the RNA (subject to valid existing rights)

Management Emphasis

Research natural areas are part of a national network of field ecological areas designated for research and education and/or to maintain biological diversity on National Forest System lands Research natural areas are managed for non-manipulative research, observation, and study RNAs serve as control areas for comparing results from manipulative research, and for monitoring effects of resource management techniques and practices. Management is designed to maintain the areas in a natural condition by allowing physical and biological processes to operate without human intervention This area is used for

* Comparison with those lands influenced by man,

* Provision of educational and research areas for ecological and environmental studies, and,

* Preservation of gene pools for typical as well as rare and endangered plants and animals

Mill Creek Cove Standards and Guidelines

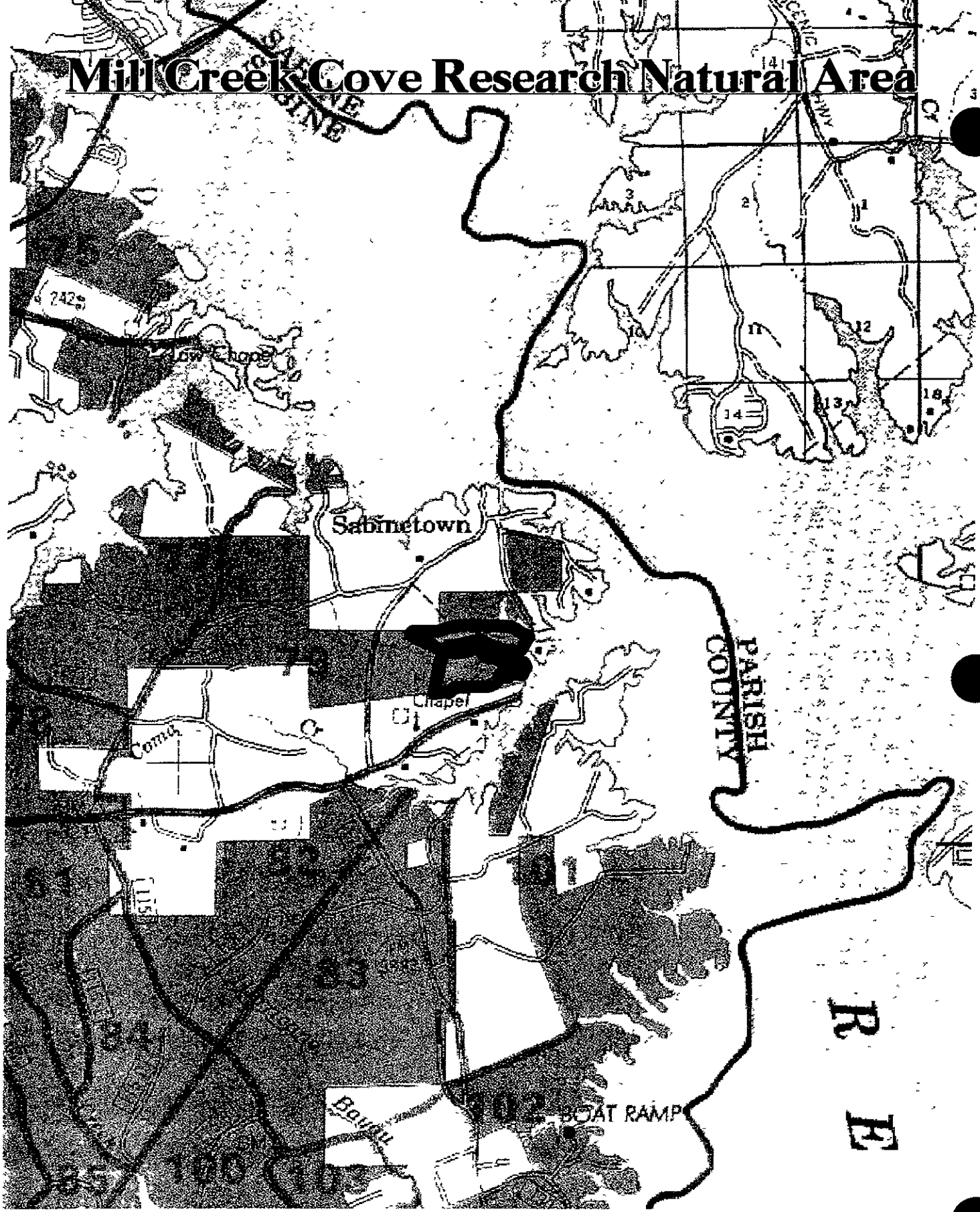
Biological Diversity

MA-8a-B1 Ensure the protection and perpetuation of the Beech-Magnolia and Loblolly-Oak plant communities or forest cover types.

Planning

MA-8a-B2 The Forest RNA Coordinator and the assigned Research Station Scientist shall prepare an Establishment Report.

Mill Creek Cove Research Natural Area



Management Area 8b
Protected River and Stream Corridors

Theme

Candidate Scenic and Recreational Rivers

Description

These areas are two free-flowing rivers possessing at least one outstandingly remarkable characteristic. An inventory of rivers on the Forests found the Winters Bayou and segments of the Neches River to be *eligible* for inclusion in the Wild and Scenic River System as a recreational river (See EIS Appendix E). A decision on this inventory requires study of the river's characteristics. Such a study would be initiated by the Texas Parks and Wildlife Department to determine suitability. The National Forests and Grasslands in Texas would cooperate.

In order to provide interim protection of public lands potentially important in such a designation, protected status is assigned to all National Forest lands within one-quarter mile from each bank of the designated river segments. This status will continue until a study is completed, and a formal recommendation of suitability is made by the state of Texas. At that time, the status of the affected tracts will be changed to be consistent with study recommendations.

The following river segments within this area (as shown in EIS Appendix E) include·

Neches River Corridor - Segments 1, 2, 3, and 4 on the Davy Crockett and Angelina National Forests

Winters Bayou - Sam Houston National Forest

Desired Future Condition

A one-quarter mile corridor from each side of the rivers and any lands visible from them under Forest Service management exist in a natural to near-natural setting, and the rivers and channels are not modified in any way. Dams or other man-made structures that impede or divert the flow of the rivers are not allowed to the extent of Forest Service or other Federal agency authority. Visitors are aware that man's activities may have subtly changed the original character of the river and its surrounding landscape only in selected areas and for short stretches Along the river you will find access to recreational river segments. These changes to the landscape however, do not detract from the recreational experience.

Recreation use on the river and within the corridor is not concentrated, and visitors have the opportunity to experience some solitude and to

enjoy the natural character of the surrounding landscape Water-based recreation activities include fishing, canoeing, and motorboating. Land based recreation activities include hunting, hiking, horseback riding and other activities that do not disturb the serenity of the area Off-road vehicle (ORV) noises or use will be rare or non-existent.

Management Emphasis

Management practices are designed so that the natural landscape appears unaltered Facilities that are present or to be constructed ensure health, safety and resource protection, though some degree of user convenience is permitted The natural character of the designated scenic river segments within the Forest ownership will be maintained. The river environment will be maintained in a somewhat natural state while providing for recreation opportunities

Recreational river management segments will consist of rivers or river segments that are free of impoundments, with shorelines and watersheds in still largely natural condition. Shorelines will be somewhat undeveloped but accessible in places by roads. Recreation values commensurate with a relatively undeveloped river corridor will be enhanced with visitors generally experiencing solitude, tranquility and a closeness to nature

The primary goals of this management area are to

* Prevent modification of the free flowing characteristics of the identified rivers;

* Protect, and to the extent practicable, enhance the outstandingly remarkable values of the identified river(s); and,

* Preserve the eligibility and potential classification of the identified rivers.

These goals will be achieved through the following management related objectives:

* Maintain a one-quarter mile corridor on both sides of the river of high quality scenery and essentially an undeveloped shoreline

* Maintain and improve fish and wildlife habitat;

* Provide opportunities for river-oriented recreation which are consistent with the largely undeveloped nature of the segment and dependent on free-flowing conditions; and,

* Utilize other resources and permit other activities which maintain or enhance the wildlife habitat quality, river fisheries, scenic attractions, or recreation values

MA-8b Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide and MA-4 Standards and Guidelines

Biological Diversity

MA-8b-01 **This area is allocated as potential old growth.**

MA-8b-02 **Manage for the biological characteristics and attributes identified for each specific area within the Ecological Classification System (ECS) hierarchy.**

MA-8b-03 **Revegetate disturbed areas with desirable non-native species where necessary to quickly establish a protective vegetative cover; however, subsequent management following establishment shall be designed to allow these to revert to native species.**

MA-8b-04 **Limit vegetation removal to maintenance or enhancement of scenery and recreation experiences, to maintain tall forest cover, to accommodate some mineral activity having valid existing rights, or to control southern pine beetle (SPB) outbreaks as described elsewhere in this prescription.**

The appearance of an old-growth forest condition within the river corridor should be maintained, particularly along the river and its immediate environment.

River channels may be cleared to the minimum extent that allows safe boat passage.

Chemicals

See Forest-wide Standards and Guidelines - generally limited to SPB or noxious weed control.

Cultural Resources

MA-8b-11 **Complete cultural resource inventories as necessary for any disturbance activities.**

MA-8b-12 **Provide interpretive facilities for unusual or outstanding cultural resources where compatible with cultural resource protection and river classification.**

Facilities

MA-8b-21 **Construct roads within the corridor only to provide access for recreation, when allowing access for valid existing rights, or other required access or crossing is determined.**

MA-8b-22 Provide structures, improvements, and signs that enhance user experiences, facilitate use and administration of the area, and protect resources; but restrict new structures to those not having an adverse effect on river values.

MA-8b-23 Campgrounds, public information centers, and administrative headquarters are allowed if such structures are screened from the river.

MA-8b-24 To the extent of Forest Service authority, permit no development of hydroelectric power facilities.

Fire

MA-8b-31 Use prescribed fire for vegetative manipulation where necessary in fire-dependent ecosystems to maintain or enhance desired conditions.

MA-8b-32 Suppression strategies, practices, and activities are limited to those which have minimal effects on scenic river values.

MA-8b-33 Suppress wildfires at the lowest acreage practicable. Prescribed natural fires may be allowed to burn within prescription in fire dependent ecosystems.

Integrated Pest Management

MA-8b-41 Allow SPB infestations to run their natural course and/or move out of the management area unless a site-specific environmental analysis indicates that successful control can be expected and the spot(s):

Threaten essential habitat for federally listed threatened and endangered species; or

Trees infested by SPB pose a public safety hazard when vacated; or

The SPB growth model and/or Forest Health (FH) entomologist predicts the spot will exceed two acres in size; or

Pending site-specific environmental analysis, it is determined the spot would impair the scenic or physiographical qualities within the management area or an adjacent management area in which SPB suppression is also generally restricted; or

The SPB spot growth model and/or Forest Health entomologist predicts the spot would expand out of the management area and, through site-specific environmental analysis, was predicted to cause unacceptable damage to resources on adjacent state, private, or federal lands.

MA-8b-42 **SPB treatment methods which may be implemented, in order of priority, are:**

Cut and leave;
Cut and remove; or
Cut and hand spray

MA-8b-43 **Fall trees away from the stream course during SPB suppression activities. Trees which cannot be safely felled away from the stream course should not be included in the treatment unless necessary to assure safety or achieve effective spot suppression.**

Lands

MA-8b-51 **Issue special use permits when compatible with the management of the area or where they are necessary to support valid existing rights.**

MA-8b-52 **New transmission lines, gas lines, etc. are discouraged. When available, additional or new facilities should be restricted to existing rights-of-way.**

MA-8b-53 **Retain all National Forest System lands except for land exchanges resulting in a significant public benefit.**

MA-8b-54 **Private lands with a significant frontage on these rivers should be considered a high priority for acquisition and be acquired from willing owners.**

Minerals

MA-8b-61 **Prohibit surface occupancy for hard rock ores or other non-liquid deposits, subject to valid existing rights.**

MA-8b-62 **Allow oil and gas leasing with controlled surface use stipulations where production facilities can be screened from the river.**

The total screening requirement need not apply to the drilling rig during the drilling phase of the operation, nor to temporary occupancy for seismic operations. Mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation and pollution, and scenery impairment.

MA-8b-63 **Locate drilling and production facility sites at least 100 feet from the river.**

Planning

See Forest-wide Standards and Guidelines

Range

MA-8b-71 **Grazing is prohibited.**

Recreation

MA-8b-81 **Design management practices to result in a physical setting that meets or exceeds the Recreation Opportunity Spectrum (ROS) class of semi-primitive motorized or roaded natural.**

These designations should refer to the established ROS maps

MA-8b-82 **Motorized travel on the water is permitted.**

MA-8b-83 **Restore or rehabilitate areas or facilities not meeting desired standards to a condition that meets both the semi-primitive motorized or nonmotorized ROS class designations, and the visual quality objective (VQO) of retention.**

MA-8b-84 **Provide access for recreation use on the river in selected locations.**

MA-8b-85 **Close the area to off-road vehicle use.**

Scenic Resources

MA-8b-91 **Scenic river corridors are managed to meet a VQO of retention.**

Silviculture Practices

MA-8b-101 **The area is classified as unsuitable for timber production.**

Unregulated timber harvest may be utilized to accomplish non-timber related goals as determined through site-specific environmental analysis

MA-8b-102 **Manage the area in as near natural a setting as possible.**

Soil and Water

MA-8b-112 **Prohibit the use of non-aquatic herbicides, except hand application for noxious vegetation control, within 100 feet of streams, unless otherwise restricted on the herbicide label.**

MA-8b-113 **Restore those areas where man-induced erosion is significantly impacting water quality, fisheries or any of the river's outstandingly remarkable values.**

Wildlife Management

MA-8b-121 **Provide habitat improvement for wildlife viewing opportunities.**

MA-8b-122 **Habitat management activities are permitted for essential populations of Federally listed threatened or endangered species.**

Management Area 8c
Scenic Areas

Theme

This management area includes Big Creek (1,920 acres), Winters Bayou (1,587 acres), Beech Ravines (1,020 acres), and Upper Colorow Creek (230 acres). These areas have an emphasis of protection, enhancement, or restoration of unique areas that are recognized as scenic, with outstanding visual quality. The Forest Service Manual (FSM) 2360 defines a Scenic Area as "a unit of land with outstanding natural beauty that requires special management to preserve this beauty" The significant quality or character for which each area was designated will be described with a desired future condition and management emphasis

These areas also have an emphasis to protect, enhance, and promote sustainable populations of unique plants or plant communities These botanical characteristics include plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity, or other features

See individual scenic areas for description, desired future condition, and management emphasis The following standards and guidelines pertain to all scenic areas, each subsequent area has one or more standards that better define the management and protection for that site.

MA-8c Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines

Biological Diversity

MA-8c-01 **This area is allocated as potential old growth.**

Some areas may be classified as restored old growth

MA-8c-02 **Do not permit introduction of exotic plant and animal species.**

Re-introduction of former native species may be permitted if the objectives of scenic areas are met Manage for the biological characteristics and attributes identified for each of the ecological units found within the Ecological Classification System hierarchy

MA-8c-03 **Allow existing non-native plant communities to revert to native plant communities.**

MA-8c-04 **Prohibit removal of all vegetation, including firewood, grass, fruit, seeds, etc; except for approved scientific investigation, southern pine beetle (SPB) control action, or when exercising valid existing rights as approved through site-specific environmental analysis.**

MA-8c-05 **Leave any felled trees in place, unless lying across trails. Do not remove any trees.**

Hazard tree felling may be permitted for safety along boundary trails or roads

Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-8c-11 **Complete an inventory of cultural resources for any ground disturbing activities and any sites determined as significant to the cultural post.**

Facilities

MA-8c-21 **Subject to valid existing rights, build new roads, trails, fences, signs, or other structures only if they contribute to the objective or protection of Scenic Areas.**

Boundary fencing is permitted for protection against livestock or excessive human use In rare instances, temporary gauging stations and instrument shelters may be permitted

Fire

MA-8c-31 **Limit suppression strategies, practices and activities to those which have minimal impacts to Scenic values. Extinguish wildfires endangering Scenic Areas.**

MA-8c-32 **Use no chemical fire retardants during fire suppression.**

MA-8c-33 **If fire is used to perpetuate a desirable vegetative condition, it should mimic a natural fire, but with prudent measures to a avoid catastrophe.**

MA-8c-34 **Allow fuels to accumulate at natural rates unless they threaten the objectives of Scenic Areas.**

Leave fire-caused debris for natural decay

MA-8c-35 **Develop fire management plans and obtain Forest Supervisor's approval before prescribed ignitions occur.**

Use prescribed fire to manage or maintain the scenic and botanical character through appropriate successional stages for which the area has been designated

Integrated Pest Management

MA-8c-41 **To reduce impacts to scenic values, treat SPB spots promptly and they should generally receive high treatment priority.**

SPB spots predicted by the SPB spot growth model and/or Forest Health entomologist to expand, may be controlled only after interdisciplinary review If the spot would threaten the scenic qualities within the area, protected species, adjacent susceptible private or high value Federally owned pines, control action may be taken. SPB suppression activities should be tailored to minimize and protect impacts on the scenery of the area

MA-8c-42 **Cut slash from treatments to lay close to the ground or remove it from the area.**

MA-8c-43 **Treatment options, in order of priority, are: Cut and leave; cut and remove; or cut and hand spray.**

Cut and remove should only be implemented when existing roads can be utilized

MA-8c-44 **If SPB infested trees are adjacent to existing roads and can be removed without damage to other vegetation or the scenic quality, treatment should be cut and remove.**

Lands

MA-8c-51 **Continue to honor rights-of-way easements, including utility corridors, existing before area establishment. Discourage upgrading that would compromise the objectives of Scenic Areas.**

MA-8c-52 **Retain all lands as public lands.**

MA-8c-53 **Acquire private inholdings where necessary to enhance values of scenic areas.**

Minerals

MA-8c-61 **Prohibit surface occupancy for hard rock ores or other non-liquid deposits, subject to valid existing rights.**

MA-8c-62 **U.S. oil and gas mineral rights may be leased with a no surface occupancy stipulation.**

Hand laying of geo-phones for seismic data collection may be permitted.

MA-8c-63 **Reserved and outstanding mineral rights in special areas will be honored and managed according to Forest-Wide Standards and Guidelines.**

Planning

MA-8c-71 **Permit and encourage research and educational use.**

Educational use of scenic areas should be directed toward all age groups Ecological responses to management activities or natural disturbances on or adjacent to scenic areas should be measured when appropriate Studies may be prioritized based on the significance of the potential impact.

MA-8c-72 **Issue written authorization in advance of all scientific activities.**

Range

MA-8c-81 **Prohibit livestock grazing except as part of approved scientific investigation.**

Where grazing is needed to establish or maintain vegetative communities, define objectives for grazing.

Recreation Management

MA-8c-91 **Design management practices to result in a physical setting that meets the recreation opportunity spectrum (ROS) class of semi-primitive motorized, unless other classifications are needed to honor outstanding rights or to provide more solitude.**

MA-8c-92 **Develop dispersed and non-impacting recreation activities and uses within scenic areas.**

This includes overnight camping; recreation use that incorporates interpretive potential; and educational activities.

MA-8c-93 **Prohibit all recreation off-road vehicle (ORV) use.**

MA-8c-94 **Institute closures or permits if recreation use threatens scenic or interpretive values.**

MA-8c-95 **Develop on-site interpretive or demonstrative facilities.**

Facilities shall be developed in concert with the scenic character of the area and without impairment to the natural features for which the area was designated to sustain.

Trail Management

MA-8c-96 **Limit trails to those needed for administrative, interpretive or recreational purposes.**

Trails should be located to maximize the visitors sense of enjoyment without compromising the values for which the scenic area was designated

Scenic Resources

MA-8c-101 **Design practices to meet the VQO of retention and partial retention.**

These designations should refer to established VQO maps.

Silviculture Practices

MA-8c-121 **This area is classified as unsuitable for timber production.**

MA-8c-122 **Prohibit removal of vegetation (including firewood, grass, fruit, seeds, etc.) unless it is approved for scientific investigation, southern pine beetle (SPB) control action, management for T&E species or when exercising valid existing rights.**

MA-8c-123 **Vegetation management activities can be used to restore or maintain the botanically significant character of the site.**

Specific activities include fire, vegetation removal, planting, or other cultural techniques that are determined to be appropriate through site-specific environmental analysis

Soil and Water

MA-8c-131 Initiate watershed restoration where man-induced erosion is damaging area values, water quality. or soil productivity

Wildlife Management

MA-8c-141 Permit only those wildlife habitat management practices specifically designed to improve habitat for threatened or endangered species.

Big Creek Scenic Area (1,920)

Location

This scenic area is on the Sam Houston National Forest, including Compartment 106, about five miles west of Shepherd, Texas

Description

Big Creek Scenic Area, located on the San Jacinto Ranger District of the Sam Houston National Forest, was established in 1962 known then as the Big Thicket Scenic Area, it originally encompassed only 1,130 acres (the part of the existing area north of Forest Development Road 217) It was expanded south of Forest Development Road 217 in 1978 to 1,420 acres The 500 acres added to the scenic area with this Plan Revision is the area immediately east of the existing area, all within Compartment 106

Three ecological communities dominate the area Coastal Plain Seepage Shrub Slope, Loblolly Pine-Shortleaf Pine-Oak Forest, and Beech-Magnolia Forest One management sensitive species, the slender wakerobin, occurs in the scenic area

Desired Future Condition

The vegetation is a mixture of species of various ages Facilities such as trails, trailheads or interpretive signs can be seen, but are constructed in a manner that enhances the visual quality of the area A well developed trails system provides access to the interior of the area Visitors have the opportunity to experience solitude and enjoy natural character of the landscape Visitors enjoy viewing the forest vegetation and clear streams that is relatively undisturbed by recreation users Facilities may be seen, but blend with natural surroundings of the area

Management Emphasis

To protect, enhance, or restore the unique character of the "Deep East Texas Big Thicket" This area is managed to maintain it's special interest values and to maintain the character of the vegetation and scenic values

* Provide non-motorized access into and through the Scenic Area
* Promote and interpret the qualities of the Big Creek Scenic Area
* Recreational use of the area is primarily intended for interpretation, educational, and inspirational activities

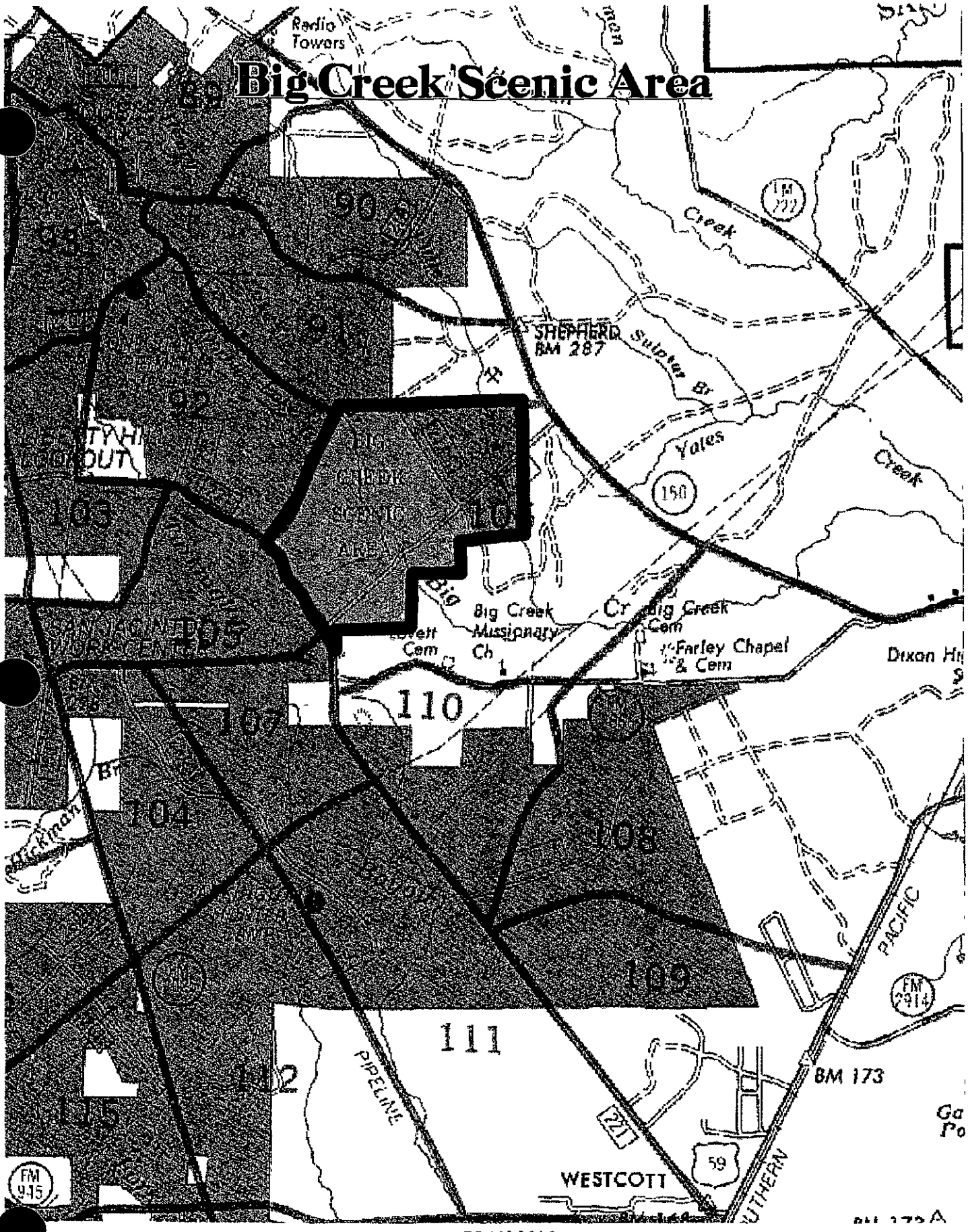
Biological Diversity

MA-8c-A1 **Ensure the protection and management for the perpetuation of the mature semi-evergreen mesic forest.**

Work with the Texas Natural Heritage program and provide the appropriate management to enhance viability of slender wake-robin and other special plant species populations

Recreation

MA-8c-A2 **Hunting and trapping of wildlife is prohibited unless it is needed to manage population levels.**


Big Creek Scenic Area
Radio Towers
Creek
FM 222
SHEPHERD BM 287
Sulphur Br
Yates
Creek
160
BIG CREEK SCENIC AREA
Big Creek Missionary Ch
Big Creek Cem
Farley Chapel & Cem
Dixon Hi
110
107
104
108
109
111
112
115
PIPELINE
PACIFIC
FM 2914
BM 173
WESTCOTT
59
FM 945
90
91
92
103
105

Winters Bayou Scenic Area (1,587 acres)

Location

This area is on the San Jacinto District of the Sam Houston National Forest, in Compartments 118 and 120, about five miles northwest of Cleveland, Texas

Description

Winters Bayou Scenic Area was established in 1987 It originally contained 970 acres with an additional 617 acres added in this Revision Some mineral facilities within the periphery of the area will be managed through MA-10b standards until such a time as closure and restoration action occur The area is dominated by Swamp Chestnut Oak-Willow Oak and Bottomland Forest No sensitive plant species are known to occur within this area Low lying areas have an understory of dwarf Palmetto, a primary attraction to the area

Desired Future Condition

The vegetation is a mixture of species of various ages Facilities such as trails, trailheads or interpretive signs are constructed in a manner that maintains the visual quality of the area Trails provide access to the interior of the area where visitors have the opportunity to experience solitude and enjoy natural character of the landscape Trail systems may be maintained, upgraded expanded or reduced depending upon demand and analysis Visitors enjoy viewing the forest vegetation and clear streams Facilities will be present to the extent needed to maintain the area or to facilitate visitor use of the area

All of the mineral rights in Winters Bayou Scenic Area are either outstanding or reserved, resulting in oil and gas wells being drilled in the area Through time oil and gas facilities will be closed down and restored to the natural vegetation occuring within the area Interpretation of the oil and gas wells, and the rights of the mineral owners is provided

Management Emphasis

To protect, enhance, or restore the unique character of the "Deep East Texas Big Thicket" This area is managed to maintain it's special interest values and to maintain the character of the vegetation and scenic values Some of the area will maintain upland pine communities on the periphery of the hardwood bottomlands Standards for upland pine stands will be through Management Area 2 (MA-2) standards and quidelines that provide quality habitat for red-cockaded woodpecker (RCW) and related species

* Provide non-motorized access into and through the Scenic Area
* Promote and interpret the qualities of the Winters Bayou Scenic Area
* Recreational use of the area is primarily intended for interpretation, educational, and inspirational activities

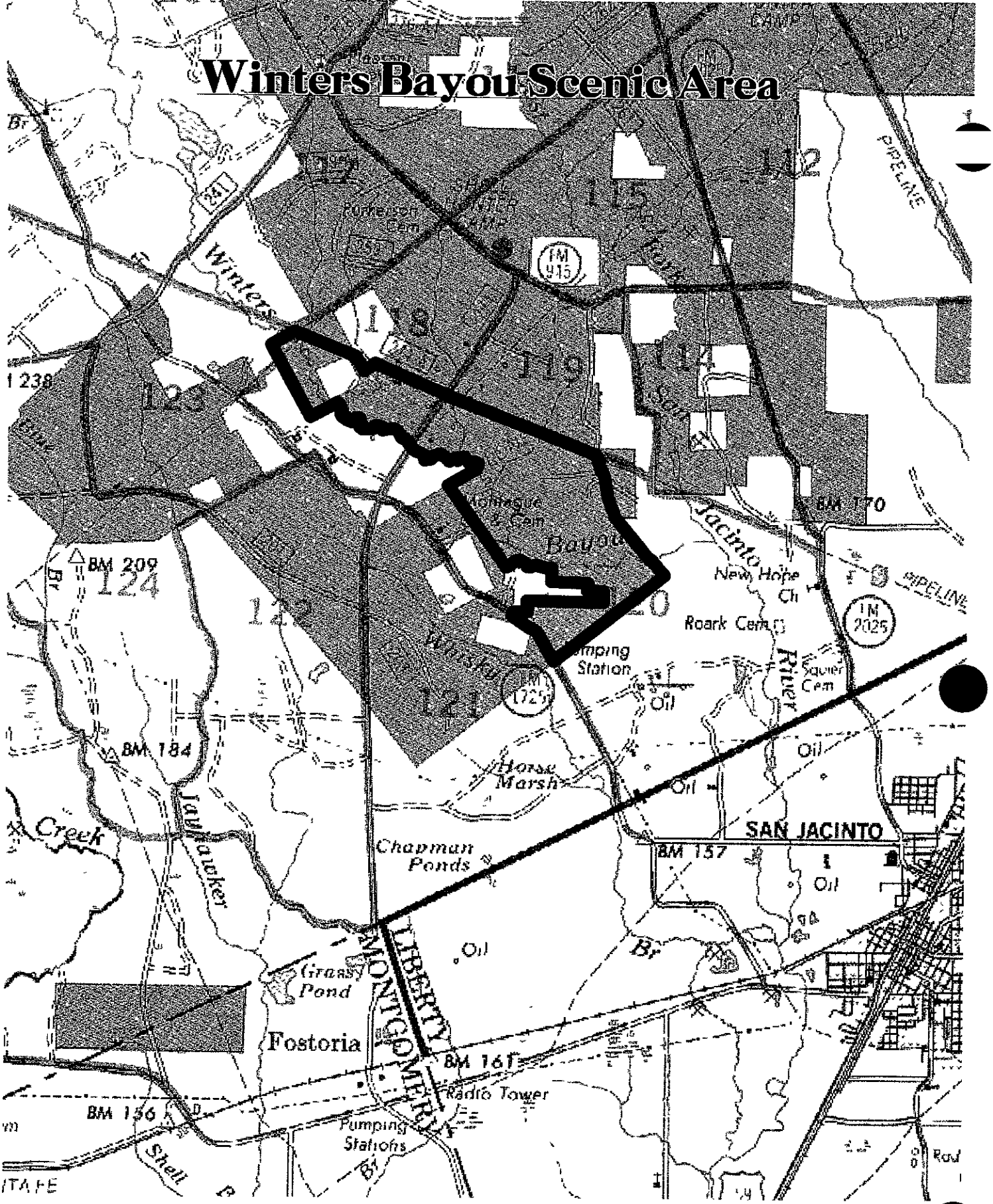
Biological Diversity

MA-8c-B1 Ensure the protection and management for the perpetuation of the mature semi-evergreen mesic forest.

Facilities

MA-8c-B2 Interpretive facilities should be developed to interpret the oil and gas production and mineral ownership in the area.

Winters Bayou Scenic Area



Beech Ravines (1,020 acres)

Location

This area is located on the Sabine National Forest in Compartments 61 and 63, about 15 miles east of San Augustine, Texas along the shores of Toledo Bend Reservoir

Description

The primary area of exceptional scenic and botanical character is 827 acres with approximately 200 acres around the primary area perimeter that is considered a secondary management zone It has a scenic beech-white oak-loblolly pine ravine system that drains east towards Toledo Bend Reservoir and the Sabine river It was designated as a scenic area of approximately 516 acres along the shoreline of Toledo Bend in the 1987 Forest Plan

Desired Future Condition

Throughout this area, including mesic uplands adjacent to slopes, hardwood species increase in size, abundance, and overall dominance. Evidence of fire will fade and leaf litter will become increasingly thick on the ground Canopy gaps will be rather small and limited to natural tree mortality The importance of pine and its occurrence in the site will gradually fade as the influence of fire is removed and existing trees die, being replaced by more shade tolerant hardwood species Species common or unique to this area that will be seen in the future include

Bloodroot (Sanguinaria canadensis)
Toothwort (Dentaria laciniata)
Carolina lily (Lilium michauxii)
Perfoliate bellwort (Uvularia perfoliata)
Slender wake robin (Trillium gracile)
Southern lady slipper (Cypripedium kentuckiense)
Dog tooth violet (Erythronium rostratum)
Bearded short husk (Brachyelytrum erectum)

Management Emphasis

Management is directed toward maintaining and perpetuating the above plant species The more mesic side slopes and beech-white oak communities that exemplify the unique botanical character of this site are not adversely effected by management for the adjacent upland pine communities Efforts to maintain upland pine communities on the periphery of the primary ravine areas will be through Management Area 2 (MA-2) standards and guidelines that provide quality habitat for red-cockaded woodpecker (RCW) and related species

Management of the ravine areas and existing beech-white oak communities will be primarily through protection and close monitoring Efforts to control excessive recreational use and erosion may be needed to ensure the development of the area's botanical character.

Integrated Pest Management

MA-8c-C2 **Do not take action against insects or diseases on side slopes and in ravine areas unless the outbreak is a significant, immediate threat to adjacent private lands or the outbreak jeopardizes Federally listed threatened or endangered species.**

SPB spots predicted by the SPB spot growth model and/or Forest Health entomologist to expand, may be controlled only after interdisciplinary review If the spot would threaten the botanical qualities within the area, protected species, adjacent susceptible private or high value Federally owned pines, control action may be taken SPB suppression activities should be tailored to minimize and protect impacts on the special character of the area.

Recreation Management

MA-8c-C3 **Hunting and trapping is permitted**

Silvicultural Practices

MA-8c-C4 **The beech-white oak ravine system is considered unsuitable, with no programmed timber harvest.**

Manage the upland pine areas with a primary emphasis for RCW and bald eagle habitat. Management activities should be consistent with the development of the mesic hardwood character

Upper Colorow Creek Scenic Area (230 acres)

Location

This area is on the Sabine National Forest in Compartment 67, about 10 miles east of San Augustine, Texas

Description

This botanical area encompasses the 100 acre Colorow Creek Scenic Area as designated in the 1987 Forest Plan It contains a relatively large area of essentially undisturbed mesic hardwood forest Mesic hardwood tree species are common throughout, especially in the lower slopes and along drainages Upland hardwood and pine species can be found in variable abundance near ridgetops and upper slopes Terrain is highly dissected, with abundant slopes, steep sided ravines, and eroded stream channels which have exposed some interesting geologic features, including scenic sandstone cliffs, sinkholes, and large old trees

The natural range of these plants is primarily in cooler northern regions and there existence in east Texas forests is attributed to relict climatic conditions which were more common during the last glaciation These unique species include

Bloodroot (Sanguinaria canadensis)
Toothwort (Dentaria laciniata)
Carolina lily (Lilium michauxii)
Perfoliate bellwort (Uvularia perfoliata)
Slender wake robin (Trillium gracile)
Southern lady slipper (Cypripedium kentuckiense)
Dog tooth violet (Erythronium rostratum)
Bearded short husk (Brachyelytrum erectum)

Desired Future Condition

Throughout this area mesic hardwoods will increase in size, abundance, and overall dominance It is expected that American beech (Fagus grandifolia) and southern magnolia (Magnolia grandiflora), the traditional "climax" hardwood species of the south, will become increasingly evident throughout as succession continues The importance of pine will become less noticeable through natural mortality, although loblolly will continue to survive and reproduce in localized canopy gaps as older trees die or are blown down With the exception of scattered natural mortality gaps, the forest will become increasingly closed canopied Few shrubs, small trees, and understory plants will be evident Downed woody debris and leaf litter will be increasingly accumulated Evidence of fire and past tree cutting will disappear The mesic slope forests will perpetuate populations of plant species which are uncommon in Texas

Management Emphasis

Management will change from a scenic area to a botanical area emphasizing relict plant populations and plant communities, especially the mesic hardwood types Activities which "set back" succession such as burning, soil disturbance, tree removal, and other actions, will be avoided

Management of the mesic areas and existing beech-white oak communities will be primarily through protection and close monitoring. Efforts to control excessive recreational use and erosion may be needed to ensure the development of the areas botanical character

Upper Colorow Creek - Standards and Guidelines

Fire

MA-8c-D1 **Prescribed fire will not be used within the boundaries of this site.**

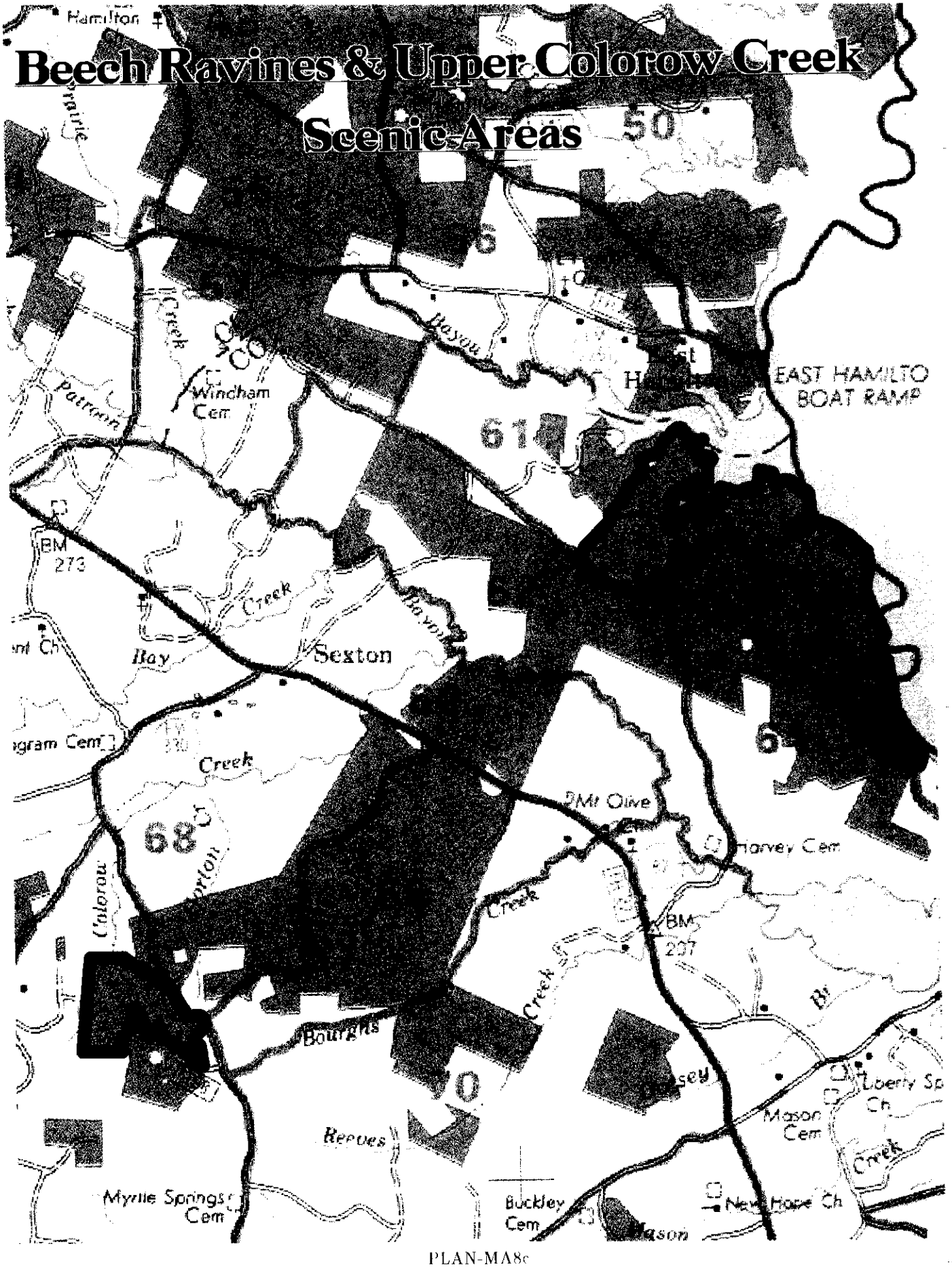
Wildfire suppression strategies should be limited to non-mechanical techniques

Integrated Pest Management

MA-8c-D2 **Do not take action against insects or diseases on side slopes and in ravine areas unless the outbreak is a significant, immediate threat to adjacent private lands or the outbreak jeopardizes Federally listed threatened or endangered species.**

SPB spots predicted by the SPB spot growth model and/or Forest Health entomologist to expand, may be controlled only after interdisciplinary review If the spot would threaten the botanical qualities within the area, protected species, adjacent susceptible private or high value Federally owned pines, control action may be taken. SPB suppression activities should be tailored to minimize and protect impacts on the special character of the area

Beech Ravines & Upper Colorow Creek Scenic Areas



Management Area 8d
Natural Heritage Areas

Theme

This management area consists of 27 sites, most of which have been identified within the Texas Natural Heritage Report (TNHR), or in subsequent inventory and monitoring since that report was published Some TNHR sites have been designated as other management areas, the following sites are not included in any other management area designation

These areas have an emphasis to protect, enhance, and promote sustainable populations of unique plants or plant communities The Forest Service Manual (FSM) 2370 defines botanical areas or areas such as these TNHR sites as "a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity, or other features " The significant character of these sites within this area is described in general with a description, including name and location, and a management emphasis for each site General management area standards and guidelines that are described as well as all Forest-wide standards apply to these sites

Description

The following description of Pophers Creek and Yellowjacket Branch and the Texas Natural Heritage Sites includes the Forest in which they occur, the acres of each site, compartment or allotment number and Ecological Landtype Association in which the site is found

Angelina National Forest

Prairie Creek Seep	8 acres	C16	Clayey Uplands
Pophers Creek	166 acres	C51 & C50	Clayey Uplands
Yellowjacket Branch	589 acres	C18 & C22	Clayey Uplands
Bannister Pimpernel	20 acres	C13	Clayey Uplands

Davy Crockett National Forest

Crested Coralroot	6 acres	C7	Sparta Sandhills
Neches Bluff	4 acres	C20	Sparta Sandhills

Sabine National Forest

Fox Hunters Hill	451 acres	C139	Mayfl ver Uplands
Matlock Hills	215 acres	C66	Redlands
San Augustine Sandhills	136 acres	C51, C52	Redlands
Sandy Creek	160 acres	C51	Redlands
Sixmile Creek	299 acres	C111-113, C130	Clayey Uplands
Stark Tract	448 acres	C142	Mayflower Uplands
Surprise Beech	130 acres	C79	Lignitic Uplands
Crooked Creek	4 acres	C65	Clayey Uplands
Cypress Creek	66 acres	C65	Lignitic Uplands
East Hamilton Ravine	4 acres	C50	Redlands
Mason Creek	6 acres	C71	Lignitic Uplands

Sam Houston National Forest

Coldspring slender wake-robin	9 acres	C96	Big Thicket

Caddo National Grasslands

Center Point Prairie	90 acres	C90	Blackland Prairie
Coffee Mill Lake Prairie	27 acres	C23	Crosstimbers
Gober Prairie	60 acres	C47	Blackland Prairie
Lake Crockett Flatwoods	60 acres	C11	Crosstimbers
Spoonamore Prairie	19 acres	C8	Crosstimbers

LBJ National Grasslands

Bald Knob Hill	33 acres	C32	Limestone Mesa
Pecan Creek Mesa	30 acres	C31	Limestone Mesa
Post Oak Ridge	88 acres	C2	Crosstimbers
Pringle Creek	93 acres	C3	Crosstimbers

Desired Future Condition

Sites in Lignitic Uplands, Redlands and Clayey Uplands LTA's may include beech-white oak-loblolly pine ravine systems, including mesic uplands adjacent to slopes More mesic sites will have mesic hardwood tree species in the lower slopes and along drainages Upland hardwood and pine species can be found in variable abundance near ridgetops and upper slopes Hardwood species increase in size, abundance, and overall dominance in the lower slopes of these ravine systems Evidence and use of fire will decrease and leaf litter will become increasingly thick on the ground Canopy gaps will be rather small and limited to natural tree mortality The importance of pine and its occurrence in the site will gradually fade as the influence of fire is removed and existing trees die, being replaced by more shade tolerant hardwood species.

Terrain is variable, with slopes, steep sided ravines, and eroded stream channels which may also expose some interesting geologic features, including scenic sandstone cliffs, sinkholes, and large old trees. Plants of these areas are primarily characteristic of cooler northern regions, and their existence in east Texas forests is attributed to relict climatic conditions which were more common during the last glaciation. These unique species include:

Bloodroot (Sanguinaria canadensis)
Toothwort (Dentaria laciniata)
Carolina lily (Lilium michauxii)
Perfoliate bellwort (Uvularia perfoliata)
Slender wake robin (Trillium gracile)
Southern lady slipper (Cypripedium kentuckiense)
Dog tooth violet (Erythronium rostratum)
Bearded short husk (Brachyelytrum erectum)

Sites in the Mayflower Uplands, Sandy Uplands and Clayey Uplands may have stands of mixed pine-oak nearly pure longleaf pine, which dominate the overstory on upland portions of these areas. These sites will develop a thick, nearly continuous grass cover beneath. As trees mature, reproduce, and die, the overstory will become increasingly uneven aged. Trees of various sizes will replace the present stands of uniformly sized trees. Overall tree density will become more varied. Patches of regenerating seedlings and saplings will be common, interspersed with occasional dense clumps of mature trees, hardwood areas, and canopy openings with few to no trees. Signs of fire (including scarred trunks, and occasionally browned needles) will be prevalent. Some natural mortality and downed trees will be evident due to lightning strikes, fire and disease damage, and windthrow. These open savanna-like conditions foster high levels of plant species diversity, including several unique plant species. Longleaf savannas may include populations of rare West Gulf Coastal Plain endemics.

Unique species which occur in these upland, dryer habitats include

Slender gay feather (Liatris tenuis)
Louisiana squarehead (Tetragonetheca ludoviciana)
Erect milkpea (Galactia erecta)
Leadplant (Amorpha canescens)
Incised groove bur (Agrimonia incisa).

In the Mayflower Uplands LTA, hillside bog (pitcher plant bogs) communities, dominated by herbaceous wetland species, including many carnivorous plants, and orchid species, will be perpetuated. The open aspect of bogs through frequent fire, will provide the essentials for the propagation of many rare and restricted species In larger, wet areas where fire is less frequent, baygall habitats will be seen. These acid seep forests, with thick evergreen shrub communities (often lacking a true overstory) will have abundant ferns and mosses in the understory.

Unique species which occur in these bog or baygall habitats include

Bog coneflower (Rudbeckia scabrifolia)
Drummond's yellow-eyed grass (Xyris drummondii)
Bent sedge (Carex styloflexa)
Nodding nixie (Apteria aphylla)
Texas bartonia (Bartonia texana)
Yellow fringeless orchid (Platanthera integra)
Grasspink (Calopogon tuberosus)
Rose pogonia (Pogonia ophioglossoides)
Rough-leaf yellow eyed grass (Xyris scabrifolia)
Texas trillium (Trillium pussillum var texanum).

Management Emphasis

In these areas, the natural disturbance effects of fire, weather, and erosive action should be allowed to work unimpeded Some active management, in addition to natural processes, will be used for maintenance or to speed up needed restoration

Management may emphasize relict plant populations and plant communities, especially the mesic hardwood types Activities which "set back" succession such as burning, soil disturbance, tree removal, and other actions in these areas, will be avoided The continued use of frequent prescribed fires (including growing season ignitions) will maintain an open, herbaceous dominated understory throughout the majority of mayflower uplands or clayey uplands

Management of the mesic areas and existing beech-white oak communities will be primarily through protection and close monitoring Efforts to control excessive recreational use and erosion may be needed to ensure the development of the areas botanical character

Allow frequent fire return intervals to enhance the species composition of fire maintained communities Fires should be allowed to burn throughout the area, and not limited to specific sites, to allow natural plant community variability and ecotones to reestablish

Some of these sites within this management area are surrounded entirely by MA-2, which emphasizes mature upland pine for the restoration of species such as the RCW Standards established that benefit population improvement for RCW are a priority and are generally compatible with this botanical area

MA-8d Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines

Biological Diversity

MA-8d-01 **These areas may be allocated as potential old growth.**

Some areas may be classified as restored old growth

MA-8d-02 **Manage for the biological characteristics and attributes identified for each of the ecological units found within the Ecological Classification System hierarchy.**

MA-8d-03 **Do not permit introduction of exotic plant and animal species.**

Reintroduction of former native species may be permitted if the objectives of the botanical area are met

MA-8d-04 **Allow existing non-native plant communities to revert to native plant communities.**

MA-8d-05 **Leave any felled trees in place, unless lying across trails.**

Emphasize the development of old growth characteristics for the plant communities existing within the botanical area

Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-8d-11 **Complete an inventory of cultural resources for any proposed ground disturbing activities and to determine if any significant sites occur.**

Facilities

MA-8d-21 **Subject to valid existing rights, prohibit new roads, fences, or signs unless they contribute to the objective or protection of the botanical character of the area.**

Boundary fencing is permitted for protection against livestock or excessive human use

Fire

MA-8d-31 **Limit suppression strategies, practices and activities to those which have minimal impacts to botanical values. Extinguish wildfires endangering the area.**

MA-8d-32 **Use prescribed fire to manage or maintain the botanical character and successional stages for which the area has been designated unless restricted in certain plant communities as defined in specific botanical areas.**

MA-8d-33 **Normally allow fuels to accumulate at natural rates unless they threaten the objectives of the area.**

Leave fire-caused debris for natural decay.

Integrated Pest Management

MA-8d-41 **Treatment of SPB infestations will consider compatibility with the objectives and desired future condition of that area.**

MA-8d-42 **SPB spots should be evaluated and should generally receive treatment priority over spots in Management Area 1 if necessary to maintain botanical values.**

SPB spots predicted by the SPB spot growth model and/or Forest Health entomologist to expand, may be controlled only after interdisciplinary review. If the spot would threaten the botanical qualities within the area, protected species, adjacent susceptible private or high value Federally owned pines, control action may be taken SPB suppression activities should be tailored to minimize impacts on the botanical character of the area

MA-8d-43 **SPB treatment options, in order of priority, are:**

Cut and leave;

Cut and remove; should only be implemented when existing roads can be utilized.

Lands

MA-8d-51 **Continue to honor rights-of-way easements, including utility corridors, existing before area establishment. Discourage upgrading that would compromise the objectives of the area.**

MA-8d-52 **Retain all lands as public lands.**

MA-8d-53 **Acquire private inholdings where necessary to enhance values of the area.**

Minerals

MA-8d-61 **Prohibit surface occupancy for hard rock ores or other non-liquid deposits, subject to valid existing rights.**

MA-8d-62 **U.S. oil and gas mineral rights may be leased with a no surface occupancy stipulation.**

Hand laying of geo-phones for seismic data collection may be permitted pending site-specific evaluation for any adverse effects

MA-8d-63 **Reserved and outstanding mineral rights in special areas are honored and managed according to Forest-wide standards and guidelines.**

Planning

MA-8d-71 **Permit and encourage research and educational use.**

Educational use of the area should generally be directed toward the graduate level, but may be permitted at any level Ecological responses to management activities or natural disturbances on or adjacent to botanical areas should be measured when appropriate Studies may be prioritized based on the significance of the potential impact

Range

MA-8d-81 **Prohibit livestock grazing except as part of approved scientific investigation.**

Where grazing is needed to establish or maintain vegetative communities, define objectives for grazing

MA-8d-82 **Initiate fencing or other methods of livestock control when incidental or casual livestock grazing exceeds 25 percent of annual desirable forage production.**

MA-8d-83 **Do not implement structural or non-structural range improvements within the area.**

Recreation Management

MA-8d-91 **Design management practices to result in a physical setting that meets or exceeds the recreation opportunity spectrum (ROS) class of semi-primitive motorized.**

MA-8d-92 **Allow dispersed recreation activities and uses within the area.**

Prohibit or discourage those activities that impact the botanical character of the area, this includes overnight camping, recreation use within 200 feet of lakes, ponds and streams; and pack and saddle stock use

MA-8d-93 **Prohibit all recreation off-road vehicle (ORV) use.**

MA-8d-94 **Institute closures or permits if recreation use threatens research or educational values.**

MA-8d-95 **Encourage on-site interpretive or demonstrative facilities.**

Facilities shall be developed in concert with the botanical character of the area and without impairment to the natural features which the area was designated to sustain

MA-8d-96 **Design publicity that would attract the general public to the area.**

Monitor effects of public use on the botanical features of the area and implement measures, as needed, to protect sensitive plants

Trail Management

MA-8d-101 **Limit trails to those needed for access to conduct research, for educational purposes, and to manage visitor use.**

Existing trails may be allowed to remain as long as the area objectives are not compromised

Scenic Resources

MA-8d-111 **Design practices to meet retention or partial retention visual quality objective (VQO).**

These designations should refer to established VQO maps

Silviculture Practices

MA-8d-121 **The area is classified as unsuitable for timber production.**

MA-8d-122 **Prohibit removal of vegetation (including firewood, grass, fruit, seeds, etc.) unless it is approved for scientific investigation, southern pine beetle (SPB) control action, management for T&E species or when exercising valid existing rights.**

MA-8d-123 **Vegetation management activities can be used to restore or maintain the botanically significant character of the site.**

Specific activities include fire, vegetation removal, planting, or other cultural techniques that are determined to be appropriate through site-specific environmental analysis

Soil and Water

MA-8d-131 **Initiate watershed restoration where man-induced erosion is damaging area values, water quality, or soil productivity.**

Wildlife Management

MA-8d-141 **Permit only those wildlife habitat management practices specifically designed to improve habitat for threatened or endangered species.**

Management Area 8e
Special Bottomland Areas

Theme

Areas having significant riparian or wildlife habitat characteristics where large old trees are maintained for aesthetics and wildlife needing old-growth characteristics

Locations

The **BEAR CREEK** area and the area along Pomponaugh Creek lie south of Pineland, Texas in Compartment 88 of the Sabine National Forest

The **AYISH BAYOU** area lies along the eastern edge of the Angelina National Forest adjacent to the Ayish Bayou River east of Turkey Hill wilderness It is within forest Compartments 20, 101, 102, and 103

The **ATTOYAC RIVER** area lies along both sides of the Attoyac River on the northern side of the Angelina National Forest just above a large arm of the Sam Rayburn Reservoir It is east of Etoile, Texas in forest Compartments 104, 105, and 106

The **UPPER ANGELINA RIVER** area lies above both sides of the Angelina River about ten miles north of Lufkin, Texas just east of U S Highway 59 It is a unit of the Angelina Forest separated from the main units to the southeast and is included in forest Compartments 107, 108, 109, 110, and 111.

Description

The Bear Creek area includes 665 acres of riparian bottomland along two drainages emptying into Sam Rayburn Reservoir This area, in two separate units, has an essentially undisturbed character of older hardwoods with some pines

The Ayish Bayou area includes about 1,200 acres of riparian bottomland hardwoods with some scattered areas of pine on upland benches above the floodplain Some of the area may experience extensive flooding from backwaters of Sam Rayburn Reservoir The area has been determined to have significant archeological values which are excluded from this area as individual sites or areas in MA-8f

The Attoyac Bayou area includes about 3,500 acres of riparian bottomland hardwoods with some scattered pine on upland benches above the floodplain similar to the Ayish Bayou area It will also experience extensive flooding from backwaters of Sam Rayburn Reservoir There are also some archeological sites within this area, but they are included in Management Area 8f (MA-8f).

If other archeological sites are found within the Ayish and Attoyac Bayou areas they will be excluded from this management area and added to MA-8f

The upper Angelina River area includes about 6,110 acres of riparian bottomland hardwoods with some scattered pine This area has extensive floodplains on both sides of the Angelina River that may remain flooded several weeks annually from the Angelina River, and backwater from Sam Rayburn Reservoir

Desired Future Condition

This management area retains its unique characteristic(s) and is maintained in a natural to near-natural setting The water channel is not modified in any way. Dams or other structures that impede or divert the flow do not exist Visitors are aware that man's activities may have subtly changed the original character of the surrounding landscape only in selected areas The changes do not detract from the recreational experience

Recreation use is not concentrated, and visitors have the opportunity to experience some solitude and to enjoy the natural character of the surrounding landscape Water-based recreation activities include fishing, boating, and canoeing Land-based recreation activities include hunting, hiking, horseback riding, and other activities that do not disturb the character of the area

Management practices do not alter the natural landscape Access to water segments is provided at select locations Facilities may be constructed for health, safety, and resource protection plus some degree of user convenience

Management Emphasis

These areas are established to provide a more restrictive management than is found in MA-4, which is Streamside and Riparian Areas A high emphasis is placed on improving and maintaining the riparian characteristics of the bottomland hardwood component for potential old-growth characteristics and wildlife habitat values associated with this ecosystem. Additional management activities may be implemented to improve scenery, the fishery, and streamside zones for wildlife habitat up to one-quarter (1/4) mile from the water's edge. This area is to remain essentially undeveloped except for compatible improvements that enhance aesthetics, wildlife habitat, and visitor enjoyment of these

MA-8e Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines

Biological Diversity

MA-8e-01 **This area is allocated as restored old-growth.**

Implement protection or vegetative manipulation to develop potential old-growth characteristics.

MA-8e-02 **Manage for the biological characteristics and attributes identified for each area within the Ecological Classification System hierarchy.**

a *Emphasis for management actions should be for the enhancement of the riparian character and wildlife populations endemic to the area*

b *Revegetate any disturbed areas with native species, unless they are unavailable*

Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-8e-11 **Protect any historical and cultural characteristics of the area through clear boundary definition and educational signing.**

Interpretive activities may be initiated where they are compatible with cultural resource protection

Facilities

See Forest-wide Standards and Guidelines

Fire

MA-8e-21 **Prescribed fire may be used for vegetative manipulation within the area and must conform to specific actions that would protect or enhance the aesthetics, wildlife, or riparian characteristics of the area.**

MA-8e-22 **Suppression strategies, practices, and activities shall be limited to those which have minimal effects on defined values.**

Integrated Pest Management

MA-8e-31 **Treatment of insect and disease infestations must be compatible with aesthetics, riparian, and wildlife values.**

Use Standards and Guidelines identified in Management Area 8b (MA-8b) for southern pine beetle (SPB) control

Lands

MA-8e-41 **Issue special use permits when compatible with the management of the area or where they are necessary to support valid existing rights.**

MA-8e-42 **Discourage new transmission lines, gas lines, etc.. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way.**

Rights-of-way may cross these zones subject to mitigation requirements determined through site-specific environmental analysis Obtain U S. Corps of Engineers clearance for impacted jurisdictional wetlands

MA-8e-43 **Identify base floodplains and jurisdictional wetlands in all land exchanges.**

The environmental analysis for any land exchange shall identify wetland and riparian values of all tracts

Minerals

MA-8e-51 **Prohibit removal of common variety minerals.**

MA-8e-52 **Make public owned leasable minerals available for leasing.**

To the extent practicable, new exploration and production activities shall be compatible with the soil, water, wildlife, and fisheries management emphasis for this area

MA-8e-53 **Federal oil and gas leases shall contain a stream protection stipulation requiring oil and gas well sites and containment facilities be located outside the SMZ of perennial or intermittent streams and buffer zones of wetlands or lakeshores.**

a *Further set back may be required as determined necessary through site-specific environmental analysis.*

b *Pipelines and seismic survey projects may cross streamside zones subject to mitigation requirements determined through site-specific environmental analysis Obtain U S Corps of Engineers clearance for impacted jursidictional wetlands*

c *Reccomend well sites and facilities for reserved and outstanding oil and gas operations be located outside of the SMZ*

Planning and Range

See Forest-wide Standards and Guidelines

Recreation

MA-8e-61 **The recreation opportunity spectrum (ROS) for this management area shall generally be semi-primitive non-motorized or roaded natural at trail or road crossings.**

These designations should refer to established ROS maps.

Scenic Resources

MA-8e-71 **Design practices to meet the VQO of modification, partial retential or retention.**

See Forest-wide Standards and Guidelines

Silvicultural Practices

MA-8e-81 **This area is classified as unsuitable for timber production.**

a *Unregulated timber harvest may be utilized to accomplish non-timber related goals and desired future conditions of the ECS and as approved through site specific environmental analysis.*

b *No harvest shall occur within the primary zone unless for forest health, safety or to provide habitat for threatened or endangered species*

c *Harvest and silvicultural management may occur within the secondary zone to achieve the desired future condition*

MA-8e-82 **Designate all perennial and intermittent stream courses as protected stream courses in the timber sale contract and protected as described in standard contract provisions.**

MA-8e-83 **Exclude skidders and other logging equipment from the primary stream-side zone. Entry into the secondary zone may be authorized by the sales administrator on a case-by-case basis and at designated stream crossings.**

a. *Do not authorize equipment use during wet ground conditions*

b *Designate crossings for perennial stream must be identified during site specific environmental analysis Other protected streams that may require a designated crossing shall be identified during site-specific environmental analysis*

c. *Crossings should be at right angles to the stream or riparian area*

MA-8e-84 **Leave vegetation and naturally-felled timber wherever they afford shade over a stream channel or maintain the integrity of the soil near such a stream.**

Following incidents of extreme catastrophic occurrence, action may be taken to enhance the natural integrity of the streamside zone

MA-8e-85 **Silvicultural practices for riparian areas damaged by past management or catastrophic events will be designed to reestablish stands that provide desired vegetation characteristics.**

a *Use information from the established ECS and vegetation community to achieve riparian ecosystem goal, restoration activities will be designed to maintain or improve the stated desired ecological conditon*

b. *When designing a timber sale, locate cutting areas and access so as to avoid stream crossings.*

MA-8e-86 **Stream channels shall not be used at any time as skid trails.**

MA-8e-87 **Servicing of equipment shall not be permitted within the management area.**

MA-8e-88 **Remove any debris deposited by current management actions in stream channels that may adversley effect the integrity of the stream**

Site-specific conditons may exist that could consider leaving logging debris in the stream channel if such actions would improve or maintain stream integrity.

MA-8e-89 **Mechanical site preparation shall be prohibited.**

MA-8e-89 **Any tree planting shall be done by hand.**

MA-8e-91 **Retain, where available, hardwood den trees, snags, or SPB vacated trees (12 inches diameter breast height (DBH) or greater) during all stand entries, and silvilcultural treatments.**

Salvage operations are normally prohibited unless safety hazards, sucessful SPB control or enhancement of the riparian condition deem salvage appropriate.'

Soil and Water

MA-8e-101 **Subject to valid existing rights, no soil disturbing activities within this management area will be permitted except for the following types of projects when approved through site-specific environmental analysis: (a) Restoration of eroded or disturbed sites; (b) construction or repair of**

ponds; (c) special use, utility and pipeline crossings; (d) seismic surveys; (e) road or trail construction, reconstruction or maintenance; (f) timber harvest for non-timber or vegetation enhancement purposes; (g) recreation facilities; and (h) correction of safety hazards.

MA-8e-102 Allow ponds, greentree reservoirs, or flood control structures to be constructed if approved through site-specific environmental analysis.

MA-8e-103 Prohibit concentrated recreation use unless appropriate mitigation has been provided.

Where appropriate facilities are provided for concentrated recreational use and where no environmental damage is indicated, activities may continue

MA-8e-104 Activities located on navigable waters or waters of the U.S., will comply with the Clean Water Act.

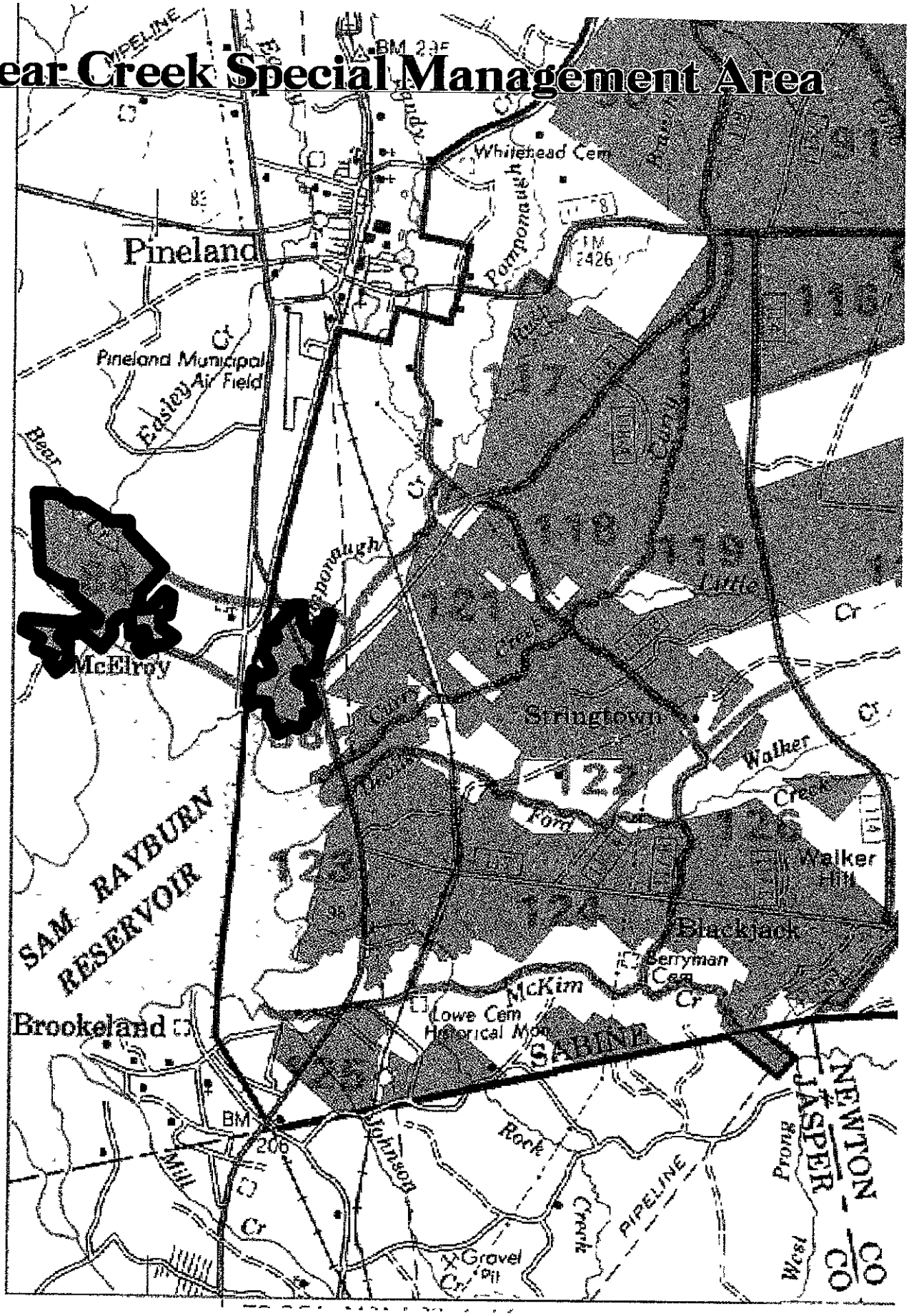
MA-8e-105 Where a jurisdictional wetland is involved, obtain Section 404 permits from Corps. of Engineers when an activity is not under the general permit provisions.

MA-8e-106 Lake banks shall be protected, restored or enhanced to meet non-point source pollution goals and aquatic habitat objectives.

Wildlife

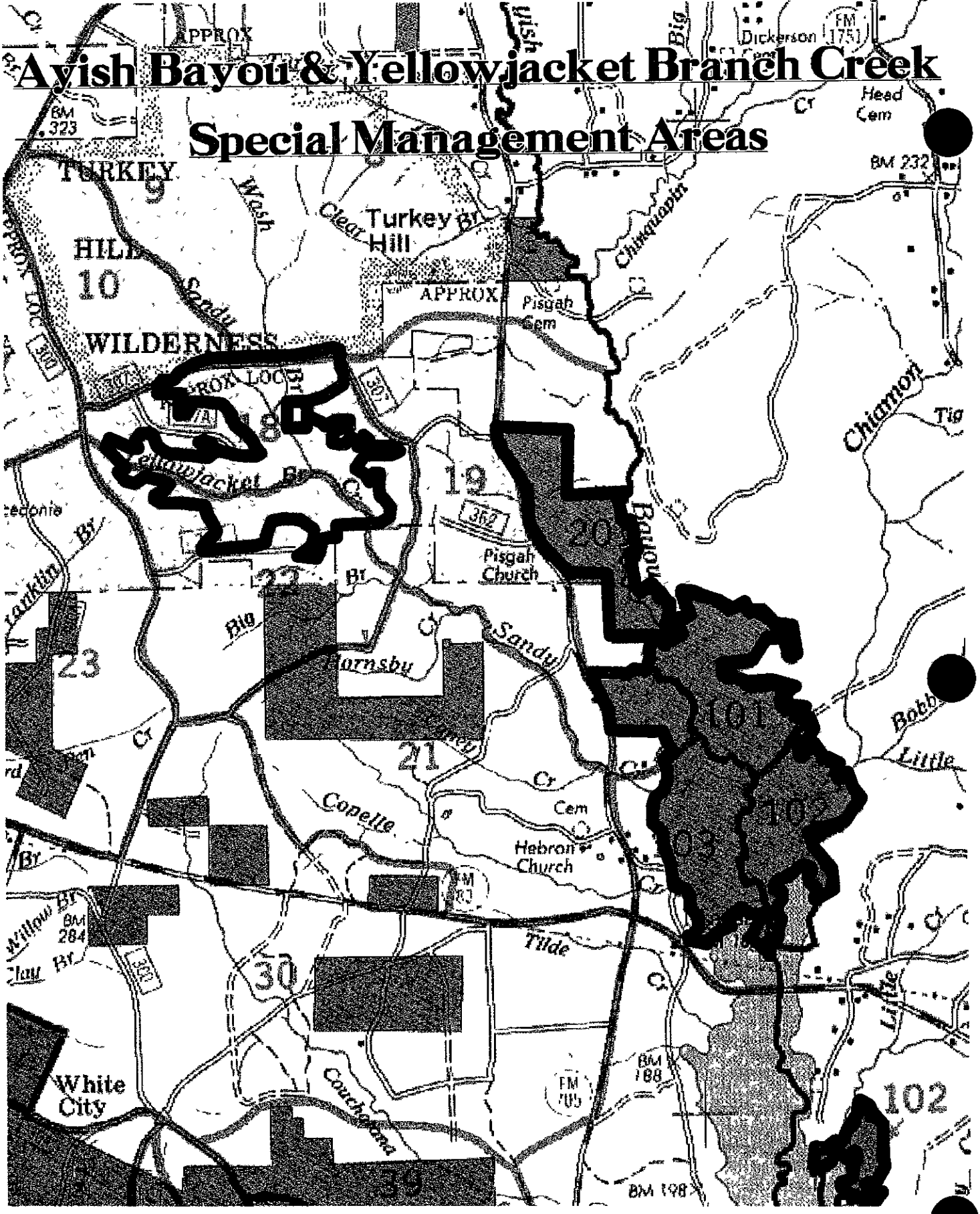
See Forest-wide Standards and Guidelines

Bear Creek Special Management Area

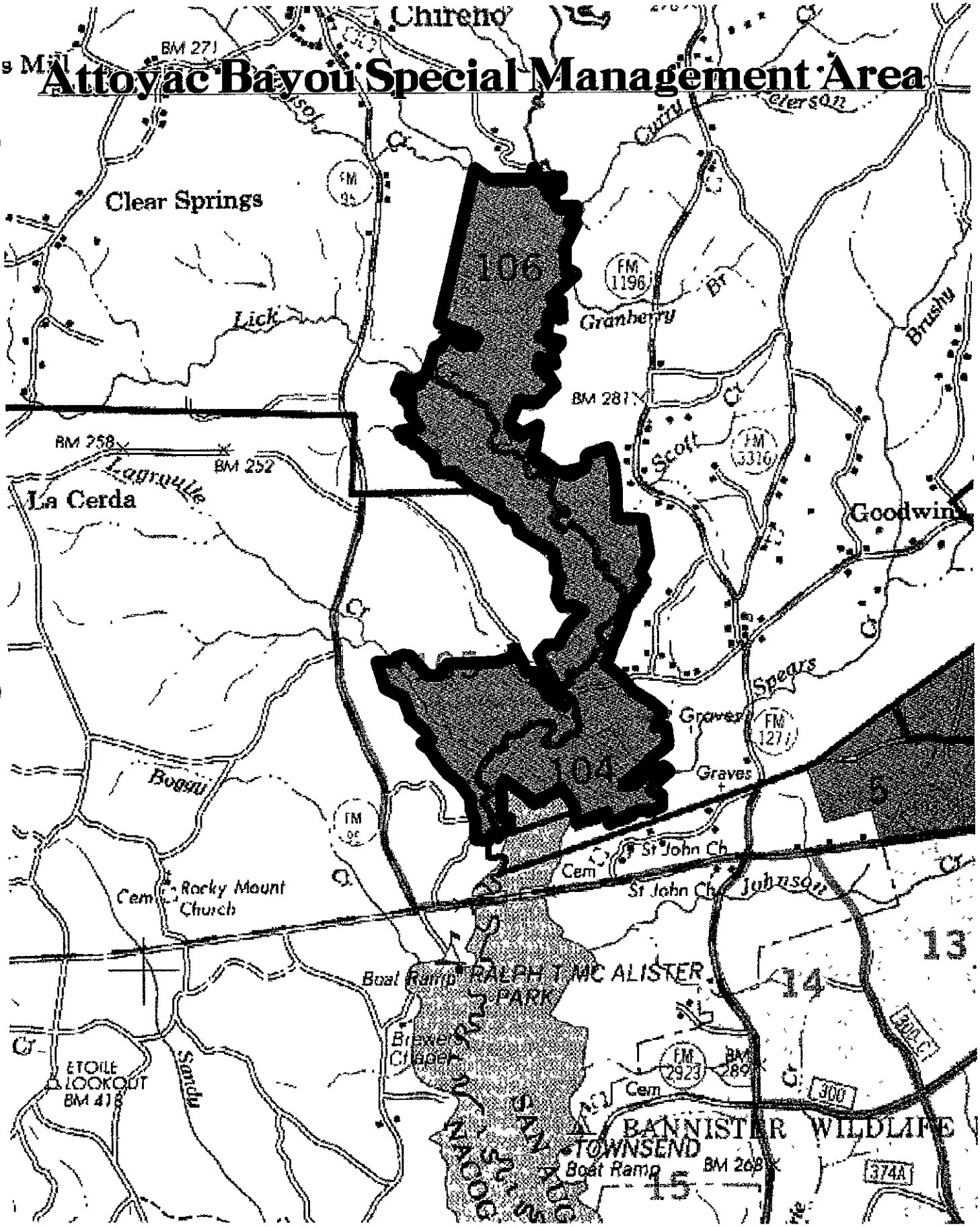


Ayish Bayou & Yellowjacket Branch Creek

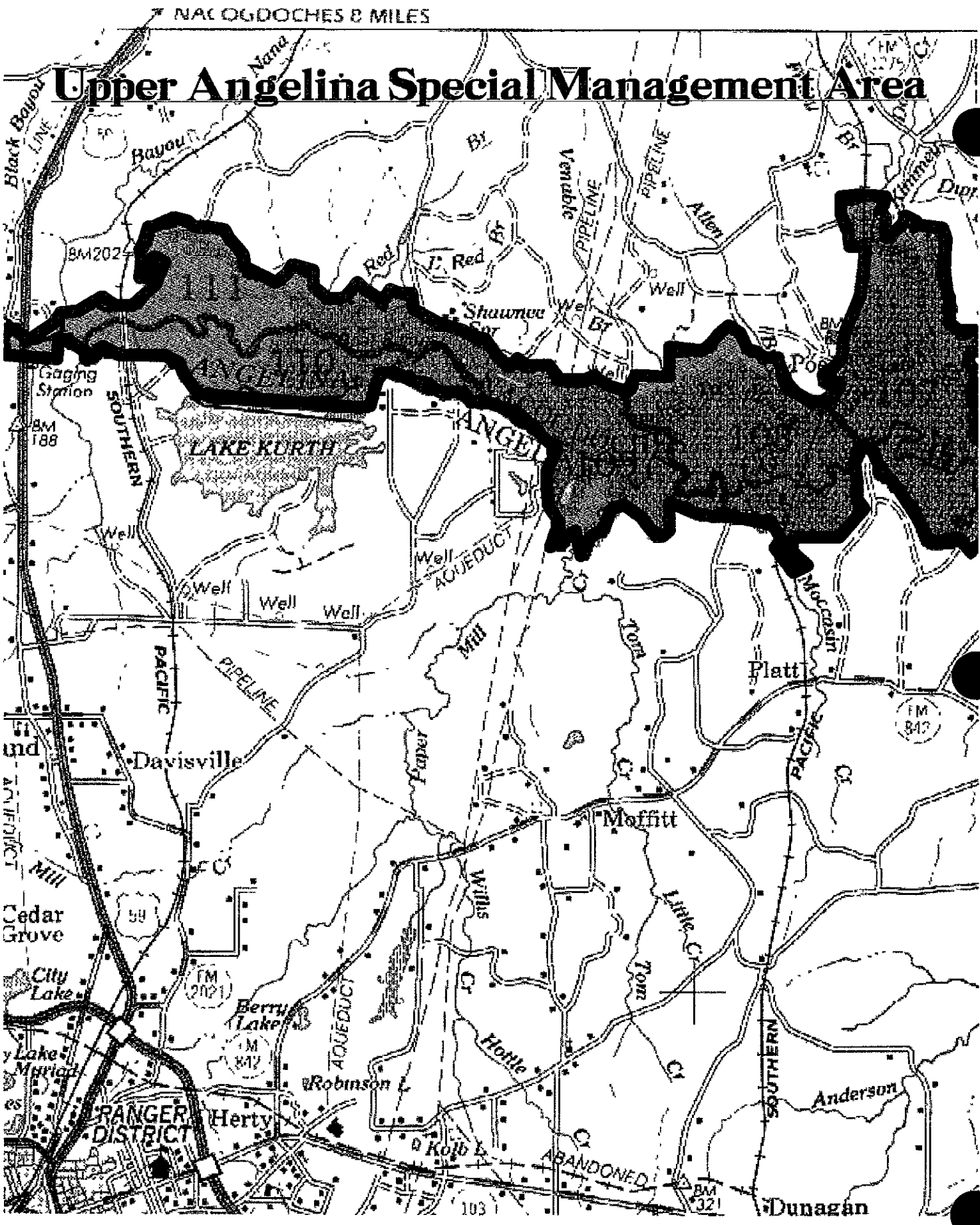
Special Management Areas



Attoyac Bayou Special Management Area



Upper Angelina Special Management Area



Management Area 8f
Cultural Heritage Areas

Theme Archeological and Historic Areas - A unit of land possessing features, sites or a concentration of sites, buildings, structures, or objects united historically or prehistorically by plan or physical development, and which have been determined to be significant to our understanding of the prehistoric and historic occupation and utilization of the lands in which they are located

MA-8f Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines

Biological Diversity

MA-8f-01 **This area is allocated as potential old-growth**

Manage vegetation to develop potential old-growth characteristics.

MA-8f-02 **Manage for the biological characteristics and attributes identified for each specific area within the Ecological Classification System hierarchy.**

Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-8f-11 **Protect and manage the historical, archeological, scientific, interpretive, and other values, integrity, or contexts for which the areas are designated.**

Facilities

MA-8f-21 **Construct new roads or trails only when they are necessary for interpretive or educational purposes or will correct resource damage occurring from existing roads or trails.**

Existing roads within these special areas will be closed to public use if an evaluation determines resource integrity would be lost if roads remain open

MA-8f-22 **Existing hiking trails will remain open. Trail stabilization and repairs will be allowed only after any adverse effects to heritage resources have been mitigated.**

Fire

MA-8f-31 **Manage fire and fuels through suppression practices, management of ignited prescribed fire, and vegetation manipulation to protect the values for which the area is designated or to maintain or restore natural conditions.**

MA-8f-32 **Accomplish fire suppression and fuels management without the use of heavy equipment or fire plows in those areas where their use would endanger the historical or contextual integrity of site features or cultural deposits.**

MA-8f-33 The appropriate suppression response may be confinement, containment, or control.

Integrated Pest Management

MA-8f-41 Southern pine beetle (SPB) treatment methods which may be utilized when required include: Cut and leave, and cut and hand spray.

MA-8f-42 Allow SPB infestations to run their natural course until they leave the site limits, unless site-specific analysis indicates that retention of dead snags poses a significant danger to the standing structures or the visiting public.

Lands

MA-8f-51 Retain all lands as public lands.

MA-8f-52 Acquire private inholdings where necessary to enhance values of the special area.

Minerals

MA-8f-61 Prohibit surface occupancy for hard rock ores or other non-liquid deposits, subject to valid existing rights.

MA-8f-62 U.S. oil and gas mineral rights may be leased with a no surface occupancy stipulation.

Hand laying of geo-phones for seismic data collection may be permitted.

MA-8f-63 Reserved and outstanding mineral rights in special areas will be honored and managed according to Forest-wide standards and guidelines.

MA-8f-64 Negotiate for purchase of reserved or outstanding rights if the exercise of those rights would cause adverse effects to heritage resources.

Planning

See Forest-wide Standards and Guidelines

Range

MA-8f-71 Prohibit livestock glazing.

Recreation Management

MA-8f-81 The ROS for this management area shall be roaded natural or semi-primitive, motorized.

These designations should refer to established ROS maps

MA-8f-82 **Allow recreation use, with emphasis on interpretation, education, and inspiration, when it does not threaten the values for which areas are designated.**

MA-8f-83 **Utilize restrictions or closures under 36 CFR 261 Subpart B when necessary to protect the area from actual or potential damage due to public use.**

MA-8f-84 **Prohibit possession or use of metal detectors within the area.**

MA-8f-85 **ORV travel is not permitted within the area.**

Scenic Resources

MA-8f-91 **Manage historical and archeological areas to meet a visual quality objective (VQO) of retention or partial retention.**

These designations should refer to established VQO maps.

Silviculture Practices

MA-8f-101 **Allow stand thinning and wood gathering when it is necessary to reduce excessive fuel loads, maintain or restore natural conditions, or enhance other values for which the area is designated; but vegetation manipulation which threatens or compromises the contextual integrity of the structures, features, surface or subsurface cultural materials for scientific, historical, or interpretation within the area will not be permitted.**

MA-8f-102 **The area is classified as unsuitable for timber production.**

Soil and Water

See Forest-wide Standards and Guidelines

Special Uses and Permits

MA-8f-113 **Allow authorization of scientific activity research, or other activities that are compatible with area's values through special use permits with terms that protect or enhance the area.**

MA-8f-114 **Continue to honor rights-of-way easements, including utility corridors, existing before special area establishment, but allow no upgrading that is adverse to the objectives of the special area.**

Wildlife

See Forest-wide Standards and Guidelines

Lake Fannin Organizational Camp (200 acres)

Location

This site is on the Caddo National Grassland in Unit 39, along the upper banks of the Red River in Fannin County, Texas

Description

This historical area encompasses the Lake Fannin Organizational Camp of 200 acres identified as including the historical features of the site. These include the lodge, bathhouse, cabins and caretakers residence, as well as the remains of the boathouse and bridges. The camp was constructed in the 1930's by the Rural Resettlement Administration and is eligible for listing on the National Register of Historic Places.

Desired Future Condition

The historical and contextual integrity of the camp and associated landscape is maintained so that the scientific and educational values are retained Implementation of minimum and long-term maintenance plans results in the restoration and reuse of the camp in a manner consistent with its historical context.

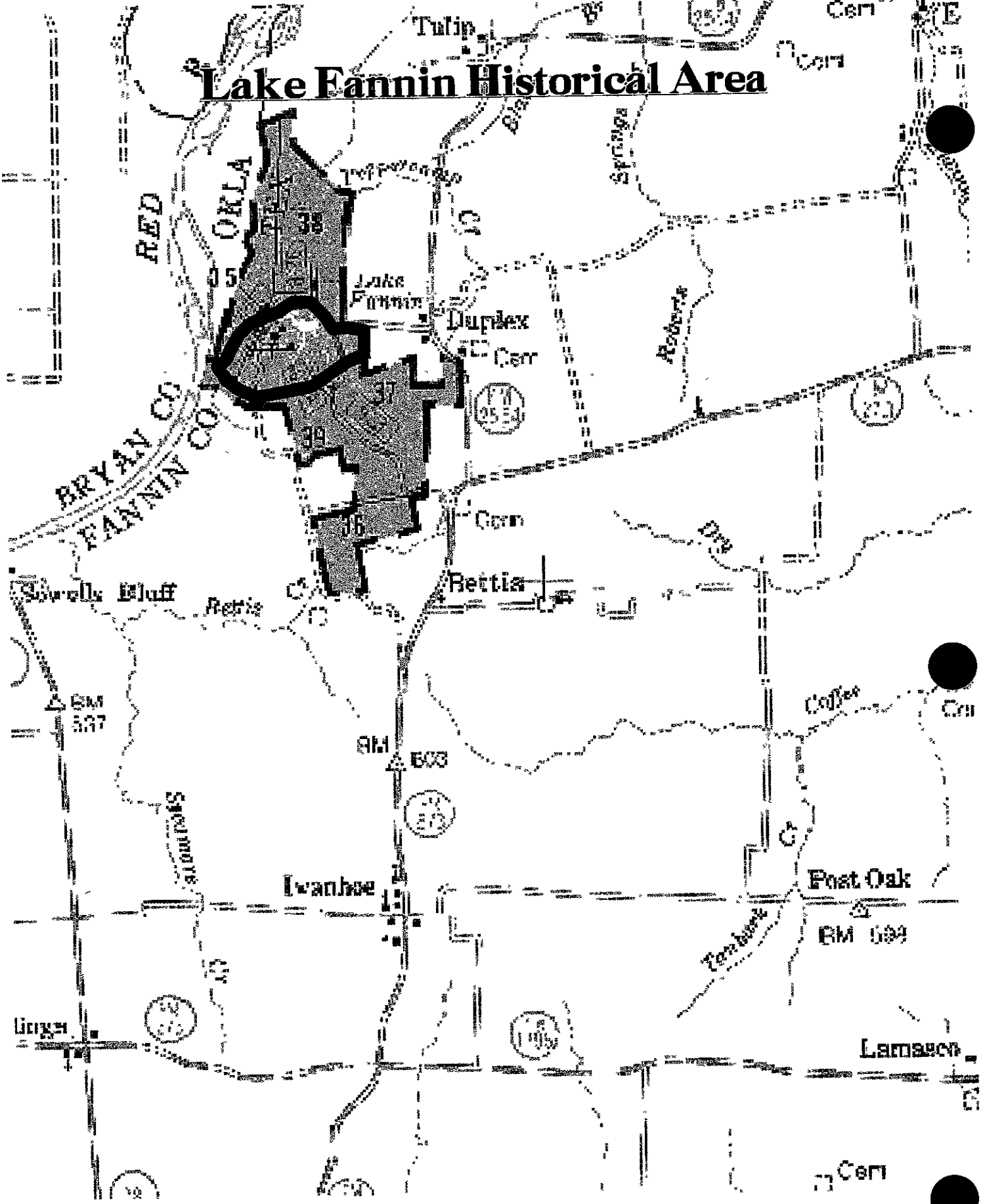
Vegetation and setting around the site structures appears near natural Vegetation manipulation is used to maintain or restore natural conditions only in those areas where standing structures and surficial features are not endangered

Facilities will be present when needed to maintain the area or to facilitate visitor use of the area, but they do not detract from the scientific, historical, or interpretive integrity of the site. Recreational use of the area is primarily for interpretation, educational, and inspirational activities.

Management Emphasis

Management emphasis is on protecting, enhancing, and interpreting for public education and recreation, the structures, features, and cultural materials associated with the construction and use of the Lake Fannin Organizational Camp.

Lake Fannin Historical Area



Attoyac Bayou Archeological Area (180 acres)
Ayish Bayou Archeological Area (1,330 acres)
Cochino Bayou Archeological Area (270 acres)

Location

The Attoyac Bayou site is in Compartment 104 on the northern portion of the Angelina National Forest at the upper end of Sam Rayburn Reservoir, about seven miles east of Etoile, Texas.

The Ayish Bayou sites occur along the Ayish Bayou River in Compartments 20, 101, 102 and 103 of the Angelina National Forest, southeast of Turkey Hill Wilderness Area

The Cochino Bayou sites occur in Compartment 54 of the Neches District on the Davy Crockett National Forest, just east of the Hagerville community.

Description

These areas encompass 1,780 acres of archeological sites and site complexes which are determined to be the most significant archeological sites yet discovered on the National Forests in Texas. Temporal projections of the sites included in these areas span the chronological continuum of human occupation in East Texas. These same areas also leave special significance for their riparian values

Desired Future Condition

The archeological and contextual integrity of the sites located within these areas are maintained so that the scientific and educational values of the sites are retained

Vegetation and setting will appear near natural. Vegetation manipulation may occur to maintain or restore natural conditions in those areas where standing structures and surficial features are not adversely affected and the scientific, historical, archeological, or interpretive integrity of the sites are enhanced.

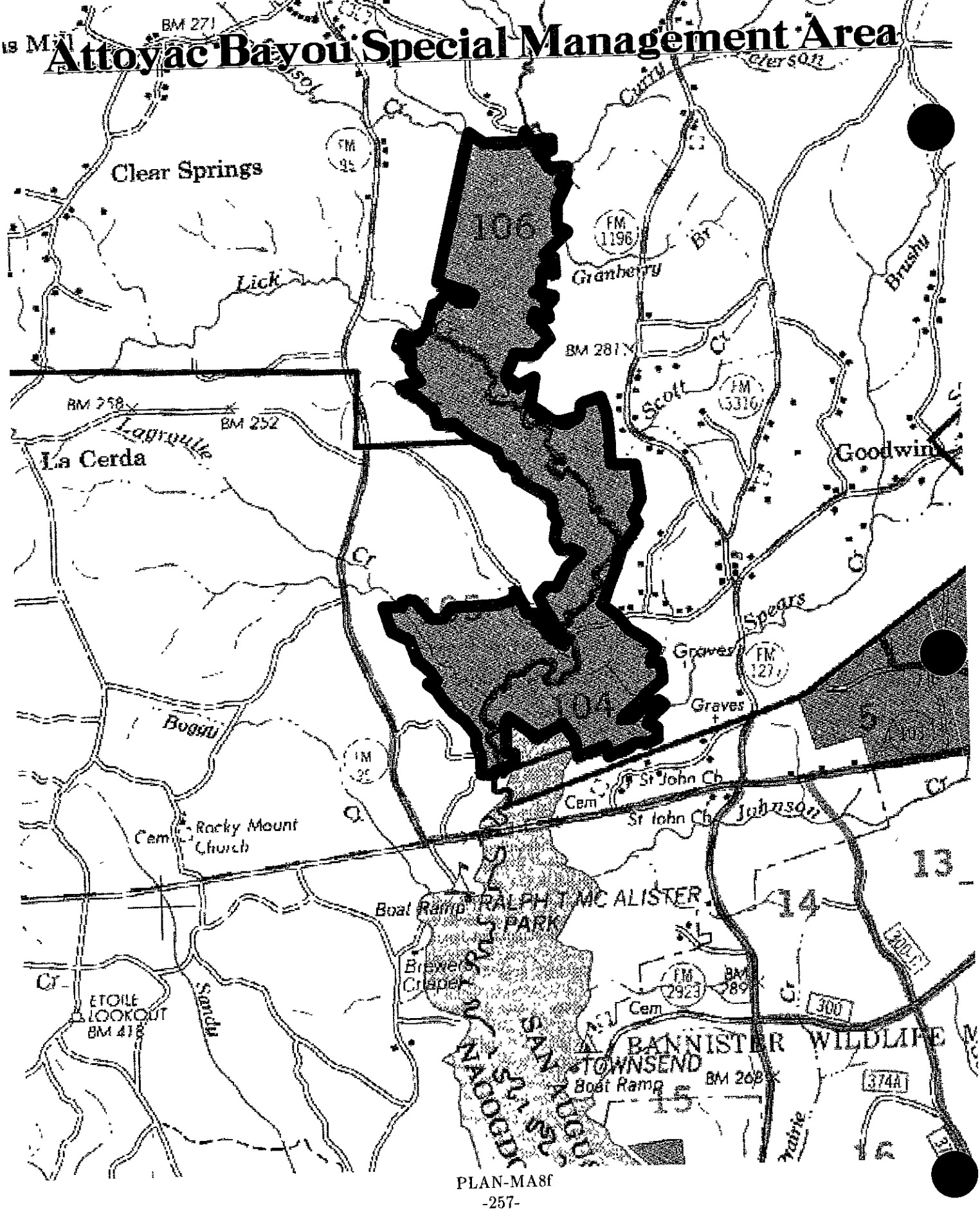
New facilities may be present, if needed, to maintain the area or to facilitate visitor use, but they will be compatible with the scientific, historical, archeological or interpretive integrity of the sites. Interpretive facilities may include wayside exhibits, kiosks, and self-guided interpretive trails

Recreational use of the area is primarily for interpretation, educational, and inspirational activities.

Management Emphasis

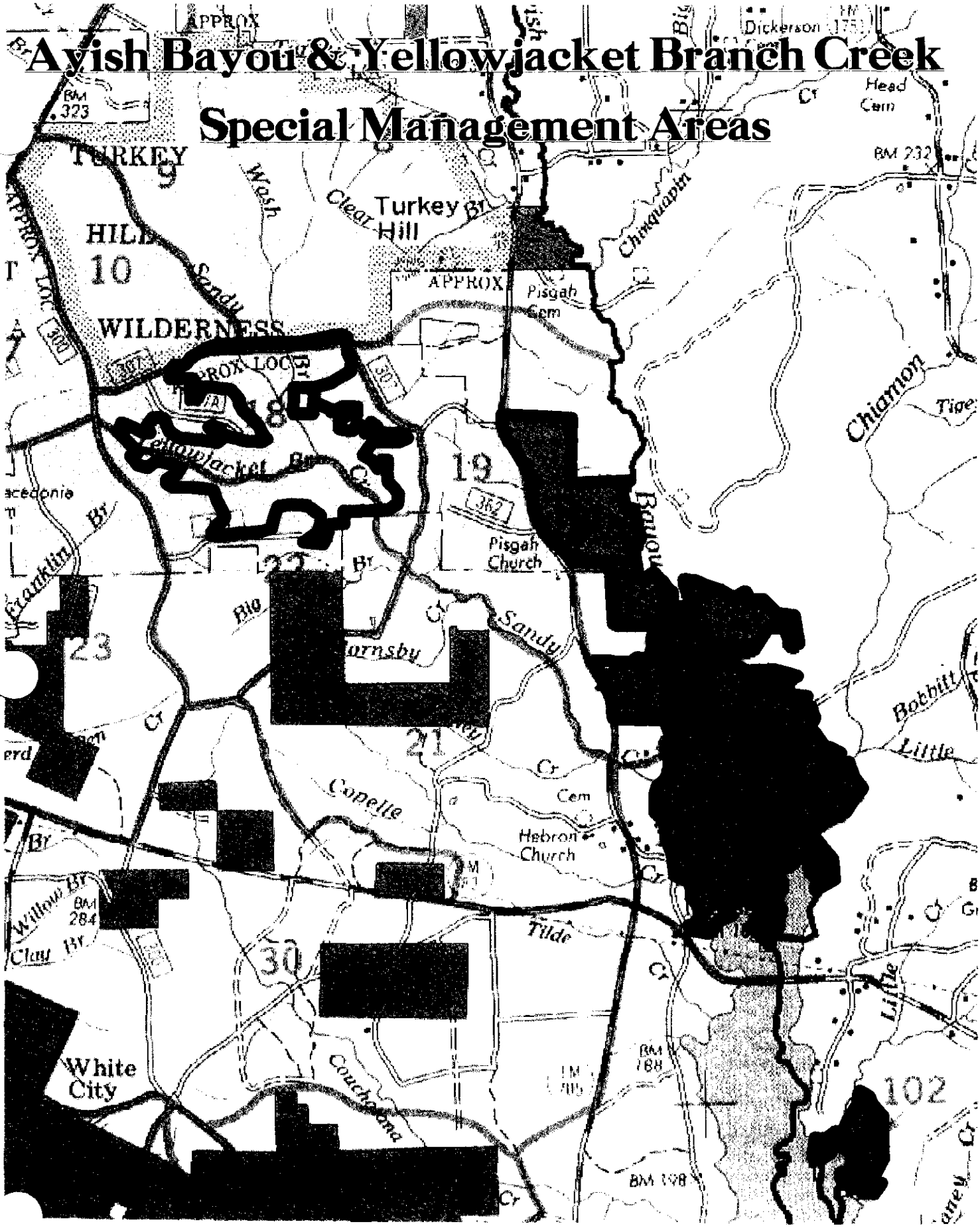
Management emphasis is on protecting, enhancing, and interpreting for public education and recreation, the sites, features, and cultural materials associated with the occupation and use of the areas by indigenous and modern cultures through time

Attoyac Bayou Special Management Area

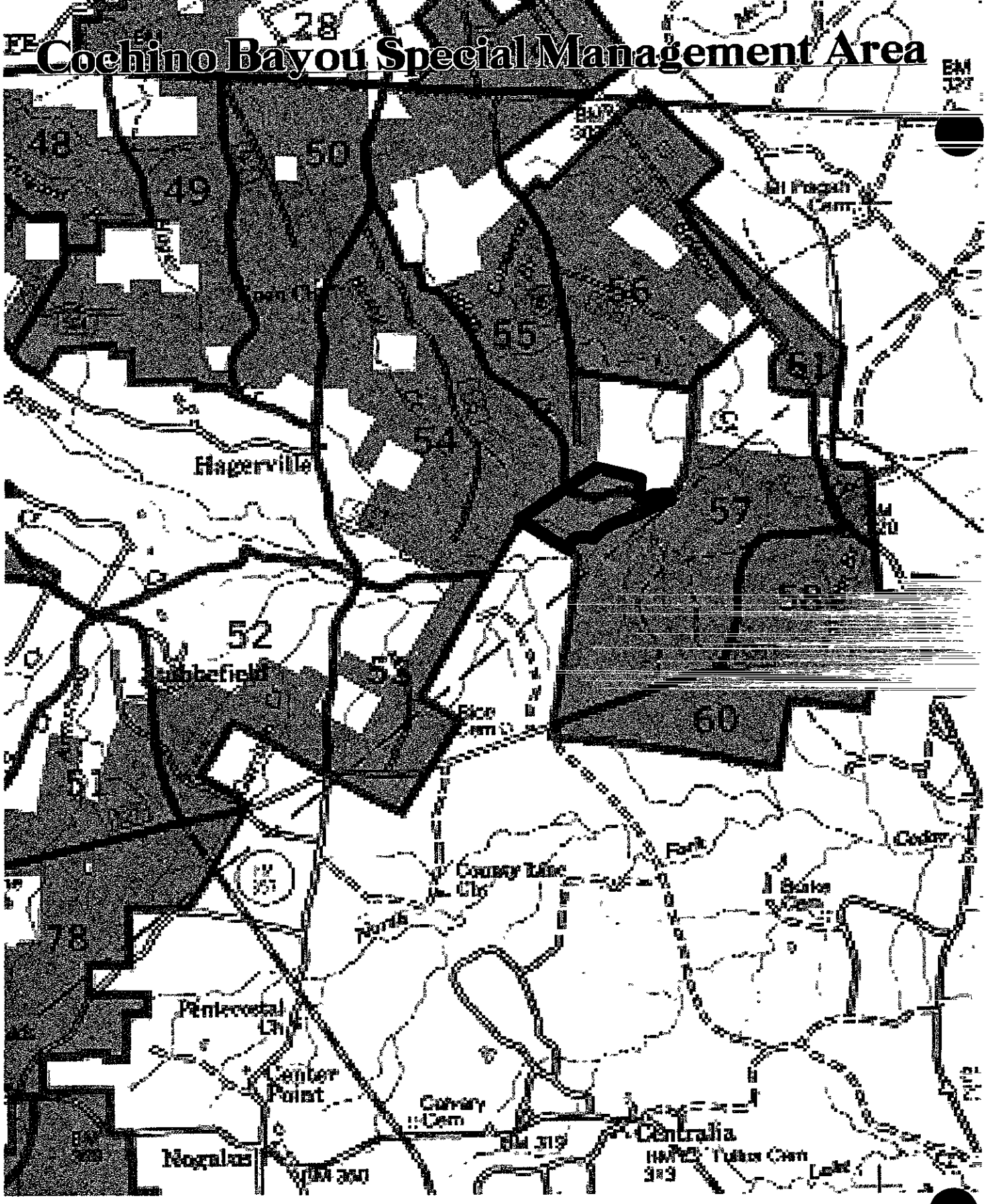


Ayish Bayou & Yellowjacket Branch Creek

Special Management Areas



Cochino Bayou Special Management Area



Old Aldridge Sawmill and Mill Town (600 acres)

Location

This site is on the Angelina National Forest in Compartments 88 and 89 along the Neches River, south of Boykin Lake.

Description

This historical area encompasses the Old Aldridge Sawmill and Mill Town including approximately 600 acres identified as the mill and mill town site. Features include standing concrete buildings, surface features of concrete and brick pads, railroad trams, mill pond and surface and subsurface concentrations of cultural materials typical of the period of occupation. Proposed boundaries include FDR 326-A to the north, Boykin Creek to the west, Neches River to the south and FDR 326 to the east.

Desired Future Condition

The historical and contextual integrity of the mill and mill town is maintained so that the scientific and educational values are retained.

Vegetation and setting will appear near natural. Vegetation manipulation may occur to maintain or restore natural conditions in those areas where standing structures and surficial features are not adversely affected and the scientific, historical, or interpretive integrity of the site is enhanced

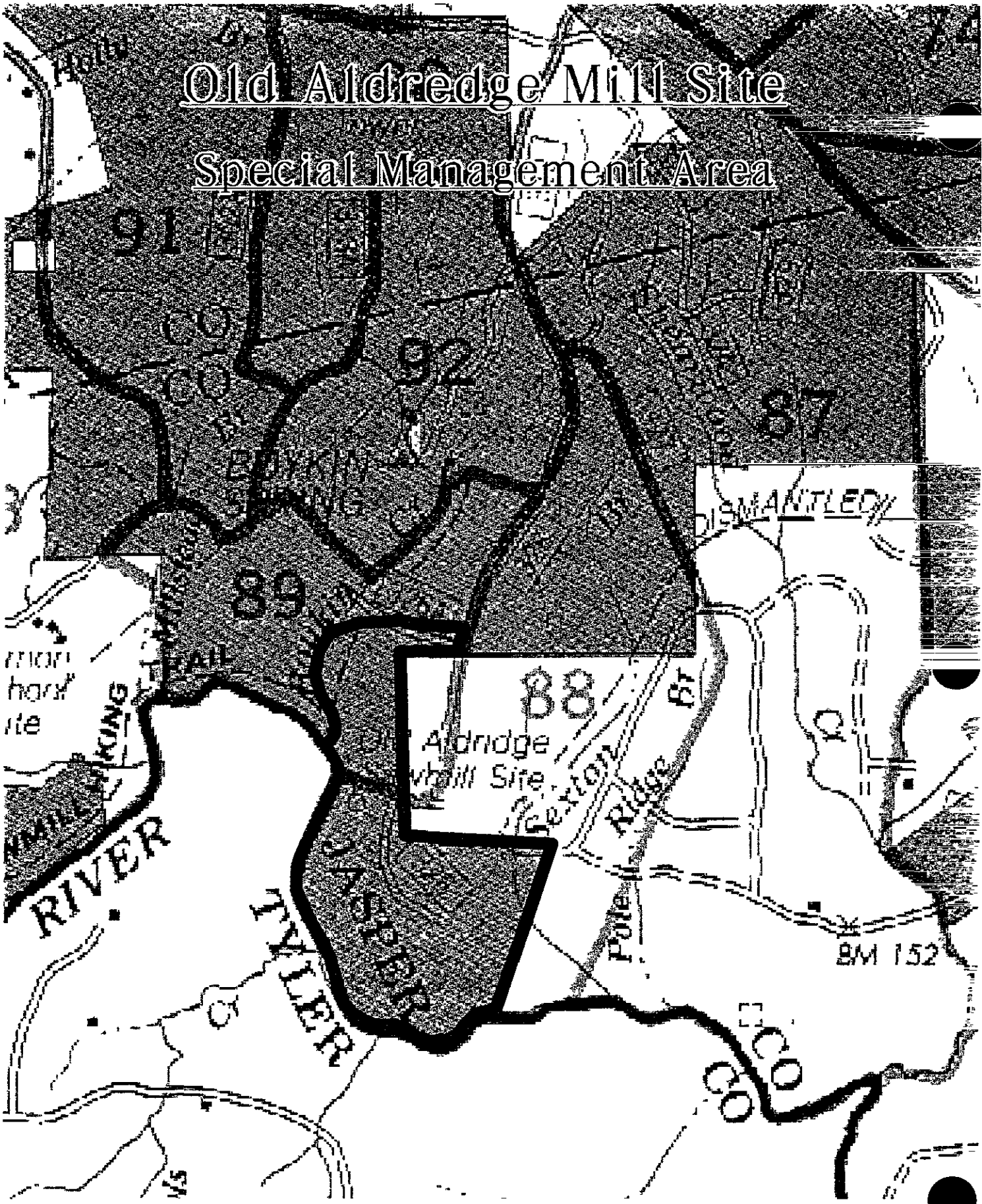
New facilities may be present, if needed to maintain the area or to facilitate visitor use, but they will not detract from the scientific, historical, or interpretive integrity of the site Restoration, rehabilitation, and interpretation of the mill and townsite will be accomplished under the guidelines of a site management and interpretive plan developed by Stephen F Austin State University. Recreational use of the area is primarily for interpretation, educational, and inspirational activities

Management Emphasis

Management emphasis is on protecting, enhancing and interpreting for public education and recreation, the structures, features and cultural materials associated with the occupation and use of the Aldridge Mill and Mill Town.

Old Aldredge Mill Site

Special Management Area



Management Area 9a
Developed Recreation Sites

Theme

Areas and sites developed with recreational user facilities to enhance camping, picnicking, swimming, boating, and fishing for National Forest visitors Interpretation and enjoyment of using the Forest and Grassland environments are emphasized

Location

These recreation sites are located on all four National Forests and the two Grasslands The Angelina has the most with Bouton Lake, Boykin Springs, Caney Creek, Harvey Creek, Sandy Creek, and Townsend The Sabine has Indian Mounds, Lakeview, Ragtown, Red Hills Lake, Willow Oak, Boles Field, and the planned Haley's Ferry Four sites can be found on the Sam Houston They are Cagle, Stubblefield, Scott's Ridge, and Double Lake The Davy Crockett National Forest has Ratcliff Lake and Kickcapoo picnic site The Caddo National Grassland is the location for East Coffee Mill and Lake Davy Crockett Campgrounds Black Creek Lake and Cottonwood Lake are on the LBJ Grasslands

Description

This management area consists of designated, developed recreation sites such as campgrounds and picnic areas Many of these areas also contain a small surrounding area incorporated to allow for future expansion and buffer the facilities from the effects of other forest management activities. This management area contains lands physically suited for developed recreation use and managed to protect other values such as water quality, soil productivity, biological diversity, and other uses or values compatible with developed recreation Some streams, small ponds, lakes and their associated riparian areas are included within this management area The large lakes, Black Creek Lake, Cottonwood Lake, Lake Fannin, Coffee Mill Lake, Lake Davy Crockett, Sam Rayburn Reservoir, Toledo Bend Reservoir and Lake Conroe, are included in Management Area 5

Within most of these areas recreation facilities are interspersed with prairie and woodland savannahs on the Grasslands, or stately pine forests and hardwood bottomlands on the Forests

Desired Future Condition

Existing bottomland hardwoods and forests adjacent to streams and lakes provide wildlife habitat, soil, and water protection Native and long-established desirable non-native plant communities exist, however, management will favor a gradual succession to natives

A well-developed road system exists in most areas providing access for recreation activities Many roads are paved or gravel surfaced to reduce

erosion and to facilitate all-weather access. Rural or roaded-natural recreation opportunities are provided with associated activities being both motorized and non-motorized in nature.

Recreational fishing opportunities are provided in all suitable ponds, lakes, and streams within these areas. Some wildlife habitat improvements have been implemented to provide opportunities to view species representative of the natural environment associated with these areas. Interpretive facilities such as information stops, interpretive programs, and information signs are also provided. Resource modification and utilization to provide adequate facilities are evident; but their form, line and contrast generally harmonize with the natural environment.

As sites or areas are rehabilitated or expanded to satisfy demand, they are built to be fully accessible to persons with disabilities.

Management Emphasis

These areas provide a wide spectrum of forest and rangeland settings offering a range of recreation opportunities dependent on developed facilities. Development includes campgrounds, picnic areas, visitor centers, boat ramps, swimming areas, and associated facilities. Developed recreation opportunities are emphasized with both motorized and non-motorized activities. Visually appealing landscapes shall be emphasized.

Facilities will be as natural, simple, and unobtrusive as possible. Use and occupancy will be regulated to protect natural resources and to ensure safe, enjoyable recreation experiences. Future development will be based on user demand patterns and specific site suitability. Improvements will be designed to complement existing area developments and to expand the Forest's capacity to accommodate additional use. An appropriate level of accessibility for future development and improvements of existing sites shall be determined by the design level and significance of the site.

These areas are managed to provide quality recreation facilities. The goals of this management area are to:

* Provide a safe, healthful, aesthetic, non-urban atmosphere for the pursuit of natural resource based recreation;

* Provide facilities and improvements at an appropriate level of accessibility, consistent with resource protection needs and anticipated user demand; and

* Provide opportunities for meaningful recreation experiences consistent with user demand and expectations.

MA-9a Standards and Guidelines

Aquatic Resources

MA-9a-01 Provide a recreational fishery in lakes and ponds capable of sustaining a fishery.

Native fisheries will be emphasized to the extent practical.

MA-9a-02 Aquatic weed control and fisheries habitat improvements, including use of Environmental Protection Agency (EPA) approved aquatic pesticides, are permitted pending appropriate site-specific environmental analysis.

MA-9a-03 Perform fish population balance checks annually on all water bodies managed for a sustainable recreational fishery.

MA-9a-04 Set creel limits to manage fish populations of each individual lake or pond based upon the results of the population balance checks.

Biological Diversity

MA-9a-11 Manage vegetation for native diversity in overstory trees and understory shrubs, forbs, and grasses.

MA-9a-12 Maintain about 30 percent of the shoreline of ponds in emergent aquatic vegetation for bank protection and for fish and waterfowl habitat.

MA-9a-13 Maintain 20 to 50 percent of the surface area of ponds that do not contain developed swimming areas and that are capable of sustaining a fishery in submergent aquatic vegetation for fish and waterfowl habitat.

Cultural Resources

MA-9a-21 Complete cultural resources surveys and evaluations for any proposed developments.

MA-9a-22 Provide interpretive facilities for unusual or outstanding cultural resources where compatible with cultural resource protection.

Interpretive facilities should be developed as per the recommendations in the Interpretive Plan.

MA-9a-23 Historical structures, sites and features within Ratcliff Lake Recreation Area, Double Lake Recreation Area and Boykin Springs Recreation area will be managed in accordance with standards and guidelines found in Management Area 8f.

Facilities

MA-9a-31 **New trails and roads are developed as necessary to provide access for recreation and other compatible multiple uses.**

New trails, trailheads or parking facilities may be built within designated recreation sites where needed to improve recreation opportunities

MA-9a-32 **Provide appropriate maintenance, operational management, and reconstruction of existing dams, roads and trails.**

This includes permitting the use of EPA approved herbicides following appropriate site-specific environmental analysis

MA-9a-33 **New facilities shall be constructed to meet FSM 2330 level III or IV criteria and standards established in the approved site development plan for the facility**

Fire Management

MA-9a-41 **The appropriate wildfire suppression response is immediate control with fires suppressed at the lowest acreage possible.**

MA-9a-42 **Suppression strategies, practices and activities shall be limited to those which have minimal effects on developed recreation values.**

MA-9a-43 **Prescribed fire may be used for vegetative manipulation to maintain or enhance visual quality and recreation experience.**

Integrated Pest Management

MA-9a-51 **Conduct periodic hazard tree surveys and remove any hazard trees identified.**

MA-9a-52 **Methods which minimize adverse recreational impacts should be selected for any insect and disease control activities.**

MA-9a-53 **EPA approved insecticides may be used for insect control following label directions.**

Lands

MA-9a-61 **Issue special use permits if compatible with the management objectives for that area.**

Minerals

MA-9a-71 **Removal of common variety minerals is not permitted.**

MA-9a-72 **Mineral leases will contain a "No Surface Occupancy" stipulation for the developed areas.**

Hand laying of geo-phone lines may be allowed

MA-9a-73 **Reserved and outstanding mineral rights in special areas are honored and managed according to Forest-wide standards and guidelines.**

Operation and Maintenance

MA-9a-81 **Prepare an operation and maintenance plan for all sites and update annually.**

Sites will be managed on a seasonal basis at the service level identified in the area operation and maintenance plan

MA-9a-82 **Inspect each site annually prior to peak use seasons for safety hazards and correct or remove before use begins.**

MA-9a-83 **Clean sites regularly to ensure that sites are clean and sanitary, free of litter, and neat in appearance.**

Personnel who perform operation and maintenance functions should be familiar with service levels in the Operation and Maintenance plans

MA-9a-84 **Maintain site improvements to their design standards with priority given to health and safety related items.**

MA-9a-85 **Operate and maintain potable water sources in accordance with Federal, State, and local regulations.**

Water supply systems shall be closed until repaired if testing indicates a hazard to human health

MA-9a-86 **Operate and maintain developed swimming sites in accordance with State regulations.**

Swimming sites will be closed if testing indicates a hazard to human health

MA-9a-87 **Operate and maintain vaults, septic tanks, and waste-water systems in accordance with Federal, State, and local regulations.**

Any system deemed dysfunctional or threatening to human health, wildlife, or water sources shall be closed, modified or repaired

MA-9a-88 **Dispose of garbage at intervals sufficient to minimize odors, prevent pollution of water supplies, and avoid attracting disease spreading insects or animals.**

MA-9a-89 **Remove unsafe trees in developed sites.**

MA-9a-90 **Plant trees and shrubs to provide cover when natural vegetation is insufficient.**

Range Management

MA-9a-101 **Exclude livestock grazing in developed recreation sites.**

MA-9a-102 **Fence developed recreation sites where necessary to exclude cattle.**

Fences around developed sites should be constructed of material other than barbed wire

Recreation Management

MA-9a-111 **The physical setting for this management area shall meet the criteria for the recreation opportunity spectrum (ROS) class of rural or roaded natural.**

These designations should refer to establish ROS maps

MA-9a-112 **Off-road vehicle (ORV) use shall be permitted when they are street legal ORVs with licensed operators on designated Forest Development Roads and site roads for entering and exiting the development.**

MA-9a-113 **Discharging firearms in developed sites is prohibited.**

MA-9a-114 **Provide interpretive services as per recommendations in the Interpretive Plan.**

MA-9a-115 **Regulate occupancy and use to the extent necessary to protect the resources and to ensure safe, enjoyable recreation experiences for the maximum number of visitors at the experience level for which the sites were designed.**

a. Regulations contained in 36 CFR 261 will be utilized as necessary to ensure full public enjoyment of recreation sites.

b Recreation areas that have deteriorated below regional standards due to low maintenance funding, erosion or other reasons, shall be evaluated for reduced services or closure (Appendix E)

MA-9a-116 **Collect use fees at those sites that meet Land Water Conservation Fund Act of 1965 fee site designation criteria.**

Clearly notify the public of the conditions of occupancy and use of recreation sites

MA-9a-117 **Provide periodic patrols and site supervision where appropriate.**

Volunteer hosts may be used in some situations Frequency of law enforcement patrols should be as identified in the established operation and maintenance plan.

MA-9a-118 **Developed recreation areas will be mapped, located and marked according to standard guidelines.**

Scenic Resources

MA-9a-121 **Design all projects and practices within visual quality objective (VQO) of retention guidelines.**

a. Emphasize natural and visually appealing landscapes (vistas, rock outcrops, lakeviews, and diversity of vegetation).

b. Design vegetation treatments and development to replicate the characteristic landscape by following these natural vegetational and landscape features

c. Facilities may dominate, but will harmonize and blend with the natural foreground and middleground of existing landscapes.

Silviculture Practices

MA-9a-131 **The area is classified as unsuitable for timber production.**

MA-9a-132 **Vegetation removal shall be strictly limited to maintain or enhance the visual quality, recreational experience, reduce fire or safety hazard, or to maintain tall forest cover.**

Unregulated harvest may be utilized to accomplish these tasks

Soil and Water

MA-9a-141 **Construct no additional picnic or camp sites within defined streamside areas, especially in the 100 year flood zone.**

MA-9a-142 **Maintain watersheds in good or better condition.**

MA-9a-143 **Prohibit concentrated recreation use on restored watershed improvement sites until these sites are fully stabilized.**

Normally, restrict use for 3 to 5 years

MA-9a-144 **The total area of cumulative detrimental soil compaction shall not exceed 33 percent of the area, except as necessary to accommodate development or restoration of sites.**

Detrimental soil compaction is an increase in soil bulk density of more than 15 percent and/or more than a 50 percent reduction in the macropore space

MA-9a-145 **Restoration plan shall define specific measures needed for desired rehabilitation.**

MA-9a-146 **Maintain water quality in developed swimming areas to meet State standards.**

Streamside and Lakeside Management

MA-9a-151 **Streamside and lakeside areas shall be managed as described in Management Area 4 except where facility design mitigates any adverse effects.**

MA-9a-152 **In facility development or improvement, protect ephemeral stream flow as deemed appropriate in site-specific designs.**

Wildlife

MA-9a-161 **Provide appropriate wildlife and fish habitat improvements to encourage fish and wildlife viewing opportunities.**

Habitat improvement may be accompanied by the construction of facilities to improve wildlife viewing opportunities.

MA-9a-162 **Wildlife viewing structures complementary to the developed recreation site may be constructed.**

Improvements should appear natural and blend with the landscape character of the site

Management Area 9b
Minimally Developed Recreation Sites

Theme

Primitive or minimally developed recreation sites for hunters, horseback riders, hikers, and boating, among other activities.

Locations

These sites are located throughout the four National Forests and two Grasslands. Some of the more prominent of these are Neches Bluff on the northern edge to the Davy Crockett National Forest, Piney Creek Horse Camp also on the Davy Crockett National Forest, and Kelly's Pond on the Sam Houston National Forest Several boat launching sites exist on the lakeshores and rivers throughout the Forests and Grasslands.

Description

This management area consists of minimally developed recreation sites that include both existing and future development sites. Most areas have a low development scale with few amenities provided Some sites have vault toilets and water systems along with interpretive and information bulletin boards, as well as specific facilities for resource protection. These developed recreation sites have specialized purposes and have facilities designed for the specific user groups.

Management Emphasis

These sites and areas have been developed to provide safe, well-maintained recreational facilities necessary to support dispersed recreational activities such as hunting, boating, hiking and horseback riding. Specific management goals are to·

* Provide facilities and improvements, consistent with resource protection needs, anticipated user demand and compatible with management goals for the surrounding area, to support specialized and dispersed recreation use on the Forest; and,

* Provide a safe, healthful, aesthetic atmosphere for the pursuit of natural, resource based recreation.

Desired Future Condition

Over most of the area you will view recreation facilities interspersed with prairie and woodland savannahs on the Grasslands, or stately pine forests and hardwood bottomlands on the Forests These areas provide a wide spectrum of forest and rangeland settings offering a range of recreation opportunities. Activities associated with these are both motorized and non-motorized. Visually appealing landscapes are maintained.

Forests adjacent to streams and lakes provide wildlife habitat, soil and water protection Native and long established desirable non-native

plant communities exist, however, management will favor a gradual reversion to natives

Facilities are as natural, simple and unobtrusive as possible. Use and occupancy are regulated to protect natural resources and to ensure safe, enjoyable recreation experiences. Future development is based on user demand patterns and specific site suitability. Improvements are designed to compliment existing area developments and to expand the Forest's capacity to accommodate additional use

The developed recreation sites remain open for use on either a year-round basis or on a regular, recurring basis as determined by the District Ranger. The user is impressed with the appearance and quality of the facilities provided. The area and its associated facilities are maintained in a safe and well-kept appearance. Forest Service personnel perform cleaning, mowing and other needed maintenance on a regular and frequent basis. Facilities that are worn or vandalized are replaced or rehabilitated.

Several areas are expanded and new areas are constructed to satisfy demand. All facilities are constructed or reconstructed to be fully accessible to persons with disabilities

A well-developed road system is noticeable in many areas and less obvious elsewhere. The road and trail system provides access for recreation activities. Many roads have been paved or gravel surfaced to reduce erosion and to facilitate all-weather access.

Recreational fishing opportunities are provided in suitable ponds and streams adjacent to or within these areas. Some wildlife habitat improvements are developed to provide opportunities to view species representative of the natural environment associated with these areas. Interpretive facilities such as information stops, interpretive programs, and information signs are also provided. Rural or roaded-natural recreation opportunities are provided.

MA-9b Standards and Guidelines

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines.

Biological Diversity

MA-9b-11 **Manage vegetation for maximum native diversity in overstory trees and understory shrubs, forbs, and grasses.**

Cultural Resources

MA-9b-21 **Complete cultural surveys and evaluations for any proposed developments.**

MA-9b-22 **Provide interpretive facilities for unusual or outstanding cultural resources where compatible with cultural resource protection.**

Facilities

MA-9b-31 **Complete all maintenance tasks in a timely manner so as to keep the site in a safe operating condition.**

MA-9b-32 **Perform site and facility rehabilitation as needed to maintain site's utility.**

MA-9b-33 **Close sites or portions of sites seasonally based on demand and cost efficiency.**

MA-9b-34 **Provide low-cost information and interpretive facilities that require a minimum of maintenance and are highly resistant to vandalism.**

MA-9b-35 **If demand warrants, a site may be upgraded to a fully developed site.**

Where this occurs, the site shall then be moved to MA-9a and managed by standards and guidelines in MA-9a.

MA-9b-36 **Developed facilities shall be provided to handle concentrated disperse camping and use in cases where resource damage warrants.**

MA-9b-37 **New facilities shall be constructed to meet FSM 2330 level I or II criteria and standards established in the approved site plan.**

Fire Management

MA-9b-41 The appropriate wildfire suppression response is immediate control with fires suppressed at the lowest acreage possible

MA-9b-42 Suppression strategies, practices and activities shall be limited to those which have minimal effects on developed recreation values.

MA-9b-43 Prescribed fire may be used for vegetative manipulation to maintain or enhance visual quality and recreation experience.

Integrated Pest Management

MA-9b-51 Conduct periodic hazard tree surveys and remove any hazards.

MA-9b-52 Methods which minimize adverse recreational impacts should be selected for any insect and disease control activities.

MA-9b-53 EPA approved insecticides may be used for insect control following label directions.

Lands

MA-9b-61 Issue special use permits if compatible with the management objectives for that area.

Minerals

MA-9b-71 Removal of common variety minerals is not permitted.

MA-9b-72 No surface occupancy for mineral developments are allowed in developed areas except for hand laying of geo-phone lines.

MA-9b-73 Reserved and outstanding mineral rights in special areas are honored and managed according to Forest-wide standards and guidelines.

Operation and Maintenance

MA-9b-81 Prepare operation and maintenance plan and update annually for all sites.

MA-9b-82 Inspect each site annually and all known safety hazards shall be corrected.

MA-9b-83 Clean sites regularly to ensure that sites are clean and sanitary, free of litter, and neat in appearance.

MA-9b-84 Maintain site improvements to their design standards with priority given to health and safety related items.

MA-9b-85 Operate and maintain potable water sources in accord with Federal, State, and local regulations.

MA-9b-86 Operate and maintain vaults, septic tanks, and waste-water systems in accordance with Federal, State, and local regulations.

MA-9b-87 Dispose of garbage at intervals sufficient to minimize odors, prevent pollution of water supplies and avoid attracting disease spreading insects or animals.

MA-9b-88 Monitor sites for deterioration, safety, and visitor use.

MA-9b-89 Remove unsafe trees in developed sites or close the area around the tree(s) to reduce risk to users.

MA-9b-90 Plant trees and shrubs to provide cover when natural vegetation is insufficient.

MA-9b-91 Establish specific procedures for vegetation management in recreation sites and include in the district operation and maintenance plan.

Range Management

MA-9b-101 Fence developed recreation sites where necessary to exclude cattle.

Recreation Management

MA-9b-111 The recreation opportunity spectrum (ROS) class for this management area shall be rural or roaded-natural.

These designations should refer to established ROS maps

MA-9b-112 Provide only basic developed recreation amenities (Level I or II). Electrical hookups, running water, and convenience facilities are not usually be provided.

MA-9b-113 Motor vehicles are restricted to designated areas only.

MA-9b-114 ORV use areas shall be designated and scheduled to minimize user conflicts.

MA-9b-115 Regulate occupancy and use, to the extent necessary, to protect the resources and to ensure safe, enjoyable recreation experiences for the maximum number of visitors for which the site is designed.

MA-9b-116 Discharge of firearms in developed sites other than shooting ranges is prohibited.

MA-9b-117 Provide periodic patrols where appropriate.

Frequency of law enforcement patrols should be identified in the operation and maintenance plan.

MA-9b-118 Provide interpretive services as per recommendations in the Interpretive Plan.

Scenic Resources

MA-9b-121 Design all projects and practices within the appropriate visual quality objective guidelines.

These designations should refer to established VQO maps.

Silviculture Practices

MA-9b-131 This area is classified as unsuitable for timber production.

MA-9b-132 Vegetation removal shall be strictly limited to maintain or enhance the visual quality and recreation experience, or to maintain tall forest cover.

Unregulated harvest may be utilized to accomplish these tasks.

Soil and Water

MA-9b-141 Prohibit concentrated recreation use on restored soil and watershed improvement sites for three to five years or until these are fully stabilized.

MA-9b-142 Restoration plans shall define specific measures needed for desired rehabilitation.

MA-9b-143 The total area of cumulative detrimental soil compaction shall not exceed 33 percent of the area, except as necessary to accommodate development or restoration of sites.

Detrimental soil compaction is an increase in soil bulk density of more than 15 percent and/or more than a 50 percent reduction in macropore space.

Streamside and Lakeside Management

MA-9b-151 Streamside and lakeside areas shall be managed as described for Management Area 4, except where facility design mitigates any adverse effects.

MA-9b-152 In facility development or improvement, protect ephemeral stream flows as deemed appropriate in site-specific designs.

Wildlife Management

MA-9b-161 Provide appropriate wildlife improvements to encourage wildlife viewing opportunities.

Habitat improvement may be accompanied by the construction of facilities to improve wildlife viewing opportunities.

MA-9b-162 Habitat improvements complementary to the developed recreation site may be implemented.

Improvements should appear natural and remain subordinate to the landscape character of the area.

Management Area 10a
Administrative Use Sites

Theme

These sites are maintained and administered to provide efficient workspace and facilities for the management of the National Forests and Grasslands

Description

This description applies to administrative facilities such as Ranger District compounds, work centers, fire towers, and communications sites This management area is located at about twenty sites throughout the Forests and Grasslands These sites encompass about 129 acres and are listed below:

Ranger District Offices:
Raven
Trinity

Miscellaneous Sites:
Jackson Hill Communication Site
Broaddus Vehicle Park
Liberty Hill Communication Site
LBJ Communication Site
Ratcliff Fire Tower
Chambers Hill Communication Site
Nogalus Communication Site

Work Centers:
Yellowpine
LBJ
Caddo
Dreka
San Jacinto
Ratcliff
Angelina
Lufkin Administrative Site

Desired Future Condition

The desired future condition is a variety of administrative facilities which promote the efficient and effective accomplishment of land and resource management and protection, including appropriate public access. Administrative facilities are designed to be functionally efficient for accomplishing the purposes for which established and to present a pleasant appearance for visitors and employees. Facilities are constructed consistent with the standards established by national and local building codes and accessible by the persons with different abilities Design and location consider the extent to which public use may reasonably be anticipated

Management Emphasis

The primary goals of this management area are to:

* Provide safe, adequate administrative facilities from which to accomplish land and resource management and protection,

* Locate and design administrative facilities in a manner consistent with public needs and to the extent feasible compatible with management area allocations of the occupied site, and

* Design and maintain sites in such a way that the Forest Service "Good Host" policy is readily apparent

MA-10a Standards and Guidelines

Air Quality, Aquatic Resources, Biological Diversity and Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-10a-01 **Complete an inventory of cultural resources before any projects or practices are implemented. (See Forest-wide Standards and Guidelines.)**

MA-10a-02 **Provide cultural resource interpretation as appropriate for special areas.**

MA-10a-03 **Structures and facilities at the Lufkin Administrative site, Liberty Hill Fire Tower, and Ratcliff Fire Tower will be managed according to standards and guidelines in Management Area 8f.**

Fire

MA-10a-11 **Fire response is immediate control for sites and the areas adjacent to the facilities.**

Prescribed fire may be used if fuel loadings present a hazard to facilities, employees or surrounding areas.

Integrated Pest Management

MA-10a-21 **Vegetation manipulation, including the use of Environmental Protection Agency (EPA) approved pesticides, may be permitted to prevent tree mortality and reduce hazard.**

MA-10a-22 **Insect control will be permitted using EPA approved pesticides.**

Lands

See Forest-wide Standards and Guidelines.

Minerals

MA-10a-31 **Removal of common variety minerals shall be prohibited.**

MA-10a-32 **Administrative sites are available for leasing with a "No Surface Occupancy" stipulation.**

MA-10a-33 **Reserved and outstanding mineral rights in special areas are honored and managed according to Forest-wide Standards and Guidelines.**

Planning

MA-10a-41 Project analysis, in accordance with current Forest Service standards (currently found in FSH 7309.11), shall be completed on all proposed facility projects. This analysis shall include the following:

Identification of project needs
Location analysis
Analysis of the alternatives

MA-10a-42 Designs for proposed administrative facility projects shall include an economic analysis, fire and safety considerations, accessibility requirements, building code compliance and civil rights impact analysis.

MA-10a-43 Facilities will take into consideration the management goals for the areas adjacent to those facilities.

Operation and Maintenance

MA-10a-51 A Facility Master Plan shall be prepared and maintained for each Forest or Grassland unit.

MA-10a-52 An operation and maintenance plan shall be prepared for all fire, administrative, and other sites.

MA-10a-53 Each site shall be inspected annually and all known safety and health hazards shall be corrected. Maintenance items noted will be scheduled and accomplished in accordance with facilities maintenance level (FSH 7309.11).

MA-10a-54 Potable water sources shall be operated and maintained in accordance with applicable federal, state and local regulations.

MA-10a-55 Vaults, septic tanks, and wastewater systems shall be inspected at regular intervals to ensure proper operation. These systems shall be operated in accordance with applicable federal, state and local regulations.

Range

MA-10a-61 Exclude livestock grazing on administrative sites.

Recreation

MA-10a-71 The ROS class for administrative sites is rural.

Scenic Resources

MA-10a-81 **All design and implementation practices should meet high quality landscape design and architectural standards, and be adapted to the site.**

No VQO's assigned to this management area.

MA-10a-82 **Landscape plans shall be prepared for each administrative site.**

Silviculture Practices

MA-10a-91 **This area is classified as unsuitable for timber production.**

Unregulated harvest for the purpose of public safety or protection of the facility may be permitted.

MA-10a-92 **Vegetation removal shall be limited to protection of area values, health and safety, and the preparation of the site for rehabilitation or future development.**

MA-10a-93 **Prune or remove potentially dangerous trees.**

Soil and Water

MA-10a-101 **Restore all eroding areas to improve water quality to eliminate hazards to the facilities, employees, or its visitors.**

Wildlife

See Forest-wide Standards and Guidelines.

Management Area 10b
Special Use Permit Sites

Theme

Authorization and management of specific uses on National Forests and Grasslands by private parties, companies, public utilities, other agencies or educational institutions for activities beneficial to the public or for exercising basic rights

Location

These uses are scattered throughout the Forests and Grasslands They may occur as linear rights-of-way, as pipelines, roads or powerlines; or as developed sites on small sites such as electronic sites

Description

These are permanent or long-term special use sites as listed in the Resource Summary Section in Chapter IV. Examples of such uses include State and county roads, utility corridors, access roads, and recreation-oriented special activities Temporary authorizations, such as for one-time or short duration recreation activities or for oil and gas exploration, are not included in this management area because these authorizations do not convey a long-term allocation of land to that use New requests for special uses are evaluated on a case-by-case basis and are added as new permits to this area when they are approved

Desired Future Condition

The desired future condition is a pattern of special uses established to provide facilities, services, or opportunities that are in the general public interest and, at the same time, reflect environmental sensitivity to other resource values These permanent or long-term uses are ordinarily those which, due to the nature of the use and the location of the affected U S land, cannot logically be accommodated on private land The authorization and attached requirements for these uses consider the surrounding environment, including adjacent management areas which may be affected by the use Valid existing rights are honored As opportunities occur, each special use permit is analyzed for its environmental effects and appropriate modifications are made Compatible multiple uses may take place within these areas When feasible, special uses are combined in a single corridor rather than developing parallel corridors

Management Emphasis

The primary goals of this management area are to

* Provide safe, efficient facilities and improvements in an environmentally sensitive manner;
* Authorize only those occupancies which promote and support the general public welfare, and do not conflict with law and Forest Service policy, and
* Minimize inconsistency with surrounding land uses and minimize the adverse impacts of these uses on other resources

MA-10b Standards and Guidelines

NOTE The following standards and guidelines apply to all lands within this Management Area In some instances, additional standards and guidelines are necessary to maintain compatibility with management of the surrounding area To address this situation, additional direction is provided in the standards and guidelines for those management areas

Air Quality and Aquatic Resources

See Forest-wide Standards and Guidelines

Biological Diversity

MA-10b-01 **Disturbed areas may be revegetated with desirable non-native species where necessary to quickly establish a protective vegetative cover; however, management following establishment shall be designed to allow these to revert to native plant species.**

Chemicals

See Forest-wide Standards and Guidelines.

Cultural Resources

MA-10b-11 **Conduct cultural resource surveys and inventories on projects which are not categorically determined to have no effect.**

Inventories and State Historic Preservation Office clearance must be completed prior to approval of the project

Fire

See Forest-wide Standards and Guidelines

Integrated Pest Management

MA-10b-21 **Forest insect and disease outbreaks may be treated in accordance with guidelines to prevent tree mortality and reduce hazard.**

MA-10b-22 **Ground application of chemicals is permitted in accordance with the Forest-wide Standards and Guidelines and label instructions.**

MA-10b-23 **Aerial herbicide application to maintain utility transmission lines where topography and access make other methods impractical may be approved after appropriate site specific analysis. For best control of herbicide placement, only helicopters with microfoil boom, or other similar technology which produce large droplets, may be used. Maximum application rates (pounds/acre) of active ingredient are:**

	FOSAMINE	GLYPHOS	HEXAZ	IMAZAPYR	SULFOMET
AL[1]	6 0	1.5	4 0	4 0	0 13
AG[2]	---	---	4 0	---	----

	TEBUT	FUEL OIL	PILCORAM	TRICLOPR/a	TRICLOPY/e
AL[1]	1 0	0 5	0 5	4 0	4 0
AG[2]	1 0	---	---	---	---

	LIMONENE	2,4-D/a	2,4-D/e	2,4-DP
AL[1]	0 9	2 0	2 5	3 0
AG[2]	---	---	---	---

[1]A = aerial liquid applications
[2]AG = aerial granular applications

MA-10b-24 **Each aerial herbicide application must have an operations plan approved by the Forest's air safety officer who must ensure that:**

a. Adequate precautions are taken to protect the crew, including equipment certification and hazard identification;

b. Areas to be aerially treated are clearly marked; and,

c. Methods used to avoid buffers and other sensitive areas are safe and effective.

Issuance and Modifications

MA-10b-31 **Issue of new special use permits or reissue of existing special use permits will be consistent with management direction in the Revised Plan. Term permits will be consistent with management direction in the first re-issue date or the first proposed permit transfer date following implementation of the Revised Plan.**

MA-10b-32 **Upon application for new special use permits, conduct appropriate site specific analysis and effects of the use before issuing a permit.**

This analysis will consider the nature of the proposed use and its effects on other resource values, as well as applicable regulations and policy.

MA-10b-33 **Consolidate linear rights-of-way into a single corridor where physically and legally feasible. Utilize cleared rights-of-way along existing roads to minimize new utility route clearings.**

MA-10b-34 **New, permanent uses may be authorized only upon a clear demonstration that the proposal is in the best interests of the general public.**

MA-10b-35 **Deny an application for a permanent use where a reasonable alternative lies in using other than National Forest lands.**

MA-10b-36 **On lands with a good probability of eventual exchange, deny applications for permanent uses except those for public utilities and roads.**

MA-10b-37 **Applications for the following types of special use permits shall be denied:**

Storage yards;
Sewage effluent handling or disposal systems;
Sanitary landfills and transfer stations;
New cemeteries or expanded burial sites for existing cemeteries; and
Uses that are contrary to regulations or written National or Regional policy.

MA-10b-38 **Authorize only one private access road per private ownership tract, regardless of multiple ownership. Avoid committing land to substitute for lack of internal access due to poor sub-division planning or uncooperative neighbors in the same private tract complex. Exceptions to the one private access route may be made:**

a. **On larger tracts where major physical barriers cause unreasonable cost or unacceptable environmental impact;**

b. **When the exception would result in a reciprocal easement being granted to the United States for needed access or would facilitate a long-range exchange of easements program; and,**

c. **To formally approve existing trespass routes where such routes are vital to continuing access to homes on adjacent private lands, environmentally acceptable, and clearly the most logical route.**

MA-10b-39 **Each permitted site shall be inspected at the frequency prescribed in the manual with priority given to safety and resource protection. All known safety hazards should be eliminated to the extent feasible according to the terms of existing permits for the site.**

Lands

MA-10b-41 **When disposing of land with permitted sites/facilities assure continuity of the existing permittee interests or ensure that adequate compensation for use rights occur.**

MA-10b-42 **Locate compatible uses in common corridors as appropriate for administration.**

Minerals

MA-10b-51 **Removal of common variety minerals shall be prohibited.**

MA-10b-52 **Permit surface occupancy where such occupancy does not unreasonably interfere with the privileges granted by the existing special use authorization.**

MA-10b-53 **Reserved and outstanding mineral rights in special areas are honored and managed according to Forest-wide Standards and Guidelines.**

Range

MA-10b-61 **Special use permits will not be used to authorize range use or facilities where a grazing permit would meet the objective.**

MA-10b-62 **Except where the nature of the special use authorization precludes grazing, the range resource will be managed similar to adjacent management areas.**

Recreation Management

MA-10b-71 **Allow dispersed recreation use opportunities when consistent or compatible with adjacent management areas.**

MA-10b-72 **Approval of new pipeline and powerline authorizations shall consider the need for, and include where needed, structures and/or measures to discourage recreational ORV use on the right-of-way.**

MA-10b-73 **Permit will be required for an activity on National Forest System lands that involves a group of 75 or more people in order to mitigate damage to resources and facilities.**

Scenic Resources

MA-10b-81 **The visual quality objective (VQO) varies depending upon the location of the site. In general, the VQO for most special use areas is modification; however, facilities shall be designed to blend or remain subordinate to the landscape character.**

Silviculture Practices

MA-10b-91 **This area is classified as unsuitable for timber production.**

Unregulated harvest may be permitted after appropriate site specific analysis where such activity does not unreasonably interfere with the privileges granted by the special use authorization.

MA-10b-92 **Vegetation removal shall be limited to supporting the functional requirements of the permit, protection of resource values involved, and provision for health and safety.**

Soil and Water

MA-10b-101 **On disturbed sites, implement erosion control practices in accordance with the Forest-wide Standards and Guidelines. (See Plan Appendix F).**

Wildlife

See Forest-wide Standards and Guidelines

Management Area 11
SFA Experimental Forest

Theme

Stephen F Austin Experimental Forest is managed for research and educational purposes

Description

The 2,600 acre Stephen F. Austin Experimental Forest (SFAEF) is approximately seven miles southwest of Nacogdoches, Texas Located within the proclamation boundary of the Angelina National Forest, it was established by Congress in 1944 as a research and educational facility in cooperation with Stephen F Austin School of Forestry. It is one of 12 experimental forests currently administered by the Southern Forest Experiment Station (SFES), New Orleans, Louisiana. The Wildlife Habitat and Silviculture Laboratory (WHSL), one of 19 research units within the SFES, has the responsibility of managing and administering the SFAEF

Desired Future Condition

The SFAEF will be managed to meet the continuing demand for knowledge, protection, and management of the renewable resources of forest lands. Research activities will alter the vegetation and landforms on an irregular spatial and temporal basis. Many stages of natural plant succession will be observable across the landscape; a result of timber harvest and road construction. The appearance of these human alterations will be softened through time. Alterations induced for the purpose of research will create short-term impacts to wildlife habitat, soil, and water resources. These impacts may appear as detrimental from an environmental standpoint; but they are desirable and essential in a research context.

No visual quality objective (VQO) or recreation opportunity spectrum (ROS) class designations have been given this management area Management of these will be coordinated with the Southern Research Station on a project by project basis.

Management of Management Area 11 will requires close coordination with the Southern Research Station in New Orleans, Louisiana

Management Emphasis

This area is managed to conduct research with a primary function to assess the impacts of forest management practices on wildlife communities and to provide information for incorporating wildlife habitat needs into forest management practices

MA-11 Standards and Guidelines

Air Quality, Aquatic Resources, Biological Diversity and Chemicals

See Forest-wide Standards and Guidelines

Cultural Resources

MA-11-01 **Complete cultural resource inventories of projects not categorically determined to have no effect.**

Inventories and State Historic Preservation Office clearance must be completed prior to the decision to implement the project.

Fire and Integrated Pest Management

See Forest-wide Standards and Guidelines.

Lands and Minerals

MA-11-11 **Only those landownership adjustment activities supporting the research objectives are permitted.**

MA-11-12 **Mineral leasing will be in concurrence of the Experimental Forest Manager, and leases will contain stipulations providing protection for the research objective for the area.**

MA-11-13 **New land use authorizations are authorized only with the concurrence of the Experimental Forest Manager.**

MA-11-14 **Forest-wide and Management Area 1 standards and guidelines apply to landownership adjustment, minerals and geology, land uses, landlines, claims, and encroachments.**

Planning, Range, Recreation Management, Scenic Resources, Silviculture Practices, Soil and Water, and Wildlife

See Forest-wide Standards and Guidelines.

MA-11-21 **This area is classified as unsuitable for timber production.**

Chapter V
Implementation of the Revised Plan

Implementation Direction

The purpose of Chapter V is to provide information on how the Revised Plan will be put into practice, or implemented. This chapter also discusses both National Forest Management Act (NFMA) and National Environmental Policy Act (NEPA) requirements which must be met when site-specific projects and activities are done to implement the Revised Plan.

Legal Requirements

The National Forest Management Act (NFMA) states "Resource plans and permits, contracts, and other instruments for the use and occupancy of National Forest System lands shall be consistent with the land management plans. Those resource plans and permits, contracts, and other such instruments currently in existence shall be revised as soon as practicable to be made consistent with such plans. When land management plans are revised, resource plans and permits, contracts, and other instruments, when necessary, shall be revised as soon as practicable. Any revision in present or future permits, contracts, and other instruments made pursuant to this section shall be subject to valid existing rights" 16 [United States Code (USC) 1604(i)]

Project Level Implementation

The Revised Plan will be implemented through a series of project-level decisions based on appropriate site-specific environmental analysis and disclosure. The Revised Plan does not contain a commitment to the selection of any specific project such as grazing permits, timber sales, wilderness plans, etc. Instead, it determines management areas and what types of projects are permissible in each area. It determines under what conditions certain management areas are suitable for management activities that produce desired outcomes. An example of one activity is a timber sale and associated production. The Revised Plan does not make decisions on the specifics of any particular timber production. It does not make decisions on the specifics of any particular timber sale that could occur on lands suitable for timber production. Such decisions must be based on appropriate site-specific analysis and appropriate disclosure during project-level implementation.

Site specific projects are selected to solve resource management problems, supply goods, and to provide services to the public The project area is assessed to determine the desired ecosystem condition in contrast to the existing condition and the opportunities in the area Possible management practices consistent with the Plan are identified to meet the purpose and need of the project A proposed project and alternatives are analyzed to disclose their likely effects and after extensive public involvement the responsible official signs a decision document giving the reasons for the decision

The projects chosen to implement this Revised Plan should be those which lead to accomplishing goals, objectives and the desired future conditions described in Chapter IV Any project that is in compliance with the standards and guidelines in Chapter IV of this document may be selected for implementation

Compliance

Upon the signing of the Record of Decision (ROD) for the Environmental Impact Statement (EIS) for the Revision of the Land and Resource Management Plan, forest officers will begin to assess existing or pending resource plans and permits, contracts and other instruments for consistency with the standards and guidelines in Chapter IV of this document Normally, such resource plans, permits, contracts, and other instruments not consistent with the applicable standards and guidelines shall be modified upon any issuance or normal re-issuance of term permits The responsible Forest Officer, however, retains the right to amend the Revised Plan to permit certain existing resource plans, permits, contracts, and other instruments to be in compliance with it Exceptions to some existing permits, contracts, or lease agreements may exist pending legal review on a case-by-case basis

The Revised Plan serves as the single Land and Resource Management Plan for the National Forests and Grasslands in Texas (NFGT) All other management plans are replaced or incorporated by this direction New project plans "under the umbrella" of direction established in this Plan will be developed to give additional, more specific guidance to management activities These project plans are needed for site specific information or to carry out direction in this Revised Plan. The following are examples of some types of project level plans for various types of proposals

* Fire Management Action Plans,

* Wilderness Plans and Implementation Schedules,

* Botanical Area Management Plans,

* Wild and Scenic Rivers Management Plans,

* RNA Management Plan,

* District Fish and Wildlife Implementation Plans, and

* Timber Project Plans

The Revised Plan supersedes the 1987 Forest Plan and incorporates, by reference, information from the following three Regional programmatic decisions:

1 The FEIS and ROD for the Suppression of the Southern Pine Beetle dated April 6, 1987, as amended;

2. The FEIS and ROD for Vegetation Management in the Coastal Plains / Piedmont dated February 27, 1989, as amended; and

3. The FEIS and ROD for the Management of the Red-cockaded Woodpecker and Its Habitat on National Forests in the Southern Region dated June 21, 1995

Resource plans and permits, contracts, and other instruments for the use and occupancy of NFS lands shall be consistent with this Revised Plan Those resource plans and permits, contracts, and other such instruments currently in existence shall be revised as soon as practicable to be made consistent with this Revised Plan When this Plan is revised, resource plans and permits, contracts, and other instruments shall be revised as soon as practicable Any revision in present or future permits, contracts, and other instruments shall be subject to valid existing rights or as otherwise specified by Standards and Guidelines in Chapter IV. General guidance for various programs that must be consistent with Plan direction may in part include the following:

Timber

All timber sales offered for sale after approval of this Plan will be consistent with this Revised Plan. Timber sales under contract prior to issue of the Revised Plan will be administered under provisions of the existing contracts. Changes to existing timber sale contracts may be made on a case-by-case basis where important resource considerations are present

All proposed reforestation, timber stand improvement, and related silvicultural activities will conform to management direction in standards and guidelines in the Revised Plan Contracts for silvicultural work not related to timber sales issued prior to the approval of the Revised Plan will continue to be administered under provisions of those contracts. Changes to pre-existing contracts may be made on a case-by-case basis when important resource considerations exist Ongoing silvicultural

work being accomplished by Forest Service crews will comply with any new direction following implementation of the Revised Plan

Recreation

New recreation special use permits issued or re-issued annual recreation special use permits will be consistent with the management direction standards and guidelines in this Plan on the first issue or re-issue date following approval of this Plan.

Recreation special use term permits that are re-issued will be consistent with management direction in the Revised Plan on the first re-issue date, or the first proposed permit transfer date following approval of this Plan.

Minerals

New mineral lease applications, permits, contracts and operating plans will be evaluated for consistency with the Revised Plan as they are received or proposed.

Existing mineral leases, permits, and operating plans in effect prior to implementation of the Revised Plan will be administered under provisions of the document as issued The Forest Service cannot unilaterally modify stipulations attached to existing mineral leases Changes to existing commitments however, may be negotiated by all willing parties if important resource considerations are present

Lands

Newly issued special use permits or special use permits that are re-issued will be consistent with management direction standards and guidelines in the Revised Plan. Term permits will be consistent with management direction standards and guidelines at the first re-issue date or the first proposed permit transfer date following approval of this Plan.

Facilities

New contracts for constructing or reconstructing facilities (including roads and buildings) will be consistent with management direction standards and guidelines in the Revised Plan Any construction or reconstruction projects under contract prior to issue of the Revised Plan will be administered under provisions of those contracts Changes to existing contracts may be proposed on a case-by-case basis where important resource considerations are present

Range

Newly issued term grazing permits or term grazing permits that are re-issued will be consistent with management direction standards and guidelines on the first issue or re-issue date following implementation of the Revised Plan

Wildlife

All fish and wildlife projects included under the Sikes Agreement between the Forest and Texas Parks and Wildlife Department will be consistent with management direction standards and guidelines in the Revised Plan

NFMA Project Requirements

A number of NFMA requirements must be completed within by site specific project plans tiered to the Revised Plan. The Interdisciplinary (ID) Team identified some examples of the following NFMA requirements which must be met during project-level implementation based on site-specific analysis for any project to which they apply

1 All resource plans and permits, contracts, and other instruments for the use and occupancy of NFS lands are to be consistent as stated above (compliance)

2 No timber harvesting, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suited for timber production (16 U S C. 1604 [k] and 36 CFR 219 27[c][1]) When timber harvest is proposed and the land has been determined to be suitable, a finding to that effect must be made If the land is determined not suited for timber production and timber harvesting is proposed, a finding must insure that harvesting is necessary to protect other multiple use values or activities The finding should reference the appropriate management direction found in the plan, planning records, or environmental documents

3 When timber is to be harvested using an even-aged management system, a determination that the system is appropriate to meet the objectives and requirements of the forest plan must be made (16 U S.C 1604[g][3][F][i] and [ii]) In addition, where clearcutting is to be used, it must be determined to be the optimum method Reference should be made to the discussions of even-aged management contained in the Forest Plan, planning records, or environmental documents

4 All proposals that involve vegetative manipulation of tree cover for any purpose must comply with the seven requirements found at 36 CFR 219 27[b] Reference the discussion or management direction found in the Forest Plan, planning records, or environmental documents

5 Site-specific location of riparian areas, wetlands and 100-year floodplains,

6 Any justification of stands to be converted from one forest type to another type, and

NEPA Project Requirements

Under the guidance of the Revised Plan, projects will be developed to most effectively accomplish management goals Projects and activities designed for implementation under the Revised Plan will be subject to environmental analysis to assure compliance with NEPA The NEPA analysis process begins once these individual projects have been identified

The FEIS for the Revised Plan is an aid to project-level NEPA compliance Project-level environmental analyses will tier to the Revised Plan and Final Environmental Impact Statement (FEIS)

Project-level decisions require site-specific environmental analysis Common project-level decisions include whether or not and if so, in what way, timber will be harvested in a given area, a campground will be constructed, or a fisheries structure will be installed The documentation for such analysis will be consistent with the Council of Environmental Quality Regulations [40 Code of Federal Regulations (CFR) 1500-1508], Forest Service Environmental Policy and Procedures Manual (FSH 1950) and Handbook (FSH 1909 15) An EIS or Environmental Assessment (EA) will be prepared, or if the analysis shows neither the activity nor the impacts to be significant and the activity conforms to the list of categories in Forest Service Handbook 1909 15 sections 31 1 or 31 2, the analysis would be excluded from documentation in an EIS or EA

NEPA analysis of proposed actions will provide the documentary basis for NFMA findings on consistency, suitability, clearcutting, even-age management, and vegetation manipulation This NEPA analysis and documentation leads to project decision-making that fully complies with NEPA, NFMA, and all other applicable regulations

Public Involvement

The public will be provided opportunities to be involved in making decisions about specific projects

NEPA implementation regulations state that one purpose of the procedures is to " ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. Most important, NEPA documents will concentrate on the

issues that are truly significant to the action in question, rather than amassing needless detail." [40 CFR 1500.1 (b)]

Environmental analyses and/or documentation of project-level actions will address the site-specific issues within the scope of the Revised Plan, EIS, and ROD.

The public plays a vital role in project planning. The opinions and concerns of interested publics will be sought early-on in the planning process for site-specific projects. Even though the public is legally prohibited from being members of the decision-making team, their comments will be given full consideration during the site-specific analysis.

Amendments and Revision

The Revised Plan can be amended at any time during its existence. Such amendments are necessary to ensure that the Plan remains a viable, flexible document for managing the Forests and Grasslands.

The Revised Plan may also be amended as part of a project-level decision where a change or adjustment in the Revised Plan is appropriate for that project but is not applicable to other areas. Examples of such changes might be adjustments to standards and guidelines, or modifications of management area boundaries. If it is determined during project design that the best method of meeting the management area goals of the Revised Plan is in conflict with either forest or management area standards and guidelines, the Forest Supervisor may approve a project-specific amendment to the Revised Plan.

This Plan will be revised on a 10-year cycle or at least every 15 years. It may also be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Revised Plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on the Forest-level programs. In the monitoring and evaluation (M&E) process, the ID team may recommend a revision of the Forest Plan at any time. Revisions must be approved by the Regional Forester.

Future revisions are not effective until considered and approved in accordance with the requirements for the development and approval of a Forest Plan. The Forest Supervisor will review the conditions on the land covered by the Revised Plan at least every five years to determine whether conditions or demands of the public have changed significantly.

Budget Proposals

The Revised Plan provides the basis for developing multi-year program budget proposals. The budget is used for requesting and allocating the

funds needed to carry out the planned management direction. Accomplishment of the annual program is the implementation of the management direction in the Revised Plan. Depending on final budgets, outputs and activities in individual years may be significantly different from those proposed. Cost and accomplishment data will be utilized to update and revise data bases and modify budget proposals.

The forest program development and budget process consists of evaluating fixed and variable cost activities, and capital investment projects. Fixed cost activities include those necessary to ensure public safety and environmental protection, and to maintain existing capital assets at certain levels of service and availability. Additionally, long-term management planning and resource inventories, general administration costs, and other costs that cannot be assessed on a per-unit basis are included in fixed cost activities.

Variable cost activities generally include those with outputs or uses that can be controlled or changed. For instance, certain costs may vary relative to the miles of trail construction proposed in an alternative.

Capital investments entail monies spent to provide or improve a facility or product for continued or future use.

The average annual budget proposal is displayed in this Revised Plan's Appendix H.

Monitoring and Evaluation

NFMA Regulations (36 CFR 219) provide the overall direction for Forest Plan M&E. The Plan will be monitored by collecting data about projects, activities, and practices executed to implement the Plan. Evaluation of this data will help determine whether or not the Plan remains sufficient to protect, maintain, restore, or achieve a diverse, healthy, and productive forest over time.

This Plan's Monitoring Chapter contains general information about the Forest M&E program, with particular focus on the questions designed to meet certain information needs associated with implementing and maintaining the Forest Plan.

The monitoring questions focus on how well the goals and objectives and standards and guidelines of the Plan are being met, and help us measure our progress toward achieving the Desired Future Conditions (DFCs) outlined in the Plan. Since DFCs reflect public issues, we are also monitoring how effectively public concerns are being addressed.

In addition to addressing monitoring questions, the M&E program encompasses other activities and administrative processes as well; such as inventorying and preparing accomplishment and status reports like the Management Attainment Reports and M&E Reports. Management and integrated resource reviews help ensure that monitoring protocols

and quality controls are followed. Other continuous monitoring activities, such as the Forest Inventory and Analysis coordinated nationally by Research, provide important information.

Monitoring and evaluation programs involve Forest ID Teams in partnership with Forest Service Research Scientists, universities and other members of the scientific community, environmental groups, other government agencies and the public.

Purposes and Objectives of Monitoring and Evaluation

One of the primary objectives of Forest Plan monitoring and evaluation is to improve decisionmaking through better information about how Forest land and resources are responding to the Plan management direction, and how well the Forest Plan is being implemented.

Gathering data and tracking events and activities helps us keep the Forest Plans current by identifying whether or not we need to change management direction in response to public and agency concerns, new information, legal and policy requirements, and changed resource conditions.

As we move into Ecosystem Management, M&E programs are broadening to increase our understanding of the social, biological and physical functions of Forest ecosystems. Interdisciplinary and broader-scale monitoring and evaluation helps decisionmakers recognize how their decisions fit with other decisions being made by other land managers beyond National Forest administrative boundaries. Monitoring strategies will entail greater collaboration with other agencies, the scientific community, and public interest groups.

Monitoring and Evaluation Program

Monitoring Questions

The Forest ID team developed monitoring questions based on the Plan DFCs, Goals and Objectives (G&Os), and Standards and Guidelines (S&Gs). These monitoring questions reflect legal requirements, public issues and management concerns. Table V-1: Monitoring Questions (See Plan-Chapter V-11) displays questions that need to be answered to ensure that the Plan decisions are being implemented, are effective, and are valid. The questions also respond to Regional or National information needs.

The questions in Table V-1 constitute Plan monitoring decisions. Changes to Table V-1 will require a Plan Amendment. Table 1 displays monitoring questions at three "levels."

Implementation Monitoring. (Did we do what we said we would do?)

Implementation Monitoring determines whether or not projects and activities are executed, or "implemented", according to the project design,

associated NEPA documents and Forest Plan objectives and standards All projects are monitored for implementation.

Effectiveness Monitoring. (Did it work?)

Effectiveness Monitoring helps determine whether or not our S&Gs are effective, whether or not we are meeting our DFCs and G&Os, and whether mitigation measures are preventing or minimizing undue environmental harm Effectiveness Monitoring occurs after implementation monitoring and may lead to Validation Monitoring

Validation Monitoring. (Are there better ways to meet Plan goals and objectives?)

Validation Monitoring helps determine whether or not the initial Forest Plan data, assumptions, coefficients, prescriptions, standards that we used to predict outcomes, and effects in the development of the Plan are still valid

Validation Monitoring is the most complex form of monitoring It requires more rigorous scientific, statistical methods and longer time frames for results than Effectiveness Monitoring. It will generally be coordinated with Forest Service Research and other members of the scientific community.

Appendix G is a Monitoring Summary Table for this Plan revision which displays the monitoring questions and general information associated with the questions The Summary Table will be updated periodically in response to the Forest Annual M&E Reports, and other indications of the need for change Appendix G of this Plan summarizes the more detailed Task Sheets discussed below

Monitoring Task Sheets

For each monitoring question, a monitoring Task Sheet is completed These task sheets are used to further develop the details, priorities and budgeting for answering the monitoring questions (See Table 3 - Sample Task Sheet) Changes to these Task Sheets will not require a Plan Amendment unless the DFCs/G&Os/S&Gs being monitored change, or the monitoring questions and/or monitoring levels change.

Any changes to these Task Sheets will be reported in the Forest's Annual Monitoring and Evaluation Reports

Task Sheet data will be entered into a computerized data base and are available to anyone upon request

Monitoring Prioritization

Not every goal, objective, or standard and guideline can be monitored at every level Monitoring priorities are determined by line officers and interdisciplinary staff. Relevancy to public and management concerns, compliance with legal and agency policy, scientific credibility needs and administrative feasibility, long and short-term budget considerations, and impact on work force all influence monitoring and evaluation strategies. New management techniques and activities associated with high risk have special implications for monitoring also

Evaluation of Monitoring Results

Monitoring information is becoming increasingly important in decisionmaking and risk assessment. The Forest Supervisor and District Rangers are personally involved in the evaluation of monitoring results. Evaluation of monitoring findings and results will be an ongoing activity throughout the year so that timely responses to changed conditions and new information can be made.

Evaluation considerations will include: The value, effects, and impacts of management practices on resources; the appropriateness of current implementation practices; casual relationships; alternative implementation activities; and the significance of any need for change to the Forest Plan–including changes to the M&E chapter or to Forest Plan implementation practices.

Thorough evaluation of monitoring results is directly linked to the decisionmaker's ability to respond to changing conditions, emerging trends, public concerns, and new information and technology.

Monitoring and Evaluation Results Reporting

Monitoring activities, findings, and results will be reported in official Monitoring and Evaluation Reports The reports will include time frames and action plans for implementing recommendations based on monitoring findings Monitoring and Evaluation Reports will be timely and available to anyone upon request

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
FOREST-WIDE DFC/GOALS AND OBJECTIVES			
DFC/Goal 1:Biological Environment			
Objective 1-a· Coordinate with other agencies and institutions, or private groups to train personnel in the identification and management of threatened, endangered, or sensitive species and unique plant communities	Are threatened, endangered, or sensitive species and unique plant communities being properly identified?	Is available training sufficient to meet diverse needs of biologists, cooperators and rangers?	
Objective 1-b Protect and improve habitat for threatened, endangered, and sensitive plant and animal species. (See Table 2)	How is the habitat of any listed species being affected? Has section 7 consultation with USFWS been conducted as required?	Are habitats and species increasing? How, when, where measured?	Is management effective; are actions improving habitat and populations?
Objective 1-b. Develop habitat for threatened, endangered, or sensitive species species not provided on privately owned forests and grasslands, while providing viable populations of other species that occur within Forests and Grasslands (See Table 2)	Are viable populations of indicator species being sustained?	What are the viability trends for selected species?	Is genetic exchange occurring between populations and sub-populations? Can genetic exchange being documented?
Objective 1-c. Manage wilderness to preserve the character of its living and non-living components, while allowing natural processes to develop.	Are natural processes shaping the wilderness character rather than man's influence? Are any activities harming natural processes?		
Objective 1-d· Implement appropriate silvicultural practices based on site specific inventory data that promote the diversity of the landscape.	Is landscape diversity being maintained?		
Objective 1-e. Maintain, improve, or restore needed unique ecosystems using ecological classification information and process restoration, emphasizing fire dependent longleaf and shortleaf pine ecosystems	Are significant longleaf and shortleaf pine ecosystems being successfully restored as per restoration priority levels?		
Objective 1-f. Manage riparian areas, to provide vital corridors for biological exchange and connecting mature forest areas.	Are riparian areas being managed to provide important corridors for biological exchange between mature forest areas?	Are target species using the riparian areas?	Are management techniques achieving the desired results and trends?

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS (continued)

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
Objective 1-f Manage riparian areas, to provide vital corridors for biological exchange and connecting mature forest areas.	Are riparian areas being managed to provide important corridors for biological exchange between mature forest areas?	Are target species using the riparian areas?	Are management techniques achieving the desired results and trends?
Objective 1-f. Manage riparian areas to protect and enhance soil, water, and vegetation.	Are riparian areas being identified as per Plan and are standards and guidelines being applied?	Are streams and corridors maintaining desired wildlife, plants, and fish populations?	
Objective 1-g· Manage ecosystems and fire dependent communities through a prescribed burning program providing resource protection and ecological management needs	Are fire dependent ecosystems being managed to maintain, improve, or restore the desired ecological processes?	Is frequency and timing of burning sufficient to achieve desired results?	Are vegetative species and conditions acceptable and meeting the desired conditions?
Objective 1-h Acquire lands that will enhance high priority resource management objectives	Are non-public lands being acquired to enhance important resources or consolidate lands for important ecosystems?		To the extent funding and private lands are available, are lands being acquired as needed to meet public program objectives?
DFC/Goal 2.Social			
Objective 2-a Provide a broad spectrum of dispersed and developed recreation opportunities to accommodate public demands	Is a balance of dispersed and developed recreation opportunities from low scale development to upper scale development being provided within public demand?		
Objective 2-b· Maintain and enhance the visual character of the forests and grasslands through visual quality objective standards	Are management activities meeting the VQO?	Have actions accomplished the intended need and met mitigation standards?	Is the form, line, color, and texture of activities meeting acceptable design quality?
Objective 2-c Protect the visual qualities of the Forests and Grasslands through vegetation management techniques to enhance views and scenic quality	Are openings and harvesting activities performed to enhance scenic quality?		
Objective 2-d Manage trails to enhance recreation opportunities, yet emphasize protection of resources and reduction of conflicts with other users.	Do project plans adequately consider other resources and minimize conflicts with other users?	Is unacceptable damage occurring to the resources? Are there unacceptable conflicts with other users?	

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS (continued)

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
Objective 2-e· Identify, protect, interpret, and manage cultural heritage resources	Are significant archeological and historical sites being identified through the completion of inventories conducted according to the Forest Heritage Resource Plan?	Are significant heritage resources being protected from adverse impacts due to project implementation, vandalism, and natural forces? Is application of the Forest Heritage Management Plan and research design resulting in the identification of significant heritage resources prior to project implementation	Are heritage resources being properly identified, protected, and interpreted at selected important sites?
Objective 2-f. Provide law enforcement effort to protect forest visitors, forest resources, and facilities	Is law enforcement provided at sufficient levels for visitor protection, enforcement of resource regulations, and facility protection?		
Objective 2-f Provide for safe use and enjoyment of the Forest and Grassland facilities by the public	Are safety and maintenance items noted in inspections of Administrative Facilities being accomplished? Are dams operated and maintained in accordance with the Dams Operation and Maintenance Plan? Are trails maintained to the standards planned in the annual maintenance planning process? Are FDRs operated and maintained to the standards planned in the annual planning process?	Are frequency, magnitude of safety problems, and risks at a low level?	
Objective 2-f. Upgrade or replace administrative facilities for the health and safety of users.	Are administrative facilities replaced as needed for health and safety of employees?		
Objective 2-g Provide equal employment opportunities for all people regardless of race, color, national origin, sex, age, religion, or physical condition.	Are equal employment regulations and opportunities being met?		
Objective 2-h Acquire rights-of-way to facilitate public access to National Forest System lands	Are public lands properly identified and access provided for use and enjoyment?	Do resource project plans identify needed access for management and users?	

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS (continued)

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
DFC/Goal 3:Economic			
Objective 3-a Maintain future management options by sustaining ecological processes and ecosystems to help meet social and economic demands of the public.	Are ecosystems being maintained or enhanced to help meet social and economic benefits?	Are trends in ecosystems' elements stable or increasing?	Are the landtypes showing positive characteristics of sustainability?
Objective 3-b· Consider economic efficiency in management of NFGT programs	Are resource programs being managed in the most cost-efficient manner?	Are efforts to reduce per unit costs effective?	Are cost efficiency measures achieving the desired results?
Objective 3-c Pursue opportunities to make landownership adjustments that improve management through lands consolidation	Are landownership adjustments improving management and consolidation?	Do acquisitions, exchanges, and disposals result in a net boundary reduction?	
Objective 3-d Establish, maintain, and protect all landline boundaries	How well are landline boundaries being established, maintained, and protected from obliteration?		
Objective 3-e· Acquire rights-of-way to facilitate efficient management of National Forest System lands	Are acquired rights-of-ways achieving better Forest management?	Do acquired rights-of-ways provide more efficient management of public lands?	
Objective 3-f. Manage the transportation system for increased cost-effectiveness and efficiency	Is the transportation system cost-effectiveness being increased?	Are FDRs constructed/reconstructed and operated in accordance with compartment project plan? Are FDRs constructed/reconstructed and operated in accordance with the Recreation Area Design Narrative? Are roads planned and constructed as temporary being obliterated and revegetated as per requirements?	
Objective 3-g Provide cost-effective fire protection to public and private property and prevent loss of human life.	Is fire protection to public and private property and human life being performed in a cost-effective manner?		
Objective 3-h: Encourage volunteers; Challenge Cost Share, Cooperative Agreements, and Partnerships in Forest Service activities	Are partnerships, cooperative agreements, and volunteer programs being encouraged?	Are requests to volunteer and support programs being processed? How are the districts and the SO soliciting people and groups to assist the Forest Service?	

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS (continued)

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
Objective 3-i. Support development of innovative, ecological, and environmentally based markets through rural development and community assistance programs.	Are programs for recreation based markets and rural development being developed?	Are recreation based markets and rural development programs improving rural economies and social conditions?	How many new jobs result from programs?
Objective 3-j. Provide employment through expanded human resource programs	Are districts/SO providing HRP employment opportunities to the public?		How many employment opportunities were created?
Objective 3-k. Issue those land uses authorizations necessary to meet public and private needs when no viable alternative to long-term commitments of NFGT lands exists	Are land use authorizations being issued only after all other opportunities are explored to provide goods and services?	Are the results of applying the application decision guidelines fair and equitable considering the needs of the public?	
DFC/Goal 4:Production			
Objective 4-a. Manage for multiple resource sustainability of renewable resources without impairment to the future productivity of the land.	Are renewable resources being managed to prevent long-term loss of future productivity of the land?	Are National Forest streams consistent with state antidegradation policies and meeting water quality standards?	Are any public lands defined with declining productivity?
Objective 4-b. Manage habitat to provide for huntable wildlife populations, while maintaining viable populations of the many non-game species (See Table 2)	Are huntable wildlife populations being provided without any detriment to viable populations of the many non-game species?	Is hunting successful and are non-game populations viable?	
Objective 4-c. Manage forest areas for appropriate size and class distribution providing sound forest health and diversity.	*Are age class distributions and species* diversity being achieved in even-aged stands forest wide?	*Is the desired ecosystem diversity being achieved?*	*What age classes exist and in what acreage amounts?*
Objective 4-c(1). Manage uneven-aged areas for a wide distribution of age classes and species diversity while allowing a sustained yield of forest resources.	Are age classes and species diversity being achieved on uneven-aged acres?	Are age classes within stands achieving the desired reverse "J" curve configuration?	
Objective 4-d. Provide a continual flow of high quality pine and hardwood sawtimber and other forest products	Is there a continual flow of high quality pine and hardwood being produced?	How do timber outputs compare to plan estimates?	

MONITORING CHAPTERS, TABLE V-1: MONITORING QUESTIONS (continued)

DFCs/GOALS/OBJECTIVES	IMPLEMENTATION QUESTIONS	EFFECTIVENESS QUESTIONS	VALIDATION QUESTIONS
Objective 4-e: Provide sustainable grazing opportunities by restoring and maintaining native grasses on the Grasslands that will meet local needs and are economically sound; while de-emphasizing grazing on the forests	Are grazing opportunities being provided at demand levels on the grasslands, while de-emphasizing grazing on the forest?	Is the Range Program achieving the expected forage utilization?	Are AUMs at the appropriate range carrying capacity level?
Objective 4-f Minimize losses from insects and diseases through an integrated pest management program	Has management resulted in a decrease of susceptibility to SPB and other pests?	Are pest incidents decreasing with applied IPM programs?	
Objective 4-g Improve forest and grassland resource production through a prescribed burning program	Is the prescribed burning program improving forest and grassland resource production?	Are ecosystems showing improvement or being sustained by burning practices?	
Objective 4-h Provide for exploration and development of non-renewable resources with minimal long-term detriment to future land productivity	Are projects implemented according to project design, Forest Plans S&Gs, and associated NEPA documents?	Are the standards and special requirements providing the protection needed and anticipated?	Are any detrimental conditions being documented (i e spills, water contamination)?
DFC/Goal 5:Physical Environment			
Objective 5-a Meet or exceed state water quality standards	Are state water quality standards of antidegradation being met per Forest Plan through implementation of standards and guidelines?	Are National Forest streams meeting state antidegradation policies and water quality standards?	Are turbidity and chemical analyses appropriate to evaluate and show that water quality is maintained in compliance with State standards?
Objective 5-b Protect municipal and other potable water supplies through sound management practices	Are management practices protecting municipal and other potable water supplies?	Do activity mitigation measurers assure consistency with state antidegradation policies and water quality standards?	Are soils being restored to the level that meets the intent of the 319 section of the Clean Water Act?
Objective 5-c Maintain or improve soils productivity and water quality	Is soil productivity and water quality being maintained or improved?		Are any sites loosing productivity or is any stream water quality being degraded?
Objective 5-d: Implement procedures and precautions that promote air quality consistent with federal and state laws	Does the Forest Service prescribe fire and smoke management program meet NAAQS/ Texas FS smoke management objectives? Does the air meet NAAQS and state standards?	Is the vegetation in the NFGT being impacted by ambient ozone concentration? Is visual quality impacted due to USFS activities?	

TABLE V-2 - FOREST & GRASSLAND MANAGEMENT INDICATORS

VEGETATION GROUPS	MANAGEMENT INDICATOR	UNITS	CURRENT STATUS	SHORT TERM OBJECTIVE	LONG TERM OBJECTIVE
Longleaf Pine Woodlands & Savannas	Red-cockaded Woodpecker	Active Clusters	25	200	300
	Slender Gay Feather	Populations	9	15	35
	Incised Groove Burr	Populations	4	20	50
	Scarlet Catchfly	Populations	2	5	10
	Longleaf - Bluestem Series	Acres	21,000	40,000	96,000
***Longleaf Pine Barrens**	Navasota Ladies Tress	Populations	1	2	5
	Little Bluestem-Rayless Goldenrod Series	Acres	440	475	500
***Herbaceous Wetlands**	Yellow Fringeless Orchid	Populations	1	5	10
	Spagnum - Beakrush Series	Acres	150	200	300
***Bay-Shrub Wetlands**	Nodding Nixie	Populations	7	20	35
	Texas Bartonia	Populations	1	5	15
	Sweetbay - Magnolia Series	Acres	250	300	400
Dry-Xeric Oak-Pine Forests	Red-cockaded Woodpecker	Active Clusters	75	300	400
	Louisiana Squarehead	Populations	5	10	25
	Shortleaf-Oak Forest	Acres	150,000	160,000	170,000
Mesic Oak-Pine Forests	Red-cockaded Woodpecker	Active Clusters	130	350	450
	Loblolly-Oak Forest	Acres	300,000	270,000	210,000
Mesic Hardwood Forests	Southern Ladyslipper	Occurrence	Unknown	Establish Base	Increase Base
	Beech - White Oak Series	Acres	2532	3000	3500
Tallgrass Prairie	Bobwhite Quail	Population Density	1/25 acres	1/20 acres	1/15 acres
	Little Bluestem-Indiangrass	Acres	15,000	20,000	25,000
Bottomlands Streamsides	Neotropical Migrants **	Occurrence	Unknown	Establish Base	Increase Base
	Neches River Rose Mallow	Populations	1	3	6
	Bottomland Hardwood	Acres	25,000	50,000	60,000

* Inclusional community or habitat groups within the Longleaf Pine Woodlands

** Neotropical migratory bird guild includes Yellow-throated Vireo, Wood Thrush, Acadian Flycatcher and others

MANAGEMENT INDICATORS COMMON TO ALL AREAS

SERAL STAGE HABITAT	MANAGEMENT INDICATOR	UNITS	CURRENT STATUS	SHORT TERM OBJECTIVE	LONG TERM OBJECTIVE
Forest/Grassland	Eastern Wild Turkey	Acres of Habitat	30,000	24,000	15,000
Early Succession	Whitetail Deer	Acres of Habitat	75,000	50,000	30,000
0-20 years	Yellow Breasted Chat	Acres of Habitat	60,000	45,000	25,000
	Snags	Number	2	2-3	2-4
Forest/Grassland	Eastern Wild Turkey	Acres of Habitat	30,000	38,000	45,000
Mid Succession	Whitetail Deer	Acres of Habitat	25,000	30,000	35,000
20-50 years	Yellow Breasted Chat	Acres of Habitat	24,000	30,000	35,000
	Pileated Woodpecker	Acres of Habitat	20,000	22,000	25,000
	Gray/Fox Squirrel	Acres of Habitat	30,000	24,000	15,000
	Snags	Number	2-4	3-6	4-6
Forest/Grassland	Eastern Wild Turkey	Acres of Habitat	275,000	160,000	45,000
Late Succession	Whitetail Deer	Acres of Habitat	180,000	100,000	80,000
50-90 years	Yellow Breasted Chat	Acres of Habitat	90,000	65,000	40,000
	Pileated Woodpecker	Acres of Habitat	200,000	150,000	100,000
	Gray/Fox Squirrel	Acres of Habitat	130,000	90,000	50,000
	Snags	Number	2-6	6-8	8
Forest/Grassland	Eastern Wild Turkey	Acres of Habitat	60,000	150,000	240,000
Old Growth	Whitetail Deer	Acres of Habitat	35,000	120,000	180,000
90 + years	Pileated Woodpecker	Acres of Habitat	60,000	200,000	350,000
	Gray/Fox Squirrel	Acres of Habitat	40,000	150,000	250,000
	Snags	Number	6-8	8-12	12+
Aquatic - Ponds	Largemouth Bass	Catch/Unit Effort	24-81	40-90	60-90
and Reservoirs	Sunfish (RE & BG)	Catch/Unit Effort	12-250	40-250	50-275
	Channel Catfish	Catch/Unit Effort	2-22	10-20	15-20
Aquatic - Rivers	Paddlefish	Occurrence	0	6+ Reprod. Adults	6+ Adults/ Rerprod
and Streams	Sabine Shiner	number streams	4	10	20
	Dusky Darter	Occurrence/slow	16	25-30	30-40
	Scaly Sand Darter	Occurrence/swift	5	8-12	12-20
	Stonefly Guild	Occurrence/Score	Fair-Good	Good-Excellent	Excellent

TABLE V-3 -SAMPLE MONITORING TASK SHEET

DFC/GOAL:

OBJECTIVE:
and/or
STANDARD:

MONITORING QUESTION:

MONITORING LEVEL. Implementation ( ) Effectiveness ( ) Validation ( )

MONITORING ITEM

Existing Data Check.
Site/Location:
Range of acceptable results:
Who collects data:
Data Collection Methodology/Design:
Frequency/Duration:
Expected Precision: L( ) M( ) H( ) Expected Reliability: L( ) M( ) H( )
Estimated Cost of Collection:
Personnel Needed:
Data Source:
Data Storage:

ANALYSIS/EVALUATION OF FINDINGS

Responsibility/Method of Analysis
Estimated Cost of Analysis
Who Evaluates Findings. Line. FS( ) DR( ) IDT RO( ) SO( ) DO( )
Other:
Findings:
Recommended actions:
Date Recommended action implemented:

REPORTING OF FINDINGS

Responsibility of Reporting.
Information to be reported:
Frequency of reporting:
Method of reporting:
Target Audience of report:
Additional Comments.

Appendix A

An Ecological Classification System

Introduction

On June 4, 1992, the Forest Service announced the agency's new policy, principles, and guidelines for Ecosystem Management This new policy stated that Ecosystem Management would mean that "an ecological approach will be used to achieve the multiple-use management of the National Forests and Grasslands " Under this policy, we will blend the needs of people and environmental values in such a way that the National Forests and Grasslands represent diverse, healthy, productive, and sustainable ecosystems

It was further stated that we should use the flexibility within existing Forest Plans to practice Ecosystem Management, and as Forest Plans need to be amended or revised they should reflect the policy of Ecosystem Management

In a follow-up letter of June 25, 1992, the Chief directed that implementation of Ecosystem Management should proceed in a smooth and orderly fashion over the next five years The effective date for some items within the policy were also identified Projects and Forest Plan amendments initiated after publication of the new final National Forest Management Act (NFMA) regulations and Forest Service Manual (FSM) 1920 Planning Manual, will comply with the direction established

In the June 4, 1992 letter, Regional Foresters and Station Directors were directed to evaluate their regional situation, and within 90 days (by September 4, 1992) develop a strategy for implementing the above policy, principles, and guidelines

The Regional Forester and Station Directors appointed a multi-disciplinary team to develop a Joint Regional/Station Strategy for Ecosystem Management implementation A final strategy was completed comprising six components which make both specific and general recommendations to implement the strategy The Joint Region/Station Strategy on Ecosystem Management provides a process for providing implementation direction on this policy One of the key components of the strategy is development of an Ecological Classification System A Regional Ecosystem Classification Team was established to develop an Ecological Classification Mapping and Inventory System (ECM&I) to be implemented regionally, and for consistency on a National basis

Ecological Classification Appendix

The following hierarchical framework represents the approach used to stratify the land into its component ecological units that affect the National Forests and Grasslands in Texas (NFGT) To be effective and useful, the units cross administrative and political boundaries

The mapping and classifications described in this "Appendix A" are the results of initial efforts of the Kisatchie National Forest staff in using Ecological Classification, but, additional coordination and improvements remain to be done This will be accomplished by coordination with neighboring National Forests and their mapping and classification efforts, and by consulting with other Federal agencies, state agencies, and universities The process will be ongoing until the Ecological Units for Subsection, Landtype Associations, Landtype, and Landtype Phase Levels are finalized through the coordination effort

The objectives of this effort are to· (1) Provide an integrated system for use in mapping, analysis, monitoring, evaluation, and data base linkages, (2) provide a unifying framework for interpreting ecosystem responses to management, disturbance, and development through time, and (3) provide an information system to aid in evaluating land capabilities, interpret ecological relationships, and improve multiple-use management (FSM 2060 1)

Summary

NATIONAL HIERARCHICAL FRAMEWORK OF ECOLOGICAL UNITS

ECOMAP, USDA Forest Service, Washington, D C

The National Hierarchical Framework of Ecological Units is a regionalization, classification, and mapping system for stratifying the earth into progressively smaller areas of increasingly uniform ecological potentials. Ecological types are classified and ecological units are mapped, based on associations of those biotic and environmental factors that directly affect or indirectly express energy, moisture, and nutrient gradients which regulate the structure and function of ecosystems These factors include climate, physiography, water, soils, air, hydrology, and potential natural communities.

The hierarchy is developed geographically from both the top-down and bottom-up, conditions that change at broad scales (such as climate and geology) are continually related to conditions that change at finer scales (such as biotic distributions and soil characteristics) This approach enables scientists and managers to evaluate broader scale influences on finer scale conditions and processes, as well as to use finer scale information to determine the significance of broader scale influences In this iterative procedure, Ecoregion and Subregion levels of the hierarchy are developed by stratification as fine scale field classifications and inventories are being completed

This regionalization, classification, and mapping process uses available resource maps including climate, geology, landform, soils, water, and vegetation. In some cases, however, additional information is needed Data bases and analysis techniques are being developed to provide interpretation of the ecological units.

Uses of the hierarchy vary according to management information needs and level of information resolution. These applications are summarized in Table 1. The hierarchical framework is largely a Forest Service effort, although there has been involvement by the U.S. Soil Conservation Service, Bureau of Land Management, U S. Fish and Wildlife Service, U.S. Geological Survey, The Nature Conservancy, and other national and regional agencies. Goals are to develop an Ecological Classification and Inventory System for all National Forest System lands, and to provide a *prototype system acceptable to all agencies. Nationally coordinated* Ecological Unit Maps will be developed for Ecoregion and Subregion scales, covering all U.S. lands.

CLASSIFICATION FRAMEWORK
(Including unit descriptions)

Ecoregion

At this broad scale, ecosystems are recognized by differences in global and continental climatic regimes, and gross physiography. It is assumed that climate governs energy and moisture gradients, and exerts primary control over systems at the lower hierarchical levels of the ECS.

DOMAINS - Subcontinental subdivisions with broad climatic similarity controlled by the distribution of global air masses. Landform is generally not significant at this level.

DIVISIONS - (Subdivisions of Domains) Regional climates become apparent Important variables are the amount of water deficit and winter temperature fluctuations. Landforms may indirectly modify climate in some areas

PROVINCES - (Subdivisions of Divisions) Corresponds to broad climatic regions or sub-zones Gross landform features become important (especially elevation in mountain ranges), and may modify temperature and wind patterns Vegetation is characterized by formations of climax or late-successional species assemblages with relative uniformity in appearance and structure

Table 1. National Hierarchy of Ecological Units.

Planning and Analysis Scale	Ecological Units	Purpose, Objectives, and General Use	General Size Range
Ecoregion			
Global	Domain	Broad applicability for modeling and sampling.	1,000,000's to 10,000's of square miles
Continental	Division	Strategic planning and assessment.	
Regional	Province	International planning	
Subregion	Section Subsection	Strategic, multi-forest, statewide and multi-agency analysis and assessment	1,000's to 10's of square miles
Landscape	Landtype Association	Forest or area-wide planning, and watershed analysis	1,000's to 100's of acres
Land Unit	Landtype Landtype Phase	Project and management area planning and analysis	100's to less than 10 acres

The following three Hierarchical Ecological Unit levels are derived and described from Ecoregions of the United States. Additional information used in the description of the Provinces comes from the Land Resource Regions and Major Land Resource Areas of the United States (U S.G S 1994 Soil Conservation Service)

Humid Temperate Domain

This Domain generally covers the eastern half of the continental U S as well as an area adjacent to the Pacific Ocean. The climate is influenced by tropical and polar air masses Seasonality is strongly evident, temperature and precipitation patterns occur in annual cycles Vegetation includes a mixture of broadleaf deciduous and needleleaf evergreen trees, The variable importance of winter frost divides this Domain into six Divisions.

A Subtropical Division

This area is located throughout the southern Atlantic and Gulf Coast states The climatic pattern is characterized by the absence of very cold winters and presence of high humidity Rainfall is "adequate" year round, often markedly greater during the summer months Summers are warm (greater than 22 ° C) and winters are mild Vegetation includes extensive evergreen pine forests and savannas in the outer coastal plain, and mixed deciduous-pine forests further inland

1 Southeastern Mixed Forest Province

This Province is located on relatively recent (geologically) deposited marine sands and clays. Much of the area is essentially flat (increasingly so towards the coast), although the northern boundary is quite dissected and locally steep Wetlands are relatively abundant due in part to an abundance of precipitation, and lack of internal drainage among soils The annual range of temperature is small to moderate Rainfall is abundant and well distributed throughout the year The potential natural vegetation (PNV) according to Kuchler (1966) is primarily "Southern Mixed Forest", which is an association of beech, sweetgum, magnolia, pine, and oak Extensive upland areas of this Province were once subjected to lightning fires, introduced by summer convectional storms These conditions favored the development of pyrophytic longleaf pine forests

2 Oceanic Mixed Constantly Humid Forests Province

This Province occurs on the inland, dissected, Gulf Coastal Plain sediments and the lower Piedmont Local relief is greater than within the Coniferous Broadleaf Evergreen Humid Forest (BEHF) Province, and wetlands are less abundant Temperature exhibits some seasonal fluctuations with freezing weather and snow potentially present during portions of the year Precipitation is also somewhat seasonal, and somewhat less than Coniferous BEHF Province The PNV is oak-hickory-pine forest (Kuchler 1966) Shortleaf and loblolly pines are predominant, with shortleaf being dominant on uplands, and loblolly historically restricted to drainages, terraces, etc

Ecosubregion

At this scale, ecosystems are recognized by differences in regional climates, as modified by geology and landform Both factors influence moisture availability and radiant solar exposure which ultimately control hydrological functioning, soil formation and development, and the establishment of potential natural vegetation Ecological unit components for these scales are summarized in Table 2 In general these units are as follows

SECTIONS - Broad areas of relatively uniform landform and physiography, which modify broad climatic zones by influencing precipitation patterns

SUBSECTIONS - At this level, landforms within physiographic regions are recognized based on similar lithology Landform patterns may modify local climates and create areas with relatively homogenous precipitation and temperature regimes

The following reference levels were developed using published maps and descriptions including. the Geographic Provinces of Texas (W K Ferguson), general soils maps of Texas (Texas Agricultural Experiment Station), Longleaf Pine Communities of the West Gulf Coastal Plain (Bridges and Orzell 1989), Natural Regions of Texas (Arnold 1978), and discussion with Texas Natural Heritage Program staff and Forest Service personnel

The **Southeastern Mixed Forest Province** includes the following Sections and Subsections in our area

West Gulf Coastal Plains and Flatwoods Section

This Section extends into Louisiana to the Province formed by the Mississippi River and adjacent floodplains The demarcation of this section represents the generalized "tension zone" (see Curtis 1959) between the Gulf Coastal Plains flora and that of the prairies and piedmont The western boundary extends to the Trinity River, where climate (decreasing rainfall and humidity) becomes largely unsuitable for longleaf pine and other primarily southeastern plant species The northern boundary represents the general boundary between longleaf pine and shortleaf oak-hickory communities Soils are predominantly thermic Ultisols

West Coastal Plains Subsection

This subsection encompasses nearly level uplands of southwestern Louisiana and southeastern Texas on Miocene and Pleistocene age sediments This area is of Miocene age or younger, and is divided from older sedimentary deposits at the Kisatchie Wold This section forms the modern day boundary of continuous, widespread longleaf pine communities (Bridges and Orzell 1989) Rainfall is greater than in ecological units both north and westward, generally exceeding 48 inches per year Soils are mostly acidic Paleudalfs, Fragiudalfs, and Ochraqualfs, which are poorly drained and receive more rainfall than subsections to the north and west Dominant plant communities include "upland" and "wetland" longleaf pine savannas

Western Gulf Coast Flatwoods Subsection

No Forest Service land is located in this subsection.

West Gulf - Alluvial Valleys Subsection

This subsection is based upon the aquatic systems of the Neches and Sabine Rivers. These segments are considered together as one subsection based on the overall similarity of biotic and physical characteristics. The Neches segment includes the confluence of the Angelina and Neches Rivers and Steinhagen Reservoir. The Sabine segment remains free-flowing below Toledo Bend Reservoir.

Reservoirs subsection

This subsection includes the Toledo Bend and Sam Rayburn Reservoirs. Although they are associated with different natural rivers, these water bodies are considered together due to the overall similarity of biotic and physical characteristics.

Mid Coastal Plain Transition Subsection

This subsection includes rolling hills of Eocene age and older in the heart of east Texas, with a narrow extension into Louisiana. As the name suggests, this area is the modern day transition where the pure and continuous longleaf pine forests "pass gradually into a mixed growth of deciduous trees and shortleaf pine" (Mohr 1897). Geology consists of clay parent material and sub-soils are invariably clayey. Soils include fine udults and udalfs.

West Gulf - Trinity River and Lake Livingston Subsection

This subsection is based on the primarily aquatic elements associated with the lower Trinity River The river crosses several environmental gradients which distinguish adjacent land units. Along this gradient, the character of the river does change somewhat although throughout it is readily distinguishable from the surrounding terrestrial units (Skinner 1975).

SUMMARY OF SUBSECTION DIFFERENTIATING CRITERIA

Subsection	West Coastal Plains	Alluvial Valleys	Mid Coastal Trans.	Trinity River
Strata	Limonitic Sands	Alluvial Gravel & Sand	Massive Clay	Alluvial Gravelly Sand
Soil Taxa	Udults Udalfs	Fluvents Aquants	Udults Udalfs	--- ---
Avg. Temp.	66-68°	---	66-68°	66-68°
Rainfall	48-52"	---	48-52"	48-52"
Growing Season	245-260 days	---	245-260 days	250-260 days
Potential Vegetation	Longleaf-Bluestem	Bottomland Hardwoods	Longleaf-Bluestem	Bottomland Hardwoods

Coastal Prairies and Marshes Section

This Section includes the coastal prairies as well as the freshwater and saltwater marshes adjacent to portions of the Gulf of Mexico. It is differentiated from the rest of the Coniferous Broadleaf Evergreen Humid Forest Province because of its extent, and because its potential natural vegetation is significantly different from the rest of this Province, (i.e. it's substantially treeless)

Gulf Coast Prairies Subsection

No Forest Service land is located in this subsection.

[This area is located on the nearly level, poorly drained area of coastal Texas and Louisiana (west of the Mississippi River). The area was predominantly non-forested, consisting of a true prairie plant community]

Gulf Coast Marshes Subsection

No Forest Service land is located in this subsection

[This area includes the fresh and saltwater marshes immediately adjacent to the Gulf of Mexico, including the very geologically recent beach dune deposits It is located in a narrow band along the coastline of Texas and Louisiana The vegetation is also generally non-forested The area supports a variety of marsh vegetation including grasses, sedges, and rushes Kuchler identifies the PNV as being a Southern Cordgrass Prairie]

Gulf Coast - Lake Ponchartrain Subsection

Found in Louisiana only

Texas Coastal Prairie Subsection

Located outside Forest Service land

Brazos and Brazoria Rivers Subsection

Located outside Forest Service land

The **Oceanic Mixed Constantly Humid Forests Province** is divided into several Sections and Subsections

Mid Coastal Plains, Western Section

This Section is split from the rest of the Oceanic Mixed Constantly Humid Forests Province at the Mississippi River (see Intrazonal Riverine Province) This western perimeter is where coastal plain elements transition into those more often associated with the central prairies This relatively "mature", undulating to rolling landscape has developed on geologies of Eocene age and older Soils are primarily Ultisols (approximately 80 percent occur on irregular plains with local relief ranging from 100 to 300 feet) Natural vegetation typically consists of mixtures of shortleaf pine, oaks, and hickories in the uplands with loblolly pine and hardwoods occurring in the lowlands

Northern Subsection

This subsection includes the rolling hills of north and northeastern Texas, adjacent Louisiana, and southern Arkansas It averages approximately 40 inches of rainfall, and tends to freeze more than 30 days per year (conditions which collectively favor the development of shortleaf pine over longleaf pine) Soils are predominantly Ultisols The predominant forest canopy was a mixture of shortleaf pine-oak-hickory on uplands

North LA Intermediate Terrace Subsection

Located in Louisiana only

Mid Coastal Plain - Western Transition subsection

This ecological unit represents the transition from pine to oak forests The area is generally underlain by massive clay decomposition residuum with areas of limonitic sandy decomposition residuum The surface is characterized by undulating to rolling uplands and fine udalf soils Potential natural community is shortleaf pine-oak

Mid Coastal - Sandhill subsection

NOTE This subsection may be further subdivided at the Trinity River to separate the eastern subsection [containing Redlands Landtype Association (LTA)] from the western sandhills (containing the Sparta Sandhills)

SUMMARY OF SUBSECTION DIFFERENTIATING CRITERIA

Subsection	Mid Coastal Plains-Northern Subsection	Mid Coastal Plains-Western Subsection	Mid Coastal Plains-Sandhill Subsection
Strata	Limonitic Sand	Massive Clay, Limonitic Sand	Quartz Sand, Limonitic Sand
Soil Taxa	Udults	Udalfs	Udults
Avg. Temp.	64-68°	66-68°	64-68°
Rainfall	48-56"	40-46"	44-48"
Growing Season	230-275 days	260-275 days	230-275 days
Potential Vegetation	Shortleaf Pine-Oak	Shortleaf Pine-Oak Post Oak-Blackjack Oak	Bluejack Oak-Pine Shortleaf Pine-Oak

Southwestern Gulf - Flatwoods Subsection

This subsection occurs on flat, poorly drained uplands on geologically recent formations, west of the Trinity River in Texas. The historic natural vegetation of this area included loblolly pine in mixture with hardwoods,

especially the more mesic species This area is believed to represent a large portion of the historic "Big Thicket", which was noted for dense, nearly impenetrable forests (in Collier 1964), consisting of a variety of species (Foster et al 1917)

Southwestern Gulf - Coastal Plains Subsection

This subsection is typically gently undulating, ranging from gently rolling in the north to somewhat flatter in the south This subsection represents the western limit of pine forests It is restricted to east Texas, west of the Trinity River drainage The biological barrier coupled with generally unfavorable climate (especially precipitation decreases) have limited the spread of longleaf pine Consequently, uplands were historically dominated by loblolly pines and mixtures of hardwood species (Bray 1906) This area seems to be the heart of one the countries largest historical concentrations of loblolly pine (Collier 1964)

SUMMARY OF SUBSECTION DIFFERENTIATING CRITERIA

Subsection	Southwestern Gulf Flatwoods Subsection	Southwestern Gulf Coastal Plains Subsection
Strata	Alluvial Sand, Silt and Clay	Massive Clay and Alluvial Pebble
Soil Taxa	Udalfs Udults	Udalfs Udults
Avg. Temp.	61-68°	66-68°
Rainfall	40-54"	40-48"
Growing Season	260-275 days	260-275 days
Potential Vegetation	Loblolly-Oak	Loblolly-Oak

The **Mississippi Alluvial Basin Province** is divided into Sections and Subsections Occurs primarily east of Texas except in the Red River area

Mississippi Alluvial Basin Section

This section includes the level bottomland and backswamps created by the meandering belts of the Mississippi, Red, and Arkansas Rivers. Soils are fertile and productive.

Mississippi River Alluvial Plain Subsection

This subsection is not found in Texas

Red River Alluvial Valley Subsection

This subsection contains the recent alluvium and levee deposits confined to the bottomlands and backswamps along the Red River in northern Texas. It also extends to central Louisiana. The original overstory vegetation was dominated by species associated with bottomlands and backswamps Due to the productivity of the soils, much of this area is under cultivation

Northern Macon Ridge Subsection

Found in Louisiana only

Landscape Scale

Landtype Association Descriptions

At this level, ecosystem patterns and processes are controlled primarily by landform Lithology, stratigraphy, geomorphic history, and land surface form influence soil and potential natural community distributions, hydrologic function, and natural disturbance regime Table 2 describes units at various landscape levels

LANDTYPE ASSOCIATIONS (LTA's) - Combinations of lithology, stratigraphy, and geomorphic history have created groups of repeatable, easily recognizable landform patterns Microclimate is modified by particular land shapes with associated soil and soil moisture regimes Wind patterns are modified by ridges and valleys, thus affecting evapotranspiration. Solar radiation begins to directly affect soil temperature and moisture regimes on exposed areas. These ecological units are differentiated primarily by surface geology (including parent material type and age), potential natural communities (represented by historical overstory), and predominant topography The LTA's for NFGT are summarized in Table 3 The descriptions for each LTA unit are as follows

MAYFLOWER UPLANDS – 55,405 acres
(Locally named "Longleaf Ridge")

This LTA occurs in an east west pattern extending from the Sabine River westward through the Western Coastal Plains Subsection The southern boundary is a low clayey region called the "Burkeville lowland", to the north are the "clayey uplands" and "sandy uplands" This LTA occurs primarily outside NF boundaries on private land, but small areas at the northernmost boundary of the LTA are located on the south end of the Angelina and Yellowpine Ranger Districts

TOPOGRAPHY The land surface form ranges from gently undulating to hilly, further south (outside Forest Service lands) the LTA becomes primarily undulating to hilly On average, slopes range from 3 to 35 percent

GEOLOGY This LTA includes the Catahoula, Whitsett, Nash Creek, and portions of the Willis geologic formations These formations were deposited beginning in the late Eocene, and Miocene periods The Catahoula is the most characteristic and dominant member on the NFGT This formation has a high percentage of volcanic materials which have weathered into bentonitic clays and tuffaceous soils Sandstones, siltstones, and mudstones are common. Willis sands cap portions of the Catahoula and become increasingly common further south While the Whitsett and Nash Creek are considered Eocene in age, they are much more similar to the Miocene aged Catahoula than the remaining Eocene aged formations which are characterized by either sandy or clay parent materials (Sandy Upland and Clayey Upland LTA's)

SOILS Soils are generally deep sands or loams which are moderately-well to somewhat excessively drained Sandy areas are characterized by the predominance of the Taxonomic Suborders, Arenic, Grossarenic, and Psamments. Some areas have dense, clayey subsoils and certain small areas have very shallow soils General soils include Rayburn-Tehran-Kisatchie association and Tehran-Letney associations

VEGETATION Longleaf pine was the dominant historic overstory vegetation throughout this LTA Inclusions of other vegetation types were small in scale, restricted to unusual edaphic or topographic situations More recently, this area has been considered the northernmost extent of the continuous longleaf pine communities in Texas (Bridges and Orzell 1989). Continuous stands of longleaf pine (sometimes associated with shortleaf and/or loblolly pine) are typical of the overstory Well burned stands often have thick, continuous coverage of graminoids, including the tallgrass prairie species (indiangrass, little bluestem, big bluestem, and switchgrass).

Longleaf pine is typical of this unit This once widespread forest type has been reduced state-wide and throughout the southeastern United

States (Noss 1988, Frost 1993) Although longleaf is still quite abundant throughout the National Forest portions of this LTA, the character of these existing stands is often quite different from the original Remaining examples of this once widespread forest type (including the majority of FS tracts) have been tremendously altered through cutting and alteration of fire regimes In natural condition these forests consisted of nearly pure, uneven-aged stands, scattered large trees occurred interspersed with patches of younger growth (See Schwarz 1907, Chapman 1909, Platt et al 1988, Bridges and Orzell 1989, Martin and Smith 1991) Frequent ground fires favor the propagation of longleaf pine, limit the spread of less resistant hardwood and pine species, and maintain an exceptionally diverse groundcover of grasses and herbs A variety of hardwood and shrub species, including sweetgum (Liquidambar styraciflua), farkleberry (Vaccinium arboreum), southern waxmyrtle (Myrica cerifera), and loblolly pine (Pinus taeda) tend to increase in importance with less frequent burns

Intact, fire maintained longleaf pine forests in this unit support very diverse understories Sensitive herbaceous species include slender gayfeather (Liatris tenuis), scarlet catchfly (Silene subciliata), erect milkpea (Galactia erecta), sawtooth nerveray (Tetragonetheca ludoviciana), and Carolina lily (Lilium michauxii) Two herbaceous dominated communities are restricted to this unit, Hillside seepage bogs and Catahoula barrens (Little Bluestem - Nuttall's Rayless Goldenrod Series) (Marietta and Nixon 1984, Orzell 1990) Each of these contain a unique assemblage of plant species, many of which are also considered "sensitive" on the NFGT

PLANT COMMUNITIES

Longleaf Pine - Little Bluestem (Upland Longleaf Pine Forest)
Post Oak - Blackjack Oak *
Sphagnum - Beakrush Series (Hillside Seepage Bog) **
Sweetbay Magnolia Series (Wooded Seep)
Nuttall's Rayless Goldenrod Series (Catahoula Barrens) **
Bluejack Oak - Pine Series
Loblolly Pine - Oak Series ***

* This deciduous community is included here as a minor, essentially disjunct component of the Post Oak Savanna and Cross Timbers Region to the west It is closely associated with the "Little Bluestem-Nuttall's Rayless Golden-Rod Series" where Catahoula Formation - Browndell rock soils (Dolezel 1988) are found near the surface

** These primarily herbaceous communities are restricted to this LTA on National Forest lands

*** This broadly defined community type is highly variable Two primary variants are found in this LTA In upland positions in the Mayflower Uplands, this type is usually an unnatural artifact of past logging and fire suppression This community naturally occurs on middle and lower slopes adjacent to stream bottoms, and may naturally occur in topographically isolated areas in portions of the Mayflower Uplands

REDLANDS LTA (Approximately 14,600 acres)

This LTA occurs in an east-west band which is narrow near the Sabine River, and widens considerably to the west outside the Western Coastal Plain Transition Subsection It is represented primarily in the center of the Sabine (around Milam and San Augustine), with minor representation on the extreme northern tip of the Angelina District

TOPOGRAPHY: This area is characterized by gently sloping to moderately steep land surfaces Slopes range from 3 to 40 percent

GEOLOGY· This LTA includes the Weches, Reclaw, Sparta, Queen City, and Carrizo formations Each was deposited during the mid-to-late Eocene period. Although these formations interdigitate considerably, the Carrizo occurs furthest north (and is somewhat older), with the Recklaw, Queen City, Weches, and finally the Sparta occurring in a coastward sequence There is considerable variation in this LTA from east to west due in part to considerable faulting which occurred in this region during the Sabine uplift and associated tectonic activity For example, the Carrizo occurs in several disjunct bands, and the Queen City dominates to the west, but is unrepresented near the Sabine River.

The Weches and Recklaw are probably the most distinctive members of this group They are narrow marine deposits with high glauconite content The Recklaw consists of about 90 percent glauconite clay, producing distinctive and productive red soils The Weches is charaterized by beds of black and brown iron ore which forms resistant hills, escarpments, and outcrops (Sellards 1966) The remaining formations consist primarily of sand deposits with slight variations in particle size

SOILS: Due to the variety of geologic parent materials it is understandable that the range of soil associations will be correspondingly broad An additional problem from a clarity standpoint is the lack of geological correlation which exists in Angelina County (Aronow 1988) and apparently Nacogdoches County From north to south the following associations may apply, the Carrizo includes areas of deep (greater than 80 inches), fine sands, which are well drained to excessively drained (mapped associations in order of importance include, Tonkawa, Darco-Tenaha, Cuthbert-Tenaha, and possibly Lilbert-Darco) The Recklaw and Weches are areas of relatively shallow (less than 12 inches), well drained loams, with red clay subsoils (Nacogdoches-Trawick association

primarily) The Sparta includes a large area of well drained, loamy fine sands over clay loam subsoils

VEGETATION This area corresponds partially to the "Redlands", a distinctive region recognized for many years in both Texas and Louisiana (see Hilgard 1884, Roberts 1893, Gow 1904, Johnson 1931, Chambers 1941). In addition, this general area is considered to be the broad boundary between the "pure" longleaf forest to the south and shortleaf pine-oak-hickory forests to the north (Gow 1904, see also Collier 1964). The vegetation in this LTA is quite variable due to the variety of geologic and soil conditions, as well as a rather diverse history of human use. The deep sandy portions of this LTA were characterized by belts of relatively pure, upland pine forests For example, the Sparta formation which extends into Louisiana "was mostly covered by upland longleaf pine forests in presettlement times These forests covered all of the uplands except those few areas not reached by frequent sweeping fires " (Martin and Smith 1991) The extent to which longleaf forests occupied both the Sparta and Carrizo in Texas is less well accepted, although excellent examples of longleaf pine communities can be found on both formations on National Forest land These "xeric longleaf pine savanna/sandhill woodland-barrens" (Bridges and Orzell 1989) are the northernmost pure longleaf stands remaining in Texas Typically, scattered longleaf pines are typical of the overstory, occasionally codominant with shortleaf pine Well burned stands often have thick, nearly continuous coverage of graminoids, although patches of mineral soil and/or lichen growth may be present Oak species [especially bluejack (Quercus incana), post oak (Q stellata), and blackjack oak (Q. marilandica)] are very important, and occasionally dominant, often increasing as fire frequency decreases

The productivity of the loamy soils, lying between these great sand belts, is an important ecological factor Much of this ground was put into cultivation long ago (Roberts 1881, Johnson 1931), obliterating evidence of historical vegetative relationships Several authors recorded a scrubby hardwood forest of oak (red, post, and blackjack), hickory, elm, and other trees (Roberts 1881, Austin 1821) and even a "thick coat of grass" (Roberts 1893) Roberts (1881) considered this area to be the lower edge, or extension of the "Black-jack belt" Hilgard (1884) places the Redlands of Louisiana in the "Oak-Uplands Region", and describes the usual timber growth as oak and hickory, "almost always associated with more or less of the shortleaf pine, the greater or lesser prevalence of black oak and hickories over the pine and inferior oaks (post oak and blackjack oak). " Cruikshank and Eldredge (1939) considered this area the best development of the "upland hardwood type" in east Texas One of east Texas' most distinctive modern day plant communities is located in areas where Weches glauconites, glauconitic clays, and marls outcrop at the surface A herbaceous dominated community develops that is of great floristic interest - two species endemic to these outcrops, white bladderpod (Lesquerella pallida) and Leavenworthia texana (see

Nixon et al 1983, and George and Nixon, 1990) are Federally endangered species

PLANT COMMUNITIES.

Shortleaf Pine - Oak Series
Weches Herbaceous (George and Nixon 1990)
Post Oak - Blackjack Oak Series
Bluejack Oak - Pine
Pine - Bluejack Oak *
Longleaf Pine - Little Bluestem (xeric longleaf pine savanna)
American Beech - White Oak Series
Sweetbay Magnolia Series

* Closely related Bluejack Oak-Pine synonymous with TNHP Shortleaf Pine-Oak on xeric sites.

ALLUVIAL BOTTOMS AND TERRACES LTA (Approximately 5,000 acres)

This unit is located primarily on the Sabine National Forest, along the Sabine River drainage Much of this LTA has been inundated by Toldeo Bend Reservoir.

TOPOGRAPHY This LTA is nearly level in any remaining unflooded bottomlands and gently undulating on surrounding terraces

GEOLOGY· Formations include the Deweyville, deposited in the late Pleistocene, and more recent (Holocene) alluvium

SOILS Surface soils are generally somewhat poorly drained, clayey or loamy soils, above thick acidic, clay or clay loam subsoils Terraces are somewhat excessively drained loamy sands, and loamy fine sands, above loamy fine sandy subsoils

VEGETATION These broad plains, which are subject to frequent overflow or flooding, are easily distinguishable from the surrounding landscape Species of bottomland forests can be considered to occur in several recognizable aggregations, due in part to sometimes subtle changes in topographic position within the floodplain (see Gow 1904, Chambless and Nixon 1975, Fredrickson 1978, Nixon unpublished, Streng et al 1989, and Martin and Smith, 1991) Deciduous hardwood species are typically dominant, and when undisturbed these species often attain large size Overstory components can include a variety of hardwood species including water oak (Quercus nigra), overcup oak (Q.lyrata), laurel oak (Q laurifolia), basket oak (Q michauxii), Carolina ash (Fraxinus caroliniana), green ash (F pennsylvanica), water hickory (Carya aquatica), and black gum (Nyssa sylvatica) Other important woody - shrubby

species may include deciduous holly (Ilex decidua), hawthorns (Crataegeous spp), ironwood (Carpinus caroliana), snowbells (Styrax americana), water elm (Planera aquatica), and sebastian bush (Sebastiana fruticosa) A variety of natural processes are important in the dynamics of these floodplain forests (see Streng et al 1989) with implications to wildlife species (see Fredrickson 1978)

PLANT COMMUNITIES

Baldcypress-Water Tupelo
Overcup Oak
Swamp Chestnut Oak-Willow Oak *
Water Oak-Willow Oak
Water Oak-Sweetgum**
Floodplain Hardwood Forest (Marks and Harcombe 1981)

* This series may be the most typical of the unit
** USFS Forest Type, not recognized by TNHP

CLAYEY UPLANDS LTA (Approximately 257,000 acres)

This LTA is one of the most widespread on National Forest land It occurs across broad areas of the central Sabine, the north end of the Angelina, and central portions of the Davy Crockett National Forests

TOPOGRAPHY Nearly level to gently sloping, with slopes ranging from 1 to 15 percent

GEOLOGY This LTA includes the Yegua (the most widespread formation in this LTA), Cook Mountain, Yazoo, Moody Branch, and Caddell Each was deposited near the beginning of the Eocene period Most have large clay components Cook Mountain is characterized by dense clay and shale deposits (the presence of glauconite produces a grayish-green appearance in this formation) Caddell is principally clay with local areas of glauconite and some very fine sand. In contrast, the Yegua is more sandy (coarse grained) especially towards the north It consists of approximately 50 percent sand, 26 percent sandy clay, 22 percent compact clay, and several other minor components

SOILS: Soils are primarily loamy above either loamy or clayey subsoils Soil depth is extremely important and can vary from several feet to a few inches Drainage classes vary from somewhat poorly drained to moderately well drained

VEGETATION: This LTA is well within the original longleaf pine belt (Mohr 1897, Bray 1904, Foster etal 1917), especially the eastern two-thirds of the LTA. The western reaches of this area grade into a more

dominant shortleaf-oak-hickory landscape due to more extreme temperature gradients and drier climate Eastern portions are recognized as historical upland longleaf pine savannas (Bridges and Orzell 1989) that extended northward from the Mayflower and Sandy Uplands LTA In contrast to the historically open savannas (see description under Mayflower uplands), most existing stands in this LTA are in a close-canopied condition, dominated by 50 to 70 year old stands of loblolly and shortleaf pines These mixed forests have replaced former longleaf pine savannas throughout this region due to human impact The selective removal of mature longleaf seed sources, the prevalence of razorback hogs (which fed selectively upon longleaf trees), and the alteration of fire regimes (long periods of fire suppression followed by periods of winter burning versus the natural "growing season" or lightning fire burn cycles) are important factors which are related to the demise of longleaf pine savannas (Frost 1994, Bridges and Orzell 1989, Collier 1964)

Although widespread changes have occurred in the vegetation of this LTA, there is still evidence that longleaf pines abounded here Recent vegetational studies have documented the presence of remnant longleaf pines across every soil type, except heavy Lacerda clays, in this LTA (Smeins and Hinton 1987, Fountain and Risner 1988) Reproductive, ecological, and silvical characteristics of longleaf pines suggest that these remnant trees indicate the former existence of nearly pure stands (Boyer 1993). In addition, occasional stands of longleaf pine have persisted as a result of Forest Service management

Typical prescribed burning practices are not designed to be effective in restoring savanna-like conditions in this LTA An aggressive program of "restoration burning" would be required to recreate conditions favorable to establishment and growth of longleaf pines and associated species (McWhorter 1993) The intensity and frequency of necessary treatments to accomplish these objectives can be inferred from a large body of research literature (for example Robbins and Myers 1990), although no particular studies have yet been conducted on NFGT lands.

PLANT COMMUNITIES

Longleaf Pine-Little Bluestem Series
American Beech-White Oak Series
Loblolly Pine-Oak Series*
Shortleaf Pine-Oak Series*

* Each of these community types occurred naturally in limited areas of this LTA The present abundance of these types is directly related to human disturbance of natural process, especially fire suppression and periodic winter burning This phenomena is most pronounced with loblolly pine-oak forests (see description above) Shortleaf pine-oak communities were more widespread than loblolly pine communities, probably occurring naturally on

clay loams, and heavy clay soils; especially in the western portions of the LTA. These forests were heavily influenced by fires which occurred frequently in adjacent longleaf pine forests (Martin and Smith 1991) These fires were probably less frequent than those in longleaf forests, but may have been sufficient to create relatively open, canopied stands with grassy understories

LIGNITIC UPLANDS LTA (Approximately 14,600 acres)

This LTA occurs north of the Redlands On National Forest land, it occurs exclusively on the Tenaha District

TOPOGRAPHY Gently sloping to strongly sloping, occasionally steep Slopes range from 1 to 40 percent

GEOLOGY: This area is underlain by the Wilcox formation in upland positions, with large areas of recent alluvium along drainages

SOILS· Soils are typically well drained, very fine sandy loams (to 10 inches thick) above clayey subsoil.

VEGETATION· Geographically, this LTA is thought to correspond with the generalized shortleaf pine region of several early authors (see Collier 1964) The Wilcox geology especially corresponds with "the typical section" (see TAES 1931) that was considered shortleaf pine country. Although site specific variation is expected in the vegetation of this unit, the presence of shortleaf pine is a primary indicator Toward the southern portion of this unit, the forests of longleaf pine "pass gradually into a mixed growth of deciduous species and shortleaf pine" (Mohr 1897) Originally, shortleaf was of vast economic importance, it occurred in nearly pure stands but was more often associated with upland oaks, hickories, and other hardwood species (Foster et al 1917) This LTA probably supported some areas of pure pine, pine and hardwood, and prairies of all sizes (Collier 1964)

Numerous, fairly large "riparian areas" dissect the Lignitic uplands. Shortleaf pine remains important in many of these areas, especially near the upper slopes, and sites which have been most frequently burned The presence of hardwoods in association with shortleaf pine is well established (Loughbridge 1880, Martin and Smith 1991, Foti and Glenn 1991) Moving down the topographic and moisture gradient, loblolly pines and mesic hardwoods become increasingly important. Communities with American beech are particularly distinctive and important here, especially in sites with steep topography.

PLANT COMMUNITIES

Shortleaf Pine - Oak
Loblolly Pine - Oak
American Beech - White Oak

SANDY UPLANDS LTA (Approximately 40,600 acres)

This LTA is a narrow band beginning at Sam Rayburn Reservoir running west across the south end of the Davy Crockett National Forest The southern boundary is the Kisatchie Wold, the northern is the Clayey Uplands

TOPOGRAPHIC POSITION Nearly level, gently sloping to strongly sloping uplands, some areas are considered low ridges

GEOLOGY The Manning and Wellborn formations were deposited during the late Eocene The primary components are sands and sandy clays

SOILS Soils are primarily loamy, somewhat poorly to moderately well drained, above clay or sandy clay loam subsoils Permeability may be slow to very slow in large areas

DIFFERENTIATING CRITERIA The predominance of sandy surface materials contrasts with adjacent geologies

VEGETATION This LTA is characterized by the historical presence of longleaf pine The importance of longleaf communities (savannas) was probably greatest to the east, gradually declining to there western boundary in Trinity County For broad descriptive purposes, the upland vegetation of this LTA is considered essentially similar to that of the Mayflower Uplands (See vegetation description under IIB1 above) Whereas longleaf pine savannas were the overiding landscape influence in the Mayflower Uplands, this LTA probably had significantly greater percentage of inclusionary community types, especially near its westernmost boundary Shortleaf pine-oak communities are probably the most important such inclusional type

PLANT COMMUNITIES.*

Longleaf Pine-Little Bluestem Series
Loblolly Pine-Oak Series
Shortleaf Pine-Oak Series

* Note that two longleaf landscape associated communities (pitcher plant bogs, and Catahoula barrens) are not found in this LTA It is unknown if Sweetbay Magnolia Series occurs here

SAN JACINTO FLATWOODS LTA (Approximately 13,200 acres)

This LTA is restricted to the southwestern loblolly hardwood subsection, and is found only on the San Jacinto District

TOPOGRAPHY This area consists of broad, smooth, relatively undissected, flat (nearly level) to very gently sloping flatwoods Drainages are poorly defined, and generally shallow and narrow Flatwoods ponds (sometimes known as "hog wallows" or "blow outs") are shallow, intermittently dry, wetlands characteristic of the Bentley In addition, pimple mounds (or microknolls 10 to 25 feet in diameter, and 1 to 4 feet high) may be locally abundant

GEOLOGY This LTA occurs on the Bentley Formation, the oldest strata definately deposited during the Pleistocene (Recent) epoch of the Tertiary period (Aronow 1988) There is some difficulty in distinguishing the Bentley from the Montgomery, and some geologists have considered them both as the Lissie (Aronow 1988) The Bentley is characterized by the topographic features described above, and a large amount of organic detritus and partially decomposed plant remains - none of which have become fossilized as in the older formations

SOILS They are silty, loamy, or sandy and moderately well drained to poorly drained Surface layers range from 4 to 19 inches in depth above sandy clay loam, silt loam, or very fine sandy loam subsoils General soils include the Otanya-Kirbyville-Dallardsville, and Sorter-Otanya-Waller map units

VEGETATION Seasonally high water tables alternating with droughty periods are primary influences on the vegetation within this LTA Periodic, low intensity, surface fires were probably of great historical importance in maintaining an open vegetative structure Wetland longleaf pine savannas occur on the Bentley further east, although no remnant savannas remain in Texas due to fire suppression and type conversions (Bridges and Orzell 1989) Longleaf pine is known to exhibit good growth on at least some soil groups within this LTA (McEwen et al 1988) It is unknown to what extent wetland longleaf pine savanna communities extended west of the Trinity River, although "old timers" have described open stands of longleaf pine in the area Areas protected from fire, or only occasionally winter burned, develop dense stands which invariably include loblolly pine, sweetgum, yaupon, blackgum, and southern waxmyrtle, among others Flatwoods ponds are noted as distinctive, usually graminoid dominated, inclusional communities of which several types have been recognized (Bridges and Orzell 1989) Inland bays also occur in this LTA Although specific plant community information is lacking, these areas are typically poor pine sites due to hydric properties Sites may be dominated by black gum (Nyssa sylvatica), water oak (Quercus nigra) and willow oak (Q phellos)

PLANT COMMUNITIES

Water Oak-Willow Oak
Longleaf Pine-Little Bluestem (wetland pine savanna)
Loblolly Pine-Oak Series

RAVEN HILLS LTA (Approximately 128,000 acres)

This LTA is the northernmost in the southwestern loblolly hardwood subsection It includes the entire Raven District of the Sam Houston National Forest, and adjacent portions of the San Jacinto District.

TOPOGRAPHY Primarily gently undulating to gently rolling, with a large area of nearly level to sloping terrain just north of the Forest boundary

GEOLOGY Portions of this LTA found on NFGT land occurs on the Fleming and Willis formations, deposited during the late Miocene to early Pleistocene The Fleming formation consists of calcareous clays, silty clay, silt, and sandstone Most Fleming outcrops are closely associated with overlying, topographically higher, fluviatile deposits of the Willis Willis contains materials of variable sizes, including some coarse siliceous gravel with fragments of petrified wood North of the Forest boundary, the LTA is underlain primarily by the Catahoula Formation

SOILS They are primarily acidic, deep, loamy fine sands on uplands (to 26 inches), and much shallower, fine sandy loams or loamy fine sands on side slopes and adjacent to drainages Subsoils are generally firm clays, or sandy clay loams. To the north, outside the Forest, soils tend to be somewhat finer textured, associated with the Falba-Elmina-Arriola general soils units Smaller areas of this LTA (including portions within the Forest boundary) are characterized by deep loams and clays Many of these areas have distinctive firm, dark, alkaline, and clay surfaces General soils include the Depcor-Annona-Huntsburg map unit with smaller areas of Ferris-Annona-Houston Black.

VEGETATION Prairie-like openings have long been associated with east Texas, originally consisting of hundreds to thousands of individual openings of several distinct types (see Jordan 1973) At least some of these openings are related to edaphic conditions which limit woody plant growth This LTA includes natural "blackland fields", once considered "inliers of the Black Prairie within the Atlantic timber belt" (Hill 1901) Floristic work is underway to determine the actual composition of these plant communities (Carr 1993) The Blackland inliers are thought to have supported vegetation similar to Blackland sites from central Texas, although ecotypic variation among little bluestem (Schizachyrium scoparium) may contribute to important differences (Nixon 1963).

The vegetation surrounding these isolated prairies is typical "pine-hardwood" forest Loblolly pine is the primary pine species, found on up to 83 percent of the largest portion of the Raven District, with shortleaf pine as a minor component only (Thomlinson 1993) Loblolly pine (Pinus taeda) is known to tolerate a wide variety of soil types (Zon 1905, Baker and Langdon 1990), and forested communities containing loblolly pines have been described in nearly all topographic positions in east Texas and Louisiana (Diamond et al 1987, Harcombe et al 1991, Martin and Smith 1991, Nixon unpub.), although it is most commonly associated with mesic slope positions (Nixon unpublished, Martin and Smith 1991, and Harcombe et al 1991) In upland position, as found in much of this LTA, this community has been considered "mainly deciduous" (Diamond et al 1987) with several oak species dominating (esp Q stellata, Q.falcata, Q.alba, Q nigra), along with other hardwood species. Other important species include sweetgum, hophornbeam (Ostrya virginiana), mockernut hickory (Carya tomentosa), yaupon (Ilex vomitoria), and flowering dogwood (Cornus florida). In addition, loblolly pine has been described as occurring in a variety of other situations in east Texas (Zon 1905), from pure stands to hardwood mixtures Bray (1904) noted pure stands of loblolly on sandy knolls and ridges in the region which includes much of the Sam Houston National Forest The ubiquitous nature of this species and community in east Texas, and its existence in early to mid-stages of succession has contributed to a lack of detailed study and understanding of this vegetation type (Nixon unpublished, Harcombe et al 1991).

PLANT COMMUNITIES.

Loblolly Pine-Oak Series
Little Bluestem-Indiangrass Series
Shortleaf Pine-Oak Series

BIG THICKET LTA (Approximately 19,700 acres)

This component of the southwestern loblolly pine-hardwood subsection is found on the Sam Houston National Forest only, in a band dipping gradually southwestward from the Trinity River

TOPOGRAPHY This LTA is primarily an area of broad gently sloping ridges which are separated by well defined, southward flowing drainageways Slopes range from 1 to 5 percent

GEOLOGY: The Willis Formation was deposited in either the upper Pliocene or early Pleistocene It is largely fluvialite in origin, consisting of sand and gravel deposits primarily

SOILS: They are moderately well drained to well drained fine sandy loams, or loamy fine sands from 12 to 24 inches in depth Subsoils tend

to be clay loam or sandy clay loam General soils include the Pinetucky-Doucette map unit

VEGETATION The vegetation of this LTA is superficially similar to that of the Raven Hills LTA to the north, (see description for 232Fg(1), a primary distinction being the lack of blackland inliers

PLANT COMMUNITIES·

Loblolly Pine-Oak Series
Bluejack Oak-Pine Series

SPARTA SANDHILLS LTA (Approximately 29,900 acres)

This LTA crosses the north end of Neches District in an essentially east-west band It is essentially a western extension of the "Redlands" belt which extends across the northern Angelina and joins the Sabine River

TOPOGRAPHY The land surface form of this LTA ranges from gently sloping to steep Predominant slopes are 1 to 8 percent

GEOLOGY The portions of this LTA represented on National Forest land occur exclusively on the Sparta Sand This formation occurs in a continuous belt, approximately 2 5 miles wide, from central Louisiana to Lee County (near Austin) It includes nearly 70 percent quartz sand and 25 percent sandy shale The sand components of the Sparta are loose and unconsolidated

SOILS Soils are generally deep, well drained, loamy fine sands or fine sandy loams which become increasingly clayey with depth

VEGETATION The extremely deep, droughty sands, favor growth of shortleaf pine over the other "yellow pines" Although soil characteristics alone would seem conducive to longleaf pine growth, this area lies outside the known historic range of this species (Hilgard 1884, Bray 1904, Foster et al 1917) and previous planting attempts have all failed (Stiles personal comm 1993) This general areas lies well within the shortleaf belt of most early authors (Bray 1906, Foster etal 1917) and was later classified as "oak-pine" due to the nearly universal presence and overall importance of upland hardwoods (Braun 1950) Although shortleaf was the primary pine species throughout, loblolly was probably common in wetter sites originally and has almost certainly invaded former shortleaf sites (Collier 1964, Martin and Smith 1991) Shortleaf pine may have attained relatively pure growth in this area, although such areas were probably the first to be logged (Bray 1904) and were likely interspersed with larger areas of mixed hardwood growth and open prairies (Collier 1964, Jordan 1973)

PLANT COMMUNITIES

Shortleaf Pine-Oak Series
Loblolly Pine-Oak Series

GRASSLAND ECOLOGICAL UNITS

SECTION	Crosstimbers and Prairies	Blackland Prairies	Oak Woods and Prairies
SUB-SECTION	a Eastern Crosstimbers b Western Crosstimber c Grand Prairie	a Blackland Prairie	a Texas Claypan Savanna
LTA	c(1) Limestone Mesa b(1) Western c(1) Eastern	a(1) Blackland	

LAND UNIT SCALE

At this most basic scale, ecosystem patterns and processes are controlled by the interaction of local topography, soils, and vegetation These ecological units are defined in the field using tentative "models" which incorporate local landscape position, soil characteristics, and expected vegetation relationships Tentative land units are tested in the field by gathering necessary data This data can then be statistically analyzed to verify and modify the land unit models

LANDTYPE (LT's) - Subdivisions of LTA's or groupings of Landtype Phases Local climate is further modified by physiographic features such as aspect, slope gradient, and slope position. The relative importance of land form begins to diminish.

LANDTYPE PHASES (LTP's) - Subdivision of an LTA. This is the lowest category required for land use planning purposes. These units are based on topographic criteria, soil and plant associations These factors influence or reflect the microclimate and fertility of the site

SITE - The basic sampling unit, used to characterize broader units of the system Sites are small areas, usually less than an acre in size They are not usually delineated on a map although they can be used as reference sites for ecological types.

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TABLE 2 - CRITERIA FOR DESCRIBING AND DELINEATING ECOLOGICAL UNITS

ECOLOGICAL UNIT COMPONENTS	SECTION	SUB-SECTION	LANDTYPE ASSOCIATION (LTA)	LANDTYPE (LT)	LANDTYPE PHASE (LTP)
NAME AND NUMBER	Exp: Ouachita Mtns 231A	Exp' Fourche Mtns M231Aa			
MAP SCALE/SIZE	1 7.5 MM; 1,000's of square miles	1 1 MM, 500 to low 1,000's of sq miles, min width 5 mis.	1.250,000 to 1.126,720, 100's to 1,000's of acres	1 126,270 to 1.62,000 10's to 100's acres	1 24,000 or larger, less than 100 acres
DESCRIPTION/OVERVIEW	Brief overview	Brief overview	Brief description	Brief description	Same as LT
CLIMATE/AIR QUALITY	Regional climatic data	Subregional climatic data and general air quality related values	Local climate and existing air quality related values/visibility	Weather/air quality effects to biological and physical components	Same as LT
GEOLOGY	Geomorphic process, geologic age, stratigraphy, and lithology	Geomorphic process, surficial geology, geologicage, and lithology	Geomorphic process, geologic formation, surficial geology, and geologicage	Geomorphic process, rock type, and age	Same as LT
LANDFORM	Topographic relief and shape of land surface form	Same as Section	Same as Subsection	Elevation, aspect, and slope gradient of landscapeposition	Landform position, aspect, and shape
SOILS	Subgroups temperature/ moisture regime	Great groups temperature/ moisture regimes	Great groups/families/series temperature and moisture regime	Phases of soil families temperature and moisture regime	Phases of soil families or series, temperature, moisture regimes and drainage classes

TABLE 2 - CRITERIA FOR DESCRIBING AND DELINEATING ECOLOGICAL UNITS **(continued)**

ECOLOGICAL UNIT COMPONENTS	*SECTION*	*SUB-SECTION*	LANDTYPE ASSOCIATION (LTA)	LANDTYPE (LT)	LANDTYPE PHASE (LTP)
AQUATICS/HYDROLOGY[1]					
Riverine (Rivers and Streams)	Major river with associated *floodplain and wetland (Mississippi* River Valley)	Major river with associated *floodplain and wetlands* (Sabine River Valley, TX)	Major river with associated *floodplain* and wetlands (Red Lick Creek, KY)	Valley segments, river/stream patterns associated with the landscape	Stream reach and associated channel units
Palustrine (Fresh Water Wetland)	Major wetlands and wetland patterns associated with *lakes, rivers, estuaries, and* floodplains	Major wetlands and wetland patterns associated with lakes, rivers, estuaries, and floodplains	Wetland patterns (National Wetland Inventories)	Wetland types (National Wetland Inventories)	Wetland subclasses (National Wetland Inventories)
Lacustrine (Natural & Man-made Lakes)	Major lake (Lake Superior)	Major lakes/reservoirs (Lake Ponchartrain, LA)	Major lakes/reservoirs (Lake Blue Ridge, GA) or zones in *larger lakes*	Lakes/reservoirs or zones in larger waterbodies	Small lake/reservoir or zones in larger waterbodies
Marine/Estuarine (Oceans and Tidal Saltwater Wetlands)	Tidal, subtidal, and intertidal zones	Tidal, subtidal and intertidal zones	Wetland pattern	Wetland type	Wetland subclass
Phreatic (Groundwater System)	Major underground aquifer systems	Same as Section	Same but confined to LTA surface area	Underground river and associated caverns	Cavern stream reach
Watershed Analysis Areas[2]	Large river basins	Large river basins and major *tributaries*	Large watersheds, drainage and density	Drainage basin response units (DBRUS) and drainage pattern and density	Same as LT

TABLE 2 - CRITERIA FOR DESCRIBING AND DELINEATING ECOLOGICAL UNITS **(continued)**

ECOLOGICAL UNIT COMPONENTS	SECTION	SUB-SECTION	LANDTYPE ASSOCIATION (LTA)	LANDTYPE (LT)	LANDTYPE PHASE (LTP)
DISTURBANCE/LANDUSE[3]					
Pre-European Settlement /Landuse	Presettlement cultures and land uses All levels describe, but each from a unique perspective See examples.	Example Native American tribes and types of land use	Example· Large area frequently burned for game and berries	Example. Settlement area along large stream	Example· Burial site, fish weir
Post-settlement Landuse and Human-Caused Disturbances	Early settlements to current and evolving use patterns All levels describe, but each from a unique perspective See examples	Example· Rural, mostly open with grazing, light agriculture, and woodlots	Example Frequently cut over with frequent burning prior to FS, now forested with various age classes and periodic prescribed fire	Example· Major recreation complex or interstate corridor	Example. Strip mine or dam site
Natural Disturbances and Processes	Catastrophic events such as earthquakes, fires, and floods or natural recurring events. All levels describe, but each from a unique perspective See Examples	Example. Hurricane Hugo	Example· Natural fire regime in longleaf, flooding along major river, ice storm	Example. Tornado path, intense wildfire	Example Mudslide, beaver dam
FLORA					
PNV/Historical	General description	General description	Examples of communities and major species	Associations of communities	Plant communities
Existing Vegetation	General description	General description	Plant associations and groups of community types	Plant communities Ecological Community Classification System (ECCS)	Plant community, ECCS
Threatened & Endangered	General magnitude and importance	Same as Section but more localized	Examples as related to plant associations	Known species and related communities	Same as LT

TABLE 2 - CRITERIA FOR DESCRIBING AND DELINEATING ECOLOGICAL UNITS (continued)

ECOLOGICAL UNIT COMPONENTS	SECTION	SUB-SECTION	LANDTYPE ASSOCIATION (LTA)	LANDTYPE (LT)	LANDTYPE PHASE (LTP)
FAUNA					
Historic	General description	General description	Examples of species and range	Known species and general habitat	Same as LT
Current	General description	General description	Species/ communities descriptions	Home range / habitat description	Vegetation / cover / burrowing / aquatic descriptions
Threatened & Endangered	General magnitude and importance	Same as Section but more localized	Examples of species and range	Known species	Same as LT
APPLICATION OF ECM&I	Strategic, multi-forest analysis and assessment	Same as Section	Forest planning and watershed analysis	Management area and broad project planning, environmental analysis	Project planning, environmental analysis

[1]Includes associated palustrine areas.

[2]Used as part of description but not for delineation of ecological units

[3]Used only to describe ecological units except where changes from disturbance or landuse are permanent, i e , earthquake, reservoir, stripmine Descriptions are general at upper hierarchical levels and are specific at the lower levels.

TABLE 3 - ECOLOGICAL LANDTYPE ASSOCIATIONS (LTAs)

NO. CODE NAME	ALLUVIAL BOTTOMS *	LIGNITIC UPLANDS	REDLANDS	CLAYEY UPLANDS	SANDY UPLANDS
LOCATION (Districts)	Reservoirs and River Bottoms	Tenaha Only	Tenaha	Yellowpine Angelina, Trinity	Angelina Trinity
GEO AGE	Pleistocene	E. Eocene	Eocene	Eocene	L. Eocene
PARENT MATERIAL	Recent Alluvium	Marine Sands	Glauconite and Sand	Clay	Sand
SURFACE FORMATION	Water (Fluvial Deposits)	Wilcox	Formerly Mt. Selman Formation	Yegua, Cook Mnt., Jackson Gr.	Manning, Wellborn
***HISTORIC* OVER-STORY VEGETA-TION**	Bottomland Hardwood	Shortleaf Pine	Prairie	Longleaf Pine Shortleaf-Oak Hickory	Longleaf Pine
PREDOMINANT SLOPE RANGE	0 - 1 percent	1 - 15 percent	3 - 40 percent	1 - 8 percent	1 - 5 percent
PREDOMINANT TOPOGRAPHY	Nearly Level	Nearly Level to Rolling	Gently Sloping to Steep	Undulating to Strongly Sloping	Nearly Level to Gently Sloping
FIRE RETURN INTERVAL	Rare	Frequent	Frequent	Locally Frequent	Very Frequent
LL REST. OPPORTUNITY	Not Appropriate	Low	High	Moderate	High

EXPLANATORY NOTES

* ***Alluvial Bottoms*** - are found within all subsections and will be defined by major reservoir or stream terrace systems

Historic Overstory Vegetation Sources Include:
Foster, J H. et.al 1917 Forest resources of eastern Texas Bulletin #5. Dept. of Forestry, Agricultural & Mechanical College of Texas
Loughbridge, 1880 Report on cotton production in the United States. USDI Census Office, Part 1.

Fire Return Interval:
RARE = Fires of rare occurrence, of little importance to vegetation maintenance.
FREQUENT = Fires occur often (5-12 year intervals) across landscape, important to maintain veg. structure, dominant species, etc.
VARIABLE = Fire occurrence is variable due to strong local modifiers, areas of frequent fire are interspersed with areas of lesser frequency
VERY FREQUENT = Fires occur very often across broad landscapes, critical to plant community maintenance, dominant speciesreproduction, etc
VERY INFREQUENT = Fires of uncommon occurrence naturally.

MAYFLOWER UPLANDS	RAVEN HILLS	BIG THICKET	SAN JACINTO FLATWOODS	SPARTA SANDHILLS	
Yellowpine Angelina	Raven North San Jacinto	San Jacinto Only	San Jacinto Only	Neches	
Miocene	Miocene	Pleistocene	Pleistocene	Eocene	
Mud, Stone and Sand	Calc. Clay and Sand	Clay & Silt	Clay & Silt	Sand	
Catahoula Whitsett Nash Creek	Fleming and Willis	Willis	Bentley	Sparta	
Longleaf Pine	Loblolly Pine, Upland Oaks	Loblolly Hardwood	Hardwoods (Wetlands)	Shortleaf Pine	
3 - 35 percent	0 - 15 percent	1 - 5 percent	0 - 2 percent	1 - 8 percent	
Undulating to Hilly	Gently Undulating	Nearly Level to Gently Sloping	Nearly Level	Gently Sloping to Steep	
Very Frequent	Frequent	Very Infrequent	Very Inf - Rare	Frequent	
Maintenance	Very Low	Low	Low	Low	

EXPLANATORY NOTES (Continued)

Predominant Topography.
The slope classes shown for each LTA represent the PREDOMINANT slope classification across the landscape. There are areas within the LTA that may exceed the classes shown. Slope classes are in accordance with the criteria established in the Soil Survey Manual; Agricultural *Handbook No. 18, Soil Survey Staff, 1951*

Longleaf Pine Restoration Opportunity:
NOT APPROPRIATE = Soil and moisture conditions do not favor LL pine management.
VERY LOW = Areas may be outside the known historical range of the species.
LOW = Areas may be outside the historical range of the species.
MAINTENANCE = LL pine communities are well represented across the landscape
HIGH = Area within the historical range of the species, soils are traditional LL types.
MODERATE = Area lies within the historic range of the species, soils are not typical LL types.

Appendix B

Mineral Operations Clauses & Attachments

Introduction

The following clauses and attachments provide the guidance and direction required for mineral operations that utilize National Forest and Grasslands in Texas (NFGT) lands. These actions are required by operators as appropriately determined during site specific environmental analysis. The same actions are the standards recommended for owners and operators of mineral leases, reserved mineral rights, or outstanding mineral rights The following clauses and six (6) attachments may be included in part or in their entirety depending on the recommendations of the Forest Officer following appropriate site specific environmental analysis.

Clauses Pertaining to Surface Use Plan of Operations (SUPO) or for Mineral Operations Permits

1 This permit (permit also refers to SUPO) is subject to all valid claims

2. In case of change of address or ownership, permittee (permittee also includes the operator for SUPO) shall immediately notify the Forest Supervisor.

3. The permittee shall comply with all requirements of the laws of the State of Texas, as well as the laws of the United States

4 The permittee shall be responsible for the prevention and control of soil erosion or other resource damage on the area covered by this permit and lands adjacent thereto, and shall provide preventive measures as required by specifications attached to and made a part of this permit.

5. No waste or byproducts shall be discharged containing any substances in concentrations which may result in significant harm to fish and wildlife, or to human water supplies

   Storage facilities for materials capable of causing water pollution, if accidentally discharged, shall be located so as to prevent any spillage into waters, or to channels leading into water, that would result in significant harm to fish and wildlife or to human water supplies

6 The permittee shall protect the scenic esthetic values of the area under this permit, and the adjacent land, as far as possible with the authorized use, during construction, operation and maintenance of the improvements

7. If the facility authorized by this permit is, or may later be found to be, within 1200-meters of a red-cockaded woodpecker colony, then by acceptance of this permit the permittee agrees to cut no trees, either for maintenance or improvement, without the specific advance authorization of the Forest Officer In cases where proposed cutting of trees may conflict with an existing Federal court order or plan for management and recovery of the red-cockaded woodpecker the Forest Officer may deny the request to cut trees.

8. All access roads will be built on locations and to specifications approved in advance of construction by the Forest Officer in charge.

9. The permittee shall provide, whenever requested by the Forest Officer, a way across the land covered by this permit for the free ingress or egress for Forest Service employees and for users of National Forest and purchasers of National Forest products

10. The permittee shall fully and currently repair all damage other than ordinary wear and tear to National Forest roads and trails caused by the permittee in the exercise of the privilege granted by this permit.

11. The permittee shall comply with the regulations of the Department of Agriculture governing the National Forest, comply with all sanitary laws and regulations applicable to the premises, and keep the premises in a neat and orderly condition.

12. This permit may be transferred with the approval of the officer by whom it was given or his successor, subject to such conditions as may be imposed at the time of transfer. It may terminate upon breach of any of the conditions herein but in event of such termination a new authorization will be issued upon application when the causes for termination of the preceding authorization have been satisfactorily remedied and the United States reimbursed for any resultant damage.

13. The authorized operation may be temporarily suspended due to excessively wet soil conditions when unacceptable resource damage is anticipated or occurring

14 No Member of, or Delegate to, Congress shall be admitted to any share or part of this agreement or to any benefit that may arise herefrom unless it is made with a corporation for its general benefit (clauses 14 and 15 do not apply to outstanding minerals).

15. In the event of any conflict between any of the provisions contained in this permit and provisions contained in the Secretary's Rules and Regulations, the provision of the latter will control (clauses 14 and 15 do not apply to outstanding minerals)

Attachment #1

RESOURCE PROTECTION PLAN FOR OIL OR GAS DRILLING, PRODUCTION, AND STORAGE SITES

The permittee or his authorized representative will

1 Notify the District Ranger (D.R) at least five (5) working days in advance of all work which will result in surface disturbance.

2 Obtain the D R.'s approval for any changes in a permitted site plan which would result in additional surface disturbance.

3. Confine all surface disturbing activities on National Forest land associated with the project to the areas shown on the site plan and designated on the ground

4 Remove commercial timber Brush, slash, etc may be burned or otherwise disposed of as directed by the Forest Officer. Burning will follow all applicable National Forest, Texas Forest Service, and State of Texas air quality regulations and procedures Stumps and other woody material will not be buried in pits or fill areas

5 Stockpile the surface soil from the entire area to be disturbed in approved locations as specified in Attachment #3. Soil stockpiles should be leveled or rounded on top and smoothed on the sides to a 3 1 slope and vegetated as described in attachment #3

6 Construct mud pits so that they will *not* leak, break, or allow any discharge of liquids The need for pit lining (impervious clay material or artificial liner) will be determined by the Forest Officer Pits are not to be located in water courses Pit walls shall be smoothed and keyed Side slopes shall not exceed 3:1. Outside pit walls shall be vegetated. Pits shall be fenced on 3 sides away from equipment during the drilling operation and on all 4 sides during the drying phase (See attached fencing specifications)

7. Follow these sanitation guidelines.

a All litter, garbage, etc deposited on National Forest as a result of this project will be kept in a container and disposed of in an approved landfill as necessary.

b. Portable toilets will be used; waste will be hauled to an approved disposal facility.

c. In lieu of portables, flush toilets (e g , those found in trailers used for office space or crew quarters) may be used when connected to a closed sewage system. Tanks will be pumped prior to reaching system capacity Wastes will be hauled to an approved disposal facility.

8 Immediately after site construction and as needed throughout the life of the authorization, install or construct erosion devices where appropriate. Also revegetate those disturbed areas which will not sustain traffic (See also Attachment #3) The following work will be accomplished as directed by the Forest Officer.

a. sediment dams in gullies, depressions, etc

b. contour terraces on areas which exceed three percent gradient

c diversion terraces if the potential exists for heavy water flow onto or across the site

d erosion control blankets on all cut or fill slopes which cannot be shaped to a 3 1 gradient or less

e. fences around treated areas on sensitive soils until vegetation is firmly established (See attached fencing specifications).

9 The permittee will coordinate the proposed site surfacing (boards or gravel) with the Forest Officer in the planning phase No changes should be made without approval of the Forest Officer

10 After drilling operations cease·

a. Prior to the commencement of the drilling operations, the method of disposal of the drilling fluids and cuttings must be approved by the Authorized Officer. The disposal of fluids and cuttings will be accomplished within 30 days of completion of the drilling operations

The Forest Service recommends a fully containerized (closed) drilling system.

Materials may be pumped back down hole only after proper approval from the Texas Railroad Commission or Bureau of Land Management (BLM), as applicable, has been presented to the Forest Service. Pit sludge and cuttings may be buried on site in the existing pit only if an independent laboratory has tested the material and provided the Forest Service with proof that all Federal and State waste disposal requirements are met. If burial is allowed, only existing pits may be utilized If burial is not allowed, all drilling sludge and cuttings will

be removed and appropriately disposed of If man-made pit liners are used they will be removed from the pit and disposed of off of National Forest

Pits will be backfilled when dry, the site smoothed and recountoured as closely as practicable to the original topography of the area, and the stockpiled topsoil evenly respread over the site. The pits will remain fenced until backfilled unless fencing is needed to protect the site from cattle grazing or off-road vehicle use. The Authorized Officer will notify the operator when the fencing may be removed, usually after two growing seasons or when 70% coverage is achieved as per Attachment #3

b. Remove all surfacing material from areas not needed for production operations, revegetate those areas according to Attachment #3 This will be done within 30 days unless directed by the Forest Officer.

11. Within 90 days of termination of oil or gas production, or plugging of the well, remove the well-head control device and appurtenances, unless you have approval from the BLM not to remove them Then remove gravel or board surfacing, recontour the site and revegetate according to Attachment #3

12. Prior to drilling associated water well(s) the permittee will provide the Forest Officer with the appropriate approved State permits granting authorization for such well(s).

13. In the event that production status is obtained, the operator will provide the Forest Officer with a detailed production facility diagram which includes flowlines labeled for the well that they serve.

14. The permittee is responsible for adhering to all related State and Federal Laws including; Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, etc

Attachment #2

ROAD AND PAD MANAGEMENT

The permittee agrees to the following provisions

1 Construction and surfacing requirements for road access to the project area are stated in the Engineer's Report which is made a part of this attachment

2. Roads and pads will be adequately maintained during the life of the authorization. This maintenance shall include blading and shaping (to smooth surfaces and pull surfacing material back onto roadway),

resurfacing, spot graveling, ditch work, and culvert repair or additional work as specified. This work shall be conducted as needed or as directed by the Forest Officer.

3. Except for the driving surface, the road right-of-way will be revegetated according to Attachment #3

4 The road may be left and maintained for the operation of a producing well or for the use of the Forest Service at District Ranger's discretion.

5. Upon termination of operations, if the District Ranger wants the road closed, the permittee or his authorized representative will

a remove all surfacing, bridging and water-handling materials and unless otherwise authorized by the District Ranger, remove from National Forest land.

b. recontour the abandoned roadway as closely as practicable to the original condition.

c revegetate the abandoned roadway according to Attachment #3.

6 Use of roads other than those constructed by the permittee may be subject to additional requirements. Inquiry will be made to the Forest Officer prior to use of pre-existing roads.

Attachment #3

RESTORATION OF DISTURBED AREAS

The permittee agrees to the following provisions:

It is the responsibility of the permittee to establish a permanent vegetative cover on all disturbed areas where bare mineral soil is exposed. The following are procedures recommended and commonly used to accomplish this reclamation

Except for those areas needed for access and/or production, areas where soil has been disturbed shall not ordinarily be left unseeded for a period of more than 30 days If it is anticipated the area will be left exposed for more than the 30 day period seeding should occur immediately and not wait until the 30 days have passed. The seeding includes cut-and-fill slopes, ditches (wing, lead-off, etc.), shoulders, and any other exposed areas created by the project Sites that will be exposed only one fall growing season (pit walls, topsoil stockpiles, etc.) will be seeded to an elbon rye grass and wheat mixture at the rates in item number 8 of this attachment. Those other sites that will be exposed from more than one growing season will be seeded to the standard seed mixture in item number 8 of this attachment.

1. *Stockpile Soil* - During initial clearing for the project the top inches of soil from the site will be removed and stockpiled for later use in restoration. Remove woody material prior to stockpiling soil See item 5, Attachment 1, for additional instructions

2 *Waterbars/Terraces* - During occupancy and restoration slopes or gradients 3% or greater will require waterbars and/or terraces to be constructed and maintained. The Forest Officer will instruct where these structures will be placed

3. *Baled Hay and Silt Fence for Erosion Control* - Temporary erosion, sediment and water pollution control measures will be required as described in the attached specifications.

4. *Seedbed Preparation* - After returning the site to its original contour and forming any needed terraces, spread stockpiled soil evenly over the site, till the surface to produce about inches of loose soil, fertilize as in item 5 below and sow the recommended seed mixture on the freshly prepared soil bed. Rip pads and roads prior to spreading topsoil as directed by the Forest Officer.

5 *Fertilization Rates* - Fertilize all disturbed areas at the following rates*

50 pound of nitrogen per acre
50 pounds of phosphorous per acre
50 pounds of potassium per acre

*Rates are in pounds of chemical per acre It takes 500 lbs of 10-10-10 to equal the rates specified above

Fertilize and seed as recommended in item 4 above Once seed and fertilizer has been sown, drag-harrow lightly taking care not to cover seed too deeply. Approximately 1/4 inch of soil should cover the seed

Seeding must be repeated if necessary until successful establishment of cover is achieved.

6 *Mulching* - The use of hay, straw, or commercial mulch will be necessary when slopes exceed 3 percent. These areas should be covered with 1-1/2 to 2-1/2 tons per acre of mulch Mulch will be applied to the entire area during periods of drought (normally 6/15-10/1) Mulch should be tied down with woven nets, asphalt tackifier, synthetics, or disked lightly into the soil Erosion control blankets will be used on cut or fill slopes which cannot be shaped to a 3 1 gradient or less.

The utilization of appropriate machinery usually results in considerable savings and produces a more uniform job.

7 When instructed by the Forest Officer revegetated areas will be fenced to exclude livestock (See attached fencing specifications).

8 ' *Seed species, Rates, and Seasons* -

Use mixtures of at least two (2) grasses and one (1) legume

Heavier rates can be used. It is always cheaper to plant more seed than to have to replant These are minimum rates

In case of seeding failure, the permittee will reseed following the same recommendations.

RECOMMENDATIONS ON NATIONAL FORESTS

March 1 through September 15

Species	Rate per acre *In Mixture*
Orchardgrass	8 lbs.
Pensacola Bahia grass	10 lbs
Common Bermuda grass (hulled)	5 lbs
Sericea lespedeza (scarified)	8 lbs
Browntop millet	5 lbs

September 16 through February 28

Species	Rate per acre *In Mixture*
Orchardgrass	8 lbs
Pensacola Bahia	10 lbs
Common Bermuda grass (hulled)	5 lbs
Sericea lespedeza (unscarified)	6 lbs
Crimson clover (inoculated)	10 lbs.
Hairy Vetch (inoculated)	8 lbs
Louisiana Dutch clover (inoculated)	3 lbs
Fescue (Ky 31)	12 lbs.
Annuals - Elbon Rye	120 lbs.
Wheat	120 lbs

Use 1-1/2 to 2-1/2 tons per acre of straw mulch

Yearlong

(Use all of the following grasses and legumes.)

Little bluestem	3.4 lbs
Big bluestem	6 0 lbs.
Indiangrass	4 5 lbs.
Switchgrass	2 0 lbs.
Sideoats grama	4 5 lbs
Plains bluestem	1.8 lbs.
Cowpea	4 0 lbs.

Green Spangletop at the rate of 4 0 lbs. can be used instead of one of the perennials if that perennial is unavailable.

It is desirable to use this mix. However, if certain species are not available contact the Forest Officer and substitutions can be made.

From September 16 through February 28 the annuals Elbon Rye and Wheat will be added to the mixture at the rate of 120 lbs. per acre each

Use 1-1/2 to 2-1/2 ton per acre of straw mulch

9 On National Forests, reclamation may be approved not earlier than one year following the successful establishment of vegetative cover On the National Forest vegetative cover over at least 70 percent of the entire disturbed area will be considered successful establishment, if no gullies or other erosion related problems exist On the National Grasslands satisfactory vegetative cover will be considered 70 percent vegetative cover with native species after two growing seasons and no gullies or other erosion related problems exist All drilling/production related equipment or rubbish must be removed prior to Forest Service acceptance of the site as restored.

10 The permittee is responsible for successful restoration regardless of weather or other natural factors.

11 Performance Bonds (if applicable) will not be released until satisfactory reclamation is complete

Attachment #4

REPORTING

The permittee agrees to the following provisions:

1 Upon completion of testing, permittee will send the District Ranger copies of the Texas Railroad Commission's form G-1 or W-1, or both as appropriate for the well

2. A copy of each W-10 or G-10 report prepared for the Texas Railroad Commission will be mailed to the District Ranger

3. A copy of each monthly production report (P-1, P-2, or both as applicable to the well) made to the Texas Railroad Commission will be mailed to the District Ranger.

4. Produced water disposal information shall be provided to the District Ranger. This information will include disposal location, route, and amount of water disposal traffic on National Forest roads or lands.

Attachment #5

STANDARDS FOR OIL AND GAS PRODUCTION FACILITIES ON NFGT LANDS

The permittee agrees to the following.

1. Petroleum product and water storage tanks will be placed on level ground and surrounded by a dike capable of holding 1-1/2 times the volume of the largest tank

2. Tanks will be placed on a stable, solid foundation six (6) inches or more in height to insure that they remain clear of standing water. The foundation will be designed so that it will not subside and cause the tanks to sink or lean. Trenching within diked areas will not be allowed.

3. Dikes will not be dug from a level surface Instead, a level surface will be used as a base with the dike built upon that. The dike core will be of clay or other similarly impermeable material The top of the dike will be level and maintained so that it does not become beaten down at any point. The top of the dike should be a minimum of 18 inches in width and side slopes of not greater than 3:1. It is recommended that the sides and top of all dikes be covered with a thick plastic sheet and washed gravel on top of the plastic This will help prevent erosion and sloughing of dike material. Also, this will help solve the problem of vegetation growth and fire hazards; spraying or mowing should not be necessary. Dikes must be constructed before any liquid is stored in the tanks.

4 Any liquids collected within dikes, including liquids that may be rain-water, will not be drained onto the site. Drains will not be installed Liquids will be removed by vacuum truck to an approved disposal or injection facility

5. All lines used to drain oil or salt water will have well-maintained and sealed valves to prevent leaks and vandalism. Loadout valves shall be located within diked area.

6 Only so much of the site as is needed to contain production facilities, a reasonable adjacent work area, and the access road will be occupied. The remaining authorized area will be restored as per attachment #3 Guy wires left on site for work-over rigging will be well-marked

7. A fence is required to exclude casual foot traffic and cattle (See attached fencing specifications). The fence will enclose all the surface *production* equipment Its specific location will be approved by the Forest Officer in advance. Construction standards will, as a minimum, be to specifications supplied by the Forest Officer These specifications, as a minimum, include safety signs and fencing (See standard diagram for fences) Forest Service requirements for signing gates will be met

8 On-site equipment will be kept well maintained, neatly arranged, and painted where appropriate. It is the intent that a neat, orderly appearance is presented On the National Grasslands facilities will be painted an earth tone color. On National Forest facilities will be painted to blend into the surrounding environment, this will be determined by the authorized officer on a case by case basis.

9. Pesticides (including herbicides) may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash fish, etc without the prior written approval of the Forest Officer. A request for approval of planned uses and schedule of applications of pesticides will be submitted annually by the permittee. Exceptions to this schedule may be allowed only when unexpected outbreaks of pest require control measures which were not anticipated at the time the annual report was submitted At that time an emergency request and approval may be made.

   Only those materials registered by the U S Environmental Protection Agency for the specific purpose planned will be considered for use on National Forest Systems land. Label instructions will be strictly followed in the application of pesticides and disposal of excess materials and containers

10 As required by on-site conditions, measures will be taken to prevent soil erosion (Erosion control specifications are in Attachment #3)

11 Site access roads will be gated only upon the approval of the Forest Officer. Gate specifications must also be approved by the Forest Officer. Gates shall be signed and comply with the Manual of Uniform Traffic Control Devices (MUTCD)

12 Signs restricting public access will be placed only with the approval of the District Ranger All signs will be removed by the permittee at the conclusion of operations

13 The permittee shall provide a Spill Prevention Control and Countermeasure Plan or similar document which conforms to the requirements of 40 CFR 112. Upon occurrence of a spill, operator shall take immediate containment and cleanup action and notify the Forest Officer at earliest opportunity (it is possible for the sheriff's office to make quick contact)

14. Upon plugging and abandonment of the well bore, the casing will be cut off at least 36 inches below ground level as per Texas Railroad Commission regulations. The permittee will install a cap on the top of the casing and leave a small weephole as a seepage indicator. No dryhole marker will be installed

15 All non-essential equipment for the production facility will be removed from National Forest within 30 days of being excess.

Attachment #6

FIRE PROTECTION PLAN

The Permittee agrees to the following provisions

1. Comply with the Texas State Fire Laws.

2. Take all reasonable action to prevent and suppress forest fires and require his employees to do likewise.

3. Pay for the cost of suppressing forest fires and damages to the Government caused by fires resulting from acts of the permittee, operator, or his employees

4 Have slash or brush disposal fires attended at all times, with a sufficient number of personnel and equipment to keep the fires under control.

5 Confine slash or brush burning to periods of reasonable fire danger. All burning may be suspended by the Forest Officer when determined it is unsafe to burn. Notify the Forest Officer prior to burning.

6 Notify the District Ranger of escape of fire and take immediate action to control the fire The District Ranger will provide the permittee with phone numbers where fires shall be reported

7 It is the permittee's responsibility to notify the District Ranger when flaring of formation gas is to begin Prior to flaring, operator must have approval from state or BLM as appropriate

8. Mow vegetation within a 50 foot area of all production equipment to reduce fire danger monthly from May - September.

Appendix C

Determination of Lands Suitable for Timber Production, Minerals Availability, Range Suitability, and Timber Sale Schedule

Timber Production

The determination of lands suitable for timber production is a requirements of the Forest Plan Revision process A detailed description of the Timber Suitability situation is described in Chapter 13 of the Five-Year Review/Analysis of the Management Situation (AMS 1992). The National Forest Management Act (NFMA) Regulations under the 36 Code of Federal Regulations (CFR) 219 14 outline a three stage process for identifying lands suitable for timber production.

PHYSICAL SUITABILITY (STAGE 1)

Stage 1 Timber Resource Land Suitability requirements are set forth in NFMA Regulations 36 CFR 219.14(a). The purpose of Stage 1 Timber Resource Land Suitability analysis is to identify (1) Nonforest lands, (2) lands administratively or Congressionally withdrawn from timber production (wilderness, research natural areas, and National Grasslands); and (3) lands physically unsuitable for timber production Lands identified as unsuitable for timber production in Stage 1 Timber Resource Land Suitability analysis cannot legally be managed for the regulated flow of timber products The other remaining lands are identified as tentatively suitable for timber production.

Table 1 displays the determination of lands unsuitable for timber production based on Stage 1 Timber Resource Land Suitability analysis

FINANCIAL ANALYSIS (STAGE 2)

Stage 2 Timber Resource Land Suitability requirements are also set forth in NFMA Regulations 36 CFR 219.14(b). This stage is a financial analysis designed to explore the financial attractiveness of different timber intensities on the lands identified as "tentatively suitable for timber production" Results from the FORPLAN analysis of all acres that remain after those removed during Stage 1 Analysis showed a positive PNV. This financial analysis was used to identify the relative advantages of different timber intensities in different management areas and ecological units of the Forest. The Interdisplinary (ID) Team and Management Team used this financial analysis to remove some lands

in Stage 3 to better respond to public comments and management concerns

IDENTIFICATION OF SUITABLE ACRES (STAGE 3)

In addition to the above, the requirements for **Stage 3 Timber Resource Land Suitability** can be found in the NFMA Regulations 36 CFR 219 14(c) Stage 3 analysis is used to identify the lands suitable for timber production for the alternative selected as the Revised Plan The ID Team accomplished Stage 3 Timber Resource Land Suitability analysis through a three step procedure

1 The ID Team and representatives from the Ranger Districts determined the location of the management areas (MA) based on Ecological Landtype Associations (LTA's), public comments to scoping, and management concerns. Management area locations were mapped on forest administrative maps using readily definable boundaries such as compartments, highways, or major land forms These maps were then transferred to a computerized geographical referenced data base and these maps can be reviewed in the accompanying map package

2 It then was decided that any lands allocated to management areas other than MA-1 and MA-2 were de facto unsuitable for timber production since the objectives of these management areas were inconsistent with lands suitable for an objective of timber production (All of Management Areas 3, 5, 7 and 10 were removed in Stage 1 Timber Resource Land Suitability as non-forest) Thus, acres that were allocated to Management Areas 4, 8, 9 and 11 were removed at this stage

3. The remaining lands (501,753 acres) in Management Areas 1 and 2 were available to management prescriptions that allow harvesting. Based on the objectives of the Revised Plan, harvesting methods could include thinning prescriptions for land within the RCW cluster sites, recruitment stands and 100 acre circles surrounding clusters in MA-2 Additional sites identified as protected for other threatened, endangered, or sensitive plant and animal species were also directed for the "thinning only" prescription in MA-1 and MA-2. Hardwood acres within Management Area 2 (MA-2) will be managed with a minimum level prescription (see Table 2)

Table 1 Lands Capable of and Suited for Timber Production on National Forests and Grasslands in Texas

ALTERNATIVE #1 CURRENT NO ACTION
PHYSICAL SUITABILITY STAGE 1 Classification from NFMA Regulations at CFR 219 14(a)

				Alt 1
1.	**Non-Forest Land (includes water)**		**56749**	
	~ Water (Lakes and Ponds greater than 1 Acre)		[16312]	MA#5
	~ Pasture & Natural Grassland RNA, 345 acres, Lake Fannin Special Area, 200 acres, Recreation Area, 240 acres, other Grassland, 31017 acres		[31802]	MA#3,#8,#9
	~Roads,ROWs,Well Sites,etc Wells, 96 acres, rec roads, 65 acres, other roads and ROWs, 8474 acres		[8635]	MA#9,#10
2.	**Forest Land**		**618823**	
3.	**Forest Land Withdrawn From Timber Production**		**37162**	
	~ Wilderness		[37162]	MA#7
4.	**Forest Land Not Capable of Producing Crops of Industrial Wood** (note this includes 35 Ac of RNA , 19 Ac of Rec Area of NG, 834 Ac of other forest, and 4125 Ac of grassland-woods)		**5080**	MA#3,#8,#9,#10
5.	**Forest Land Physically Unsuitable**		**216**	MA#10
	~ Irreversible Damage Likely		[203]	
	~ Not Restockable Within 5 Years		[13]	
6.	**Forest Land - Inadequate Information**		**3631**	
7.	**Tentatively Suitable Forest Land**		**572734**	

FINANCIAL ANALYSIS STAGE 2 Classification from NFMA Regulations at CFR 219 14(b)

STAGE 2 TIMBER RESOURCE LAND SUITABILITY is a financial analysis designed to explore the financial attractiveness of different timber intensities on lands identified as "tentatively suitable for timber production" Results from the FORPLAN Analysis showed all these acres having a positive PNV these results were used to identify the relative advantages of different timber intensities on different parts of the Forest

IDENTIFICATION OF SUITABLE ACRES STAGE 3
Classification from NFMA Regulations at CFR 219 14(c)

8.	**Forest Land Not Appropriate For Timber Production**		**62782**	
	~ RCW Colonies		[6619]	MA #2
	~ RCW Recruitment Stands		[3648]	MA #1, #2
	~ Other Threatened and Endangered Species, plus RCW expansion		[7527]	MA #1, #2, #8
	~ Experimental Forest		[2561]	MA #11
	~ Recreation Areas		[4010]	MA #9
	~ Streamside (includes stringer acres) (Note excludes those acres that are within Wilderness, Rec,Special and Minimum Level Mgmt Areas)		[34482]	MA #4
	~ Archaeological, Historical, & Scenic Special Management		[3935]	MA#8
9.	**Unsuitable Forest Land**		**108871**	
10.	**Total Suitable Forest Land**		**509952**	
	~ Management Area # 1*	349149		MA #1
	~ 1200 Meter RCW - Management Area # 2*	160803		MA #2
11.	**Total National Forest and Grassland**		**675572**	

* Note Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

ALTERNATIVE #8
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #8

1.	**Non Forest**		**56749**	
2.	**Forest Land**		**618823**	
3.	**Forest Land Withdrawn from Timber Production**		**37162**	
4.	**Forest Land Not Capable of Producing Crops of Industrial Wood**		**5080**	
5.	**Forest Land Physically Unsuitable (No change)**		**216**	
6.	**Fores Land - Inadequate Information**		**3631**	
7	**Tentatively Suitable Forest Land**		**572734**	
8.	**Forest Land Not Appropriate for Timber Production (Net change +2393**		**86712**	
	~ RCW Colonies	6619 (No change)		MA #2, #6
	~ RCW Recruitment	3648 (No change)		MA #2, #6
	~ Other T&E (plus RCW expansion acres)	3753 (-3774 acres)		MA #1, #2, #6
	~ Experimental Forest	2561 (No change)		MA #11
	~ Recreation Areas	6094 (+2084 acres)		MA #9
	~ Streamside Acres	49807 (+15325 acres)		MA #4
	~ Archaeological, Historical, & Scenic Special Management	14205 (+10270 acres)		MA #8
	~ Administrative Adjustment Acres	-25 (-25 acres)		MA #10
9.	**NET UNSUITABLE FOREST LAND**		**132751**	
10.	**TOTAL SUITABLE FOREST LAND**		**486072**	
	~ Mgmt Area #1 Upland Forest*	222764		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	232614		
	~ Mgmt Area #6 Longleaf Ridge*	30694		

Of the acres within MA #2 and MA #6 silviculture methods will be limited to thinning on 50000 acres and only salvage on the 6525 acres of Hardwood

* Note Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

NOTE ALSO Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table

Minerals Availability

The National Forests in Texas and the Caddo National Grasslands lie in what is known geologically as the East Texas Basin. The LBJ Grasslands lie in the Fort Worth Basin There are 283,806 acres leased for oil and gas on both the Forests and Grasslands in Texas and there was a backlog of lease requests. Even during times of low oil and gas demand and poor industry economics there remains a relatively steady level of leasing. Exploration on both U.S. and private rights also continues to be a routine activity. Levels of exploration interest fluctuate with economic conditions within the industry. Development of new plays or prospects (theories of occurrence) and drilling technologies also create renewed interest in the area

There are currently (10/93) 274 oil/gas wells located on Federal surface. About 27 percent of those wells are drilled into private minerals Not all wells are currently producing, being in varying stages of development, production, or plugging and abandonment.

With the exception of wilderness areas, leasing of U.S mineral rights and their exploration and production will continue with an average of 40 to 60 new leases issued annually. The exercise of reserved and outstanding mineral rights under Federal surface will continue

The following tables show availability of leasable minerals on the Forests and Grasslands by alternatives.

Table 3. Acres Available for Leasable Energy (Oil and Gas) Minerals[1]
(National Forests)

Alternatives	Leasing with Standard Lease Terms And Conditions	CSU and TL Stipulations	Leasing With No Surface Occupancy	Unavailable due to Congressional Action[2]
1	None	381,477	40,036	25,642
2	None	366,339	55,074	25,642
3	None	363,550	57,863	25,642
4	None	364,053	57,640	25,642
4A	None	363,989	57,524	25,642
4B & 8	None	363,252	58,261	25,642
5	None	358,349	63,164	25,642
6		No Leasing		
7	None	317,053	104,460	25,642

[1] Excludes private rights under U S surface, about 194,000 acres Due to scattered pattern of mineral ownership the figures shown here are estimated based on percentage of U S rights in the Plan area

[2] Additional lands would be added to this classification if areas recommended for wilderness study in Alternatives 5 and 7 were designated as wilderness through legislation

Table 4. Acres Available for Leasable Energy (Oil and Gas) Minerals[1]
(National Grasslands)

Alternatives	Leasing with Standard Lease Terms & Conditions	Leasing with Stipulations, Notices, Limitations	Leasing with No Surface Occupancy
1	None	35,489	263
2-3	None	35,292	460
5-7	No Leasing		
4,4a,4b, & 8	None	35,142	610

[1] Excludes private rights under U S surface, about 1,622 acres Due to scattered pattern of mineral ownership the figures shown here are estimated based on percentage of U S rights in the Plan area

Range Suitablity

The capability of and availability of lands for grazing and browsing (also referred to as range suitability) is important in determining Forest Plan objectives for grazing Range suitability is addressed in 36 CFR 219.20 as follows·

"In forest planning, the suitability and potential capability of National Forest System lands for producing forage for grazing animals shall be determined. . "

Forest Service Manual 2200 defines suitable range as

"Suitable Range - Livestock. Land that is accessible or that can become accessible to livestock, that produces forage or has inherent forage-producing capabilities, and that can be grazed on a sustained-yield basis under reasonable management goals." (FSM 2210 5, WO AMENDMENT 2200-91-4)

Table 5. Lands Capable of and Suited for Forage Production on the National Forests and Grasslands in Texas

	Classification	Acres
1	**Non-Rangeland** - Land that has never supported grass and where use is precluded by development for other uses	24,786
2	**Rangeland** - Lands capable of supporting grass and not precluded by other uses	650,786
3	**Land Withdrawn from Forage Production** - Land not managed for forage production because of withdrawal for other uses	11,921
4	**Land not Capable of Producing Crops of Forage** - Lands whose site quality is such that sustained yields of forage can not be produced	0
5	**Lands Physically Unsuitable** - Lands where irreversible damage is likely to occur under rangeland management	0
6	**Lands with Inadequate Information** - Lands where further inventory is needed to determine suitability	3,895
7	**Land Suitable and Capable for Forage Production**	634,970
8	**Total National Forests and Grasslands in Texas**	675,572

Allowable Sale Quantity (ASQ)

The **Allowable Sale Quantity (ASQ)** is the quantity of timber that may be sold from an area of suitable land covered by the Forest Plan during a specified period This quantity is usually expressed as the "average annual allowable sale quantity" (36 CFR 219 3). The following NFGT **ASQ** is projected for 1996 through 2006.

1st Decade ASQ = 204.6 mmcf (1134 mmbf)

ASQ is calculated using FORPLAN analysis. This process is described in the EIS Appendix B **ASQ** can be used to estimate the volume of timber offered for sale by a Forest during a specified period of time (described as a timber sale schedule); however, timber offered cannot exceed the 10 year ASQ.

Timber Sale Schedule Based On ASQ

The sale schedule is defined as the quantity of timber planned for sale for a time period from the area of suitable land. The schedule below reflects the quantity of timber planned for sale by each Forest on the NFGT during the first 10-year period It does not require a listing of individual timber sales (Forest Service Handbook 2409.13). The schedule below is divided between MA-1, MA-2, and MA-6 (suitable lands) to reflect approximate volume that could be offered by each Forest within the appropriate Management Area. Additional timber sales may be located on unsuitable lands (management areas other than MA-1, MA-2, and MA-6) that allow harvest to meet other resource objectives. Volume from those lands and periodic salvage sales are not calculated in the following Schedule described.

Table 6. Timber Sale Schedule Allocated for First 10-Year Period mmcf (mmbf) of the Revised Forest Plan NFGT

Forest	MA-1	MA-2	MA-6	Total mmcf (mmbf)
Angelina	18 4(102)	9 8(54)	18 3(101)	46 5(257)
Davy Crockett	42 4(235)	9.5(53)	- (-)	51 9(288)
Sabine	32 8(182)	14 5 (81)	- (-)	47 3(263)
Sam Houston	8 8(49)	50 1(277)	- (-)	58 9(326)
MA Total	102 4(568)	83 9(465)	18 3(101)	
Grand Total (ASQ)				**204.6(1134)**

Appendix D

Endangered, Threatened and Sensitive Species

Introduction

No known threatened, endangered, rare or sensitive plant species were documented on the National Forests and Grasslands in Texas (NFGT) before 1987 Prior to 1987, any proposed, endangered, threatened and sensitive faunal species were limited to those listed Federally by the U.S. Fish and Wildlife Service (USFWS). Neither Category 2 nor State listed species were addressed in the 1987 Plan

The Federally listed species recognized in the 1987 Forest Plan were the endangered red-cockaded woodpecker (RCW), endangered bald eagle, and the threatened American alligator The Navasota ladies' tresses orchid, a Federally endangered plant, was discovered on the Angelina National Forest in 1988. The Texas Natural Heritage Program (TNHP) presented a listing of plant species in 1990 that were inventoried on NFGT from 1988 through 1990 This survey increased the awareness of NFGT biologists to management activities that might impact these identified plant species

Each year since 1987, TPWD and NFGT biologists have reviewed and updated the lists of threatened, endangered, or protected species that have been documented or are expected to occur on the Forests or the Grasslands The most recent list for the NFGT is being reviewed by the U S Forest Service (USFS) Regional Forester (Region 8) and includes many more species than those listed in 1987 Among these species, 8 are listed as Federally endangered, 7 are listed as Federally threatened; 2 are listed as Candidates, and a number are State endangered or threatened. Other species are listed with varying levels of concern.

The following explains the ranking for each species listed on the NFGT

FEDERAL CATEGORY (FWS)

Endangered (E) - Official designation by USFWS applied to any species which is in danger of extinction throughout all or a significant portion of its range; USFS consideration is required by law if the species is documented on National Forest (NF) lands.

Threatened (T) - Official designation by USFWS applied to any species which is likely to become an endangered species within the foreseeable future, USFS consideration is required by law if the species is documented on NF lands.

Proposed (P) - Proposed for Federal listing as threatened or endangered status by USFWS, (T) and (E) guidelines apply

Candidate (C) - Taxa for which the service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species Proposed rules have not yet been issued because this action is precluded at present by other listing activity. Development and publication of proposed rules for these taxa are anticipated The Service encourages State or other Federal agencies as well as other affected parties to give consideration to these taxa in environmental planning

RANGE-WIDE SENSITIVE (RS) - Concern for population viability exists across the species range, all occurrences contribute significantly to the conservation of the species These species typically have a global ranking signifying some acute concern for a species or communities future viability; many times this will also include USFWS "category" species

FOREST-WIDE SENSITIVE (FS) - Applies to species which· (1) Are in danger of extirpation or extinction, or (2) have either low populations, restricted ranges, special management needs, or range peripheries in Texas, the West Gulf Coastal Plain (WGCP), or NFGT lands Loss of these populations should not contribute to diminished global viability These species typically have been identified as a concern globally, but monitoring due to certain population considerations is recommended Forest Sensitive designation will apply only to those species which have been confirmed on NFGT lands

FOREST WATCH (W) - Species which have not been documented on NFGT lands, but are possible, probable, or likely based on known distribution and/or habitat requirements, or species which have been extirpated from the Forest This category may include species from all of the above categories

NUMERIC MODIFIERS (1-5) - Priority scale with one (1) being the highest, and five (5) being the least When applied to Forest Watch species, modifiers suggest the likelihood of occurrence; when applied to Forest Sensitive species, modifiers imply level of concern

Endangered, Threatened and Sensitive Species

COMMON NAME	SCIENTIFIC NAME	FWS	CON-CERN	NATIONAL FORESTS A	S	SH	DC	C/LBJ
	** BIRDS **							
American Swallow-tailed Kite	Elanoides forficatus	-	F	-	FS	FS	-	-
Bald Eagle	Haliaeetus leucocephalus	T	R	E	E	E	E	-
Golden Eagle	Aquila chrysaetos	-	F	FS5	FS5	FS5	FS5	FS5
Black-capped vireo	Vireo atricapillus	E	F	-	-	-	-	W3
Osprey	Pandion haliaetus	-	F	W3	W1	W1	-	-
Red-cockaded Woodpecker	Picoides borealis	E	R	E	E	E	E	-
Bachman's Sparrow	Aimophila aestivalis	-	F	-	-	-	-	FS
Piping Plover	Charadrius melodus	T	R	RS	RS	RS	RS	-
Peregrine Falcon	Falco peregrinus anatum	E	F	W5	W5	W5	W5	W5
Henslow's Sparrow	Ammodramus henslowii	-	F	W1	W1	W1	W1	-
White-faced Ibis	Plegadis chihi	-	F	-	-	-	-	W3
Long-billed Curlew	Numenius americanus	-	F	-	-	W1	-	-
Mountain Plover	Charadrius Montanus	C	F	-	-	-	-	W5
	** MAMMALS **							
Southeastern Myotis	Myotis austroriparius	-	F	W5	W5	W5	W5	-
River Otter	Lutra canadensis	-	F	FS1	FS1	FS1	FS1	W1
Plains Spotted Skunk	Spilogale putorius interrupta	-	F	-	-	W2	W1	-
Big Thicket Hog-nosed Skunk	Conepatus mesoleucus telmalestes	-	F	-	-	W5	-	-
Rafinesque's Big-eared Bat	Plecotus rafinesquii	-	F	W2	W2	W2	W2	-
Louisiana Black Bear	Ursus americanus luteolus	T	F	W2	W2	W2	W2	-
Black Bear		-	F	W5	W5	W5	W5	-
	** REPTILES **							
American Alligator	Alligator mississippiensis	TS/A	R	T	T	T	T	-
Alligator Snapping Turtle	Macroclemys temminckii	-	R	RS	RS	RS	RS	RS
Texas Horned Lizard	Phynosoma cornutum	-	F	-	-	W5	W5	W5
Canebrake Rattlesnake	Crotalus horridus atricaudatus	-	F	FS5	FS5	FS5	FS5	?
Louisiana Pine Snake	Pituophis melanoleucus ruthveni	-	F	FS1	W1	W1	W1	-
Texas Garter Snake	Thamnophis sirtalis annectens	-	F	-	-	-	-	W5
Northern Scarlet Snake	Cemophora coccinea copei	-	F	W1	W1	-	-	
	** AMPHIBIANS **							
Houston Toad	Bufo houstonensis	E	F	-	-	W1	-	-
Mole Salamander	Ambystoma talpoidum		F	FS3	FS3	-	W4	-
Pig Frog	Rana grylio	-	F	-	W2	-	-	-
Southern Redback Salamander	Plethodon serratus	-	F	W1	W3	W4	W4	-
	** FISHES **							
Western Sand Darter	Ammocrypta clara	-	R	W1	RS	W2	W2	W1
Goldstripe Darter	Etheostoma parvipinne	-	F	W2	W2	FS2	W2	W2
Scaly Sand Darter	Ammocrypya vivax	-	F	FS3	FS3	FS3	FS3	W3
Blackside Darter	Percina maculata	-	F	-	W2	-	-	W1
Blue Sucker	Cycleptus elongatus	-	F	W4	W4	W4	W4	W4
Creek Chubsucker	Erimyzon oblongus	-	F	FS5	FS5	FS5	FS5	W5
Smalleye Shiner	Notropis buccula	-	F	W1	W2	W1	W1	-
Sabine Shiner	Notropis sabinae	-	R	W2	W1	W2	W2	-
Paddlefish	Polyodon spathula	-	F	W1	W1	W1	W1	W1
Shovelnose Sturgeon	Scaphirhynchus platorynchus	-	F	-	-	-	-	W5

COMMON NAME	SCIENTIFIC NAME	FWS	CON-CERN	NATIONAL FORESTS A	S	SH	DC	C/LBJ
Taillight Shiner	Notropis maculatus	-	F	W2	W1	W2	W2	W1
Swamp Darter	Etheostoma fusiforme	-	F	FS2	W2	W5	W5	W4
Harlequin Darter	Etheostoma histrio	-	F	W2	W2	W2	W2	W4
River Darter	Etheostoma shumardi	-	F	W3	W3	W3	W3	W3
Mud Darter	Etheostoma asprigene	-	-	W3	W3	W4	W4	W3
Creole Darter	Etheostoma collettei	-	-	-	W2	-	-	W2
Speckled Darter	Etheostoma stigmaeum	-	F	-	W3	-	-	-
Cypress Minnow	Hybognathus hayi	-	F	W4	FS3	FS3	W4	W4
Pallid Shiner	Notropis amnis	-	F	W4	W3	FS3	W4	W4
	INVERTEBRATES							
Big Thicket Emerald Dragonfly	Somatochlora margarita	-	R	RS	RS	RS	RS	-
American Burying Beetle	Nicrophorus americanus	E	F	W1	W1	W1	W1	W1
	** PLANTS **							
Incised Groovebur	Agrimonia incisa	-	R	RS	R	-	-	-
Lead Plant	Amorpha canescens	-	F	FS2	W1	W3	W3	W1
Nodding Nixie	Apteria aphylla	-	F	F	F	-	-	-
Bluestar	Amsonia glaberrima	-	R	RS	RS	-	-	-
Texas Bartonia	Bartonia texana	-	R	RS	W1	RS	-	-
Bearded Short-husk	Brachyelytrum erectum	-	F	W1	FS1	-	-	-
Northern burmania	Burmania biflora	-	F	W1	W1	-	-	-
Bearded grasspink	Calopogon barbatus	-	F	W2	W2	-	-	-
Grasspink	Calopogon tuberosus	-	F	FS2	W2	-	-	-
Tissue Sedge	Carex hyalina	-	R	-	-	W1	W1	-
Caric Sedge	Carex microdonta	-	R	-	-	RS	W1	RS
Bent Sedge	Carex styloflexa	-	F	FS1	W2	-	-	-
Caric sedge	Carex willdenowii	-	F	FS3	FS3	FS3	FS3	-
Warner's Hawthorn	Crataegous warneri	-	R	-	-	W1	RS	-
Golden Wave tickseed	Coreopsis intermedia	-	F	-	-	W1	W1	-
Mohlenbrock's Umbrella Sedge	Cyperus grayioides	-	R	RS	RS	W4	W4	-
Kentucky Lady's Slipper	Cypripedium kentuckiense	-	R	RS	RS	-	-	-
Commanche Peak Prairie Clover	Dalea reverchonii	-	R	-	-	-	-	W1
Stanfield Prairie Clover	Dalea tenuis	-	F	-	-	-	-	F
Toothwort	Dentaria laciniata	-	F	W2	FS1	-	-	-
Shooting Star	Dodecatheon meadia	-	F	-	-	-	-	FS1
Southern Woodfern	Dryopteris ludoviciana	-	F	W4	W4	-	W4	-
Long-leaved Wild Buckwheat	Eriogonum longifolium	-	F	W3	FS2	-	-	-
Yellow Dog-tooth Violet	Erythronium rostratum	-	F	W3	FS2	-	W3	-
Erect Milk-pea	Galactia erecta	-	F	F	W3	-	-	-
Demaree's Gaura	Gaura demareei	-	R	-	R	-	-	-
Golden Hedge-hyssop	Gratiola flava	-	F	F	W2	-	-	-
Crested Coral Root	Hexalectris spicata	-	F	-	W2	W2	F3	-
Neches River rose-mallow	Hibiscus dasycalyx	C	R	W1	W1	-	RS	-
Whorled Pogonia	Isotria verticillata	-	F	FS1	W1	-	-	-
Bog Button	Lachnocaulon digynum	-	R	W3	W3	-	-	-
Texas Blade Cress	Leavenworthia texana	-	R	W5	W1	-	-	-
White Bladderpod	Lesquerella pallida	E	R	W2	W1	-	-	-
Branched gay-feather	Liatris cymosa	-	R	-	-	W1	W2	-
Slender Gay-feather	Liatris tenuis	-	R	RS	RS	-	-	-
Carolina Lily	Lilium michauxii	-	F	FS3	FS3	-	-	-
Tuberous Gromwell	Lithospermum tuberosum	-	F	-	FS1	-	-	-
No common name	Loeflingia squarrosa	-	F	W2	FS2	W2	W2	W2
Foxtail Club-moss	Lycopium alopecuroides	-	F	W2	W2	-	W3	-
Nodding Club-moss	Lycopodium cernuum	-	F	W2	W3	-	-	-

COMMON NAME	SCIENTIFIC NAME	FWS	CON-CERN	NATIONAL FORESTS A	S	SH	DC	C/LBJ
Bog Moss	Mayaca aubletti	-	F	F	W23	-	W23	-
Sandhill Four O'Clock	Mirabilis collina	-	R	W4	W4	-	W3	-
Drummond's Nailwort	Paronychia drummondii	-	F	W1	F	-	-	-
Cupleaf Beardtongue	Penstemon murraynus	-	F	W1	FS1	-	-	-
Texas trailing phlox	Phlox nivalis ssp texensis	E	R	W3	W2	-	-	-
Correll's False Dragon-head	Physostegia correllii	-	R	-	-	W1	W2	-
Long-sepaled false dragonhead	Physostegia longisepala	-	R	W2	W2	-	-	-
Orange-fringed Orchid	Plantanthera ciliaris	-	F	-	-	FS1	W1	-
Yellow Fringeless Orchid	Plantanthera integra	-	R	RS	W3	-	-	-
Rose Pogonia	Pogonia ophioglossoides	-	F	FS2	W3	-	-	-
October Flower	Polygonella polygama	-	F	W2-3	FS2	-	-	-
Rattlesnake Root	Prenanthes barbata	-	R	R	R	-	-	-
Dwarf Post Oak	Quercus boyntonii	-	R	W1	-	-	-	-
Large Beakrush	Rhynchospora macra	-	F	F	W2	-	-	-
Sabine Coneflower	Rudbeckia scabrifolia	-	R	RS	W2	-	-	-
Sweet Coneflower	Rudbeckia subtomentosa	-	F	FS1	W2	-	-	-
Bloodroot	Sanguinaria canadensis	-	F	FS1	FS2	-	-	-
Texas Sunnybells	Schoenolirion wrightii	-	R	RS	W2	-	-	-
American chaffseed	Schwalbea americana	E	R	W3	W3	W3	W3	-
Riddell's Spikemoss	*Selaginella riddellii*	-	F	FS3	FS3	-	-	-
Scarlet Catchfly	Silene subciliata	-	R	W1	RS	-	-	-
Eared Goldenrod	Solidago auriculata	-	F	FS2	FS2	-	-	-
Navasota Ladies Tresses	Spiranthes parksii	E	R	E	-	-	-	-
Silver dropseed	Sporobolis silveanus	-	F	FS4	W5	-	-	-
Oklahoma Twistflower	Streptanthus maculatus	-	R	W1	W1	-	-	-
Yellow Pimpernel	Taenidia integerrima	-	F	FS1	W2	-	-	-
Flame Flower	Talinum parviflorum	-	F	FS3	W2	-	-	W5
Roughseed Flameflower	Talinum rugospermum	-	R	-	-	-	R	-
Arkansas Meadowrue	Thalictrum arkansanum	-	R	-	-	-	R	-
Louisiana Squarehead	Tetragonotheca ludoviciana	-	R	RS	RS	-	RS	-
Hairy Jointed Meadow Parsnip	Thaspium barbinode	-	F	-	W2	W2	F1	-
Meadow Parsnip	Thaspium trifoliatum	-	F	-	FS1	F1	-	-
Slender Wake Robin	Trillium gracile	-	R	RS	RS	RS	-	-
Texas Trillium	Trillium pusillum var texanum	-	F	W1	W2	W3	W1	-
Prairie Trillium	Trillium recurvatum	-	F	-	W	-	-	-
Perfoliate Bellwort	Uvularia perfoliata	-	F	W1	FS1	-	-	-
Yellowroot	Xanthorhiza simplicissima	-	F	W2	W1	W2	-	-
Drummond's Yellow-eyed Grass	Xyris drummondii	-	R	RS	W3	-	-	-
Rough-leaf Yellow-eyed Grass	Xyris scabrifolia	-	R	RS	Rs	-	-	-
	** FRESHWATER BIVALVES **							
Roundlake	Amblema plicata perplica	-	F	W5	W5	W5	FS5	-
Rock Pocketbook	Arcidens confragrosus	-	R	RS	W1	RS	RS	-
Texas Pigtoe	Fusconaia askewi	-	R	W5	W5	RS	W5	-
Triangle Pigtoe	Fusconaia lananensis	-	F	W5	W5	W5	W5	-
Louisiana Fatmucket	Lampsilis hydiana	-	F	W2	W2	RS	W1	-
Unnamed	Lampsilis satura	-	F	W5	W5	W5	W5	-
Louisiana Pigtoe	*Plerobema riddelli*	-	R	W2	W2	RS	W1	-
Texas Heelsplitter	Potamilus amphichaenus	-	F	W5	W5	W5	W5	-
Smooth Pimpleback	Quadrula houstonensis	-	F	W3	W3	W2	W1	-
Wartyback	Quadrula nodulata	-	R	RS	RS	W1	W2	-
Western Pimpleback	Quadrula pustulosa mortoni	-	F	W5	W5	FS2	W4	-
Mapleleaf	Quadrula quadrula	-	F	W5	W5	W5	W5	-
Texas Liliput	Toxolasma texasensis	-	R	W2	W2	RS	W1	-
Fawnfoot	Truncilla donaciformis	-	F	FS3	W5	W5	W5	W5
Little Spectaclecase	Villosa lienosa	-	R	W2	W2	RS	W1	-

COMMON NAME	SCIENTIFIC NAME	FWS	CON-CERN	NATIONAL FORESTS A	S	SH	DC	C/LBJ
	TERRESTRIAL GASTROPODS							
No common name	Mesomphix globosus	-	F	W5	W5	W5	W5	-
No common name	Ventridens interextus	-	F	W5	W5	W5	W5	-
No common name	Stenotrema stenotrema	-	F	W5	W5	W5	W5	-
No common name	Mesodon infectus	-	F	W1	W1	W5	W5	W5
No common name	Triodopsis divesta	-	F	W5	W5	W5	W5	W4
	** PLANT COMMUNITIES **							
American Beech-Southern Magnolia	Fagus grandifolia-Magnolia grandiflora	-	R	W1	RS	RS	-	-
American Beech-White Oak	Fagus grandifolia-Quercus alba	-	R	RS	RS	RS	-	-
Bluejack Oak-Pine	Quercus incana-Pinus spp	-	F	FS1	FS1	FS2	FS2	-
Little Bluestem-Indiangrass	Schizacyrium scoparium-Sorghastrum nutans	-	R	-	-	RS	-	RS
Little Bluestem-Nuttall's Rayless Goldenrod	Schizacyrium scoparium-Bigelowia nuttallii	-	R	RS	W2	-	-	-
Longleaf Pine-Little Bluestem	Pinus palustris-Schizachyrium scoparium	-	R	RS	RS	EX	EX	-
Sphagnum-Beakrush	Sphagnum spp -Rhynchospora spp	-	F	FS1	FS1	-	-	-
Swamp Chestnut Oak-Willow Oak	Quercus prinus-Quercus phellos	-	R	RS	RS	RS	W1	-
Texas Oak	Quercus texana buckleyi	-	R	-	-	-	-	RS
Water Oak-Willow Oak	Quercus nigra-Quercus phellos	-	F	FS1	W1	W1	W1	-
	ADDITIONAL "WATCH" SPECIES							
Lake Cress	Armoracia lacustris		F					
Navasota false foxglove	Agalinis navasotensis		R					
Rough-stem Aster	Aster puniceus ssp elliottii var scabricaulis		F					
Marshelder Dodder	Cuscuta attenuata		R					
Giant sharpstem umbrella sedge	Cyperus cephalanthus		R					
Wolf's Spikesedge	Eleocharis wolfii		F					
Sandhill four-o-clock	Mirabilis collina		R					
Parks Jointweed	Polygonella parksii		R					
Hall's Bulrush	Scirpus hallii		R					

Appendix E

Infrastructure

Infrastructure includes Transportation System, ORV, Developed Recreation Facilities and FA&O structures and their associated constructed components Meaningful measures for monitoring and evaluation will ensure appropriate maintenance A detailed description of some of these infrastructure components and direction for plan implementation is discussed in this appendix

Transportation System

The transportation system on the National Forests and Grasslands in Texas (NFGT) is composed of State, County, and Forest Service roads and serves administrative and resource management activities Only those roads needed for access to Forest Service lands, adjoining private lands, and/or mobility for management are considered as part of the Forest Transportation System

All transportation network roads are functionally classified as either arterial, collector, or local In general, the description of these roads is as follows·

Arterial roads serve as major access routes to and through large land areas

Collector roads serve all types of traffic and are generally considered connecting roads that serve smaller areas of land These roads are used by traffic normally found on public roads

Local roads are generally short length roads which normally dead-end at a terminal facility, and usually serve a specific user or activity

Existing mileage inventoried and/or mapped by jurisdiction class is shown in the following Table E-1

Table E-1. Existing Mileage Inventoried and/or Mapped

Jurisdiction	Arterial	Collector	Local	Total
State	768 0	347 0	111 0	1,226 0
County	- 0 -	185 0	576 0	772 0
USFS	31 0	252 0	2,084 0	2,353 0
Total Miles	810 0	784 0	2,771 0	4,365 0

Forest Development Roads (FDR) are not public roads in the same sense as roads that are under the jurisdiction of public road agencies (such as states or counties). They are not intended to meet the transportation needs of the public at large. Instead, these roads are authorized only for the administration and utilization of National Forest System lands. Although generally open and available for public use, their use is at the discretion of the Secretary of Agriculture. The Forest Service may restrict or control use to meet specific management direction.

The Forest Service classifies FDRs according to the four following Traffic Service Levels (TSL).

Level A roads (usually considered arterial) are generally open year-round and can expect high volumes of traffic from all types of vehicles

Level B roads (usually considered collector) are open year-round, or closed seasonally, and can expect moderate amounts of traffic during high use seasons.

Level C roads (usually considered local) will accommodate all traffic types, although the predominant use is usually administrative and commercial traffic. Roads are designed for low volumes of traffic Some mixed use may have to be controlled to minimize conflicts, especially between public and commercial traffic

Level D roads (usually considered local) are low standard roads built for a single purpose, usually commercial timber sales Some level D roads are utilized for recreation (OHV) and other secondary purposes

Table E-2 contains descriptions of the four different levels of traffic service for Forest roads. Each describes traffic characteristics which are significant in the selection of design criteria and the operational standards for the management of that road. The levels reflect a number of factors such as average vehicle speed, travel time, traffic interruptions, safety, driver comfort, convenience, and operating cost. These factors in turn affect:

number of lanes,
turnout spacing,
lane width,
type of driving surface,
design speed,
clearance,
horizontal and vertical alignment,
curve widening,
turnarounds, and
surfacing.

Forest Highways

The Forest Highway System includes major State and County routes that lie within or adjacent to the proclaimed Forests. These roads are of primary importance for the protection, administration and utilization of the NFGT.

Upgrading and reconstruction of these facilities to meet Forest management objectives may be accomplished in a variety of ways including cooperative agreements with local and State governments, through the Forest Highway Program. Forest Highways provide paved, double lane access to and through NFGT areas.

The priority for work to be done under the Forest Highway Program is based on the relative needs of the various elements of the National Forest System, County and State governments as determined through planning at all levels Project selection and scheduling is a cooperative process completed between agencies such as the U S. Department of Agriculture (USDA) Forest Service, U S. Department of Transportation-Federal Highway Administration, and the Texas Department of Transportation. The existing highway segments listed below are currently part of the Forest Highway (FH) Program. These are not listed in prioritized order for management or development Roads may be deleted or other roads may be added based on changing conditions.

FH 87 - From U S. 96, thence east 15.0 miles to SH 87 to include bridges.

FH 17 - From FM 2342, thence south 4 5 miles to Scrapping Valley

FH 71 - From FM 1375, thence south 5.0 miles to FM 1097

FH 16 - From FM 358, thence south 12.2 miles to SH 7

FH 81 - From SH 7 to FM 2501

The following roads are a partial list of Forest Development Roads (FDR) that have been submitted to the Federal Highway Administration as candidates for the Forest Highway Program The Forest Highway ***designation is yet to be determined*** for these candidates and order of development has not yet been determined or prioritized. Roads, general description and approximate miles are as follows:

FDR 126 - From FM 2261, thence northeast 14.0 miles to Toledo Bend Reservoir.

FDR 141 - From FDR 126, thence south 4 5 miles to FDR 106

FDR 215 - From FM 1374, thence southwest 4.5 miles to Sam Houston NF FM 1375.

TABLE E-2 LEVELS OF TRAFFIC SERVICE FOR FOREST ROADS AND THEIR CHARACTERISTICS

	Level A	Level B	Level C	Level D
FLOW	Free flowing with adequate passing facilities.	Congested during heavy traffic such as during peak logging or recreation activities	Interrupted by limited passing facilities or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two way traffic is difficult and may require backing to pass
VOLUMES	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods	Erratic; frequently controlled as the capacity is reached	Intermittent and usually controlled Volume is limited to that associated with the single purpose
VEHICLE TYPES	Mixed; includes the critical vehicle and all vehicles normally found on public roads	Mixed; includes the critical vehicle and all vehicles normally found on public roads	Controlled mix, accommodates all vehicle types including the critical vehicle. Some use may be controlled to minimize conflicts between vehicle types	Single Use; not designed for mixed traffic Some vehicles may not be able to negotiate. Concurrent use between commercial and other traffic is restricted
CRITICAL VEHICLE	Clearances are adequate to allow free travel Overload permits are required	Traffic controls needed where clearances are marginal. Overload permits are required.	Special provisions may be needed Some vehicles will have difficulty negotiating some segments	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in
SAFETY	Safety features are a part of the design	High priority in design Some protection is accomplished by traffic management.	Most protection is provided by traffic management.	The need for protection is minimized by low speeds and strict traffic controls.
TRAFFIC MANAGEMENT	Normally limited to regulatory, warning, and guide signs and permits.	Employed to reduce traffic volume and conflicts	Traffic controls are frequently needed during periods of high use by the dominant resource activity	Used to discourage or prohibit traffic other than that associated with the single purpose
USER COSTS	Minimize, transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.

TABLE E-2 LEVELS OF TRAFFIC SERVICE FOR FOREST ROADS AND THEIR CHARACTERISTICS (continued)

	Level A	Level B	Level C	Level D
ALIGNMENT	Design speed is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors Design speeds are generally low	Dictated by topography, environmental factors, and the design and critical vehicle limitations
ROAD	Stable and smooth with little or no dust, considering the normal season of use	Stable for the predominant traffic for the normal use season Periodic dust control for heavy use or environmental reasons Smoothness is commensurate with the design speed	May not be stable under all traffic or weather conditions during the normal use season Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection	Rough and irregular Travel with low clearance vehicles is difficult. Stable during dry conditions Rutting and dusting controlled only for soil and water protection

FDR 208 - From FM 1791, thence southeast 5 5 miles to FDR 215

FDR 234 - From FM 1375, thence south 4 0 miles to Lake Conroe

FDR 207 - From U S. 190, thence southeast 6.5 miles to Walker-San Jacinto Co line.

FDR 206 - From FM 2296, thence southeast 9 5 miles to FM 1375

FDR 217 - From SH 150, thence southwest 3 0 miles to FM 2666.

FDR 221 - From FM 2025, thence southeast 8 5 miles to U S. 59

FDR 274 - From FM 945, thence south 6 0 miles to SH 105.

FDR 202 - From FDR 207, thence southeast 7 5 miles to SH 150.

FDR 528 - From SH 94, thence southeast 5.5 miles to FM 2262

FDR 527 - Brown Springs, Trinity County, 13 miles

FDR 333, FDR 306, FDR 335 - From SH 63, thence northeast 1.5 miles, thence southeast 4 5 miles to SH 255R

FDR 300 - From FM 1277, thence southeast 16 0 miles to FM 705.

FDR 314 - From U S. 69, thence east 4 5 miles to FDR 303

FDR 303 - From SH 63, thence south 7 0 miles to Bouton Lake

FDR 302 - From FDR 303, thence east 4 0 miles to SH 63

FDR 313 - From SH 63, thence south 2 5 miles to Boykin Spring Campground

FDR 336 - From FM 2743, thence northeast 1 5 miles to Caney Creek Recreation Area

FDR 204 - From FM 1375, thence south 5 0 miles to Scotts Ridge area

FDR 903 - Spoonamore, Fannin County, 4.1 miles

Off-road Vehicles

Background

Executive Orders issued by both Presidents Nixon and Carter, directed all federal agencies to establish policies and provide procedures that would ensure that the use of off-road vehicles (ORVs) on public lands

would be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of the land and to minimize conflicts among the various uses of those lands

Subsequent to Executive Order #11644, the U S Forest Service prepared an Environmental Impact Statement and issued regulations for use of ORV's on National Forest Systems lands This ORV EIS recommends administrative designation of specific areas and trails on which the use of ORVs may not be permitted. The criteria for designation of these areas and trails is based upon the protection of the resources of the public lands, promotion of the safety of all users of those lands and minimization of conflicts among the various uses of those lands The designation of such areas and trails should be in accordance with the following:

- Areas and trails are to be located to minimize damage to soil, watershed, vegetation or other resources of the public lands

- Areas and trails are to be located to minimize harassment of wildlife or significant disruption of wildlife habitats.

- Areas and trails are to be located to minimize conflicts between ORV use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

- Areas and trails are not to be located in officially designated wilderness areas or primitive areas.

Definition and Classes of ORVs

For purpose of definition the term "off-road vehicle" (ORV) is defined in the EIS Glossary, it is further clarified for this discussion to mean any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland or other natural terrain; except that such term excludes (a) any registered motorboat, (b) any military, fire, emergency or law enforcement vehicle when used for emergency purposes, and (c) any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, license or contract

ORV's used on NFGT System roads that are open to the general public, have been and will continue the requirement to be street legal. ORV's that are not street legal generally will be the lighter class vehicles such as motorcycles and all-terrain four-wheelers (ATVs). These are considered to be under 500 pounds in weight and less than 48 inches wide These ORVs must adhere to a maximum allowable noise level of 99 decibels,

which will be measured at 20 inches from the exhaust (The Motorcycle Industry Council recommended measurement, in accordance with SAE J 1287, June 1988) Use Off-Highway Motorcycle and All Terrain Vehicle Stationary Sound Test Manual, Motorcycle Industry Council, Arlington, VA Noise level is measured by sound level meter (SAE J-1287, June 88 or latest revision) taken at 20 inches from the exhaust at a 45 degree angle

The use of larger four-wheel drive vehicles as ORVs in the NFGT continues to offer an opportunity and challenge of going in off-route places and for traveling woods roads that are not passable by two-wheel drive vehicles These larger type vehicles have been traditionally considered OHVs on NFGT

To provide recreational opportunities for four-wheel drive vehicles (OHVs), the Forest Service would have to leave open many existing low standard roads and level "D" roads that are constructed for timber sales The availability of maintenance dollars will dictate to a large degree how many miles of these roads will remain open As the Plan is implemented year by year, available budget along with demand for four-wheel drive use will be utilized to determine how many and which roads will be left open and/or closed

ORV Management

The direction for the NFGT relative to ORV use is to protect the Forest resources as well as strive to meet the needs of the ORV enthusiast.

1 Provide for three types of woods riding on NFGT.

- **OPEN** - Cross-country riding within most of MA-1 and 2 of the Sabine, northern Angelina and Davy Crockett is permitted and as indicated on the ORV maps for NFGT This area is considered open except for those types of areas that were listed previously as closed Any portion of the "open" area may be closed by the Forest Supervisor when deemed necessary to protect resources or the safety of visitors Larger vehicles, four-wheel drive (OHVs) are restricted to FDR level "D" roads

- **RESTRICTED** - MA-4, MA-5, MA-1 and MA-2 ORV use on the Sam Houston and southern (MA-6 Longleaf Ridge) Angelina National Forest is restricted to motorcycle and ATV trails Use will be permitted on approximately 250-350 miles of designated motorcycle trails for light duty type ORVs (width 48" or less and weight 500 lbs or less) are planned and will be maintained

- **CLOSED - MA-3, 7 and 8 - Caddo/LBJ Grasslands, Special Management and Wilderness Areas:** Areas such as Big

Creek, Winters Bayou, Beech Ravines, Colorow Creek, Upland Island Wilderness, Crosstimbers and Mill Creek Cove. **MA-9 - Recreation Sites:** Motorized vehicle use is restricted to roads, parking lots or parking spurs while in or near hiking trails, campgrounds, shooting ranges or other designated recreation areas **MA-10 and 11 - Administrative Sites and Experimental Forest** (well sites, graveyards, utility ROWs etc)

Emergency closures will be made where resource damages occur as the result of over-use or abuse The extent of such closure will be minimal and these problem areas will be closed and appropriately signed

Other Open Area Closures

MA 1 and 2 areas on the Sabine, northern Angelina and Davy Crockett National Forests are generally open, unless closed through Supervisor's Order Analysis and evaluation of these ORV closures take into consideration such factors as noise, safety, quality of the various recreational experiences provided, potential impacts on soil, watersheds, vegetation, fish, wildlife, wildlife habitat and size of tracts. **Other closures may include:**

Regeneration areas: To protect the investment in site preparation and planting Closures will be made, as necessary under provisions for "Emergency Closures " If and when closed, they will remain closed for a period of about five years The exterior boundary will be appropriately signed during the emergency closure period if deemed necessary

Permanent wildlife openings· Unfenced openings are recognizable by the public through appropriate signing if needed. The areas are shown on the two inch per mile maps, but frequently new areas are added and/or old areas dropped

Timber sale temporary logging roads Those permanently closed to ORV use after they have been shaped, water-barred and planted or seeded

Red-cockaded woodpecker clusters may be closed to protect the habitat of this endangered species and to prevent harassment from vehicle noise Trails will be located away from existing clusters, however if RCW move into these areas, use may continue unless disturbance is verified Signs may be placed around clusters if needed

ORV Strategy and Implementation

The Sam Houston and southern Angelina National Forests (MA-6 or Longleaf Ridge) receive heavy pressure from ORVs The majority of this use involves woods riding by motorcycle enthusiasts Some of the

activity is made up of organized competitive events such as motorcycle enduros, however, much of it is pleasure riding, using any roads and existing trails passable to motorcycles

Organized four wheel drive (4x4s or OHVs) groups have and continue to use the Longleaf Ridge Area, primarily on old trams and traffic service level "D" Forest Service System roads Both Forests have a continuing conflict between ORV use, other recreational users and various resources including RCW

Because of their mobility and increasing numbers, ORVs can conflict with resources and other uses of the Forest. In many areas, soil compaction and erosion exacerbated by ORV use becomes a problem Damage is done to waterbars installed for erosion control Historic and cultural sites such as Old Aldridge and tram roads have also received resource damage

Implementation Steps

The following steps will move the Sam Houston and Angelina NF's from the current ORV use that will provide a desired experience and protect resources The transition period will be used to inventory all roads and trails on these forests, evaluate their condition and impacts to adjacent resources. Using the inventory and demand information, working with the public and ORV user groups will aid in determining which existing trails and roads will a) remain open through mitigation, reconstruction, and improvement as designated trails or b) be closed due to unacceptable impacts on soil, water and/or other resources.

Step 1 - Inventory and Evaluation

Many more miles of existing (non-designated) ORV trails can be found on these two areas These non-designated, existing trails will be inventoried, evaluated and a recommendation will be made to reconstruct, maintain, mitigate or close each trail segment

Step 2 - Evaluation and Mitigation

Those trail segments that are determined to remain open must be brought up to standards or permanently closed as the Plan is implemented The time-frames and quality of the trail designation process will be dependent on available funding, cooperation of groups, and human resources available

If any existing trails cannot meet standards, or are in conflict with other resource needs, they will be closed. Temporary closures may be needed during the evaluation and maintenance phase of this process, as determined through site-specific environmental analysis.

Challenge-type events, stressing power or speed, are prohibited on the NFGT. Organized competitive events such as motorcycle enduros that do not stress power and speed will use designated routes by special use permit Enduros will be excluded from sensitive areas such as special management areas, scenic areas, bird rookeries, lakeshore zone, developed recreation areas (except ingress/egress), and travel on designated hiking trails.

Step 3 - Partnerships

Cooperation with the Trail Riders of Houston, the Southeast Texas Trailriders and other organized groups will be a key element through the inventory, mitigation and management steps in this process. Assistance in the selection of appropriate trail locations is very important to ensure not only resource integrity, but to assure the opportunities for optimum recreational experiences are maintained. Partnerships will be pursued to allow development of one or more ORV associations that could cooperate in the operation and maintenance of ORV trails through creative management and funding

Step 4 - Monitoring

In areas where ORV's are permitted, monitor and evaluate the effects of ORV use and limit the number of ORVs to carrying capacity of the soil and/or adverse effects to water quality All ORV use will be monitored on a continuing basis by observation by trained resource personnel. Monitoring will be done periodically on a spot check basis As the need develops, more sophisticated monitoring such as vehicle counts, test areas, etc. may be deemed appropriate and initiated.

Developed Recreation Facilities

The NFGT proposes a wide spectrum of recreational opportunities to address a number of issues raised by the public. A major component of this task involves the periodic development of facilities necessary to ensure the delivery of these recreation experiences in a safe, healthful, natural, non-urban atmosphere. Facility development needs may vary from providing new facilities at new locations, to reconstruction, renovation, improvement or even closure of existing sites. Routine operation and maintenance of these facilities are detailed in MA-9a and MA-9b.

Following is a list of existing and proposed developed recreation areas and the types of projects planned for these areas that will contribute to the achievement of the Forest's desired future condition. Rehabilitation refers to the work necessary to restore the site to its original condition including the reconstruction of roads, water, wastewater treatment systems, and replacement of existing facilities Rehabilitation can also include enhancement projects for a variety of items such as reconstruction of trails, picnic sites, camping units, or toilet buildings necessary to meet the requirements of the Americans With Disabilities Act (ADA)

and other laws Also included may be providing water, sewer or electrical hookups at individual camping sites, renovations of existing structures, or the construction of new facilities at these existing sites Decisions as to what enhancements will be included in projects will be the result of individual site specific analysis The following trail miles are proposed in this Plan

Trails	Length (Miles)	Planned (Miles)	TOTAL (Miles)
Hiking	188	15	203
Horse	52	90	142
Off-Road Vehicle (ORV)	55	250-300	305-355
Mountain Bike	15	50	65
Canoe	12	50	62

Interpretive facilities also are included in the project list, and include sites operated in cooperation with the Ozark Interpretive Association Project proposals are prioritized as high, medium, or low based on a variety of factors currently known, including but not limited to the following

Proximity to Population Centers,
Rural Development Opportunities,
Activity Concentrations due to Special Local Attractions,
Congressional Interest,
Current Use/Recreation Activity,
Projected Demand,
Proximity to Other Similar/Existing Facilities,
Access to the Site, and
Cost Analysis of Development/Enhancement to Appropriate Standards

These projects will be implemented as funding becomes available. Depending on this funding, the list may or may not be completed during the planning period, and unforeseen conditions may necessitate changes to this list The following table addresses all proposed facilities for recreation in this Plan

Forest	Area	Proposed Activity	Priority
Angelina	Bouton Lake	Rehabilitate	M
	Boykin Springs	Rehabilitate	H
	Caney Creek	Rehabilitate	H
	Harvey Creek	Evaluate for Closure	H
	Letney	Evaluate for Closure	M
	Sandy Creek	Rehabilitate	M
	Townsend	Evaluate for Closure	M
	Northside	Complete Construction	H
	Shooting Range	Complete Construction	M
	Ranger Office(Int)	Complete Construction	H
	Zavalla Work Center	Complete Construction	H
	Auto Tour(Int)	Maintain	H
Davy Crockett	Kickapoo	Rehabilitate	L
	Neches Bluff(Prim)	Rehabilitate	L
	Ratcliff Lake	Rehabilitate	H
	4C's Primitive(2)	Rehabilitate	M
	Auto Tour(Int)	Maintain	H
	RCW Viewing (Int)	Maintain/Develop	H
Sabine	Haleys Ferry	Complete Construction	M
	Boles Field	Rehabilitate	M
	Indian Mounds	Rehabilitate	H
	Lakeview	Rehabilitate	M
	Ragtown	Rehabilitate	L
	Redhills Lake	Rehabilitate	H
	Willow Oak	Evaluate for Closure	H
	Shooting Range	Construct	M
	Yellowpine Office	Construct	H
Sam Houston	Double Lake	Rehabilitate	H
	Kelly Pond	Campground Construction	M
	Stubblefield Lake	Rehabilitate	H
	Lone Star Trail	Rehabilitate	M
	Cagle	Campground Construction	H
	Scotts Ridge	Campground Construction	H
	Tarkington Bayou	Campground Construction	H
	Shooting Range	Construct	H
	RCW Viewing(Int)	Maintain/Enhance	H
	Auto Tour(Int)	Develop	H
Caddo/LBJ	Black Creek	Rehabilitate/Expand	H
	Cottonwood Lake	Campground Construction	H
	South Coffeemill	Campground Construction	H
	East Coffeemill	Rehabilitate	H
	East and West Lake Davy Crockett	Rehabilitate	H
	Shooting Range	Construct	H
	Ranger Office(Int)	Construct	H
	Overlook(Int)	Construct	H
	LBJ Horse Camps (3)	Construct	H

(Int) - Interpretive
(H) - High
(M) - Medium
(L) - Low

Trail Miles and Priority

Forest	Trail	Length	Priority
Angelina	Sawmill/Hiking	5 5	H
	*ORV (P)	50-100	H
	*Horse (P)	30	H
Davy Crockett	4Cs/Hiking	20	H
	Neches River/Canoe	50	M
	Piney Creek/Horse	52	M
	*Mountain Bike (P)	40	H
Sam Houston/Raven	ORV	55	H
	*ORV (P)	200	H
	*Horse (P)	30	H
	LSHT	91	H
	*Mountain Bike (P)	15	H
	Interpretive (P)	4	H
	LSHT (P)	4	
San Jacinto	LSHT	36	H
	Scenic Area	3	H
	*Horse (P)	20	H
	Mountain Bike	15	H
	*Mountain Bike (P)	10	H
	Canoe (P)	12	H
	Interpretive	1	H
Sabine	Trail Between Lakes	28	H
Caddo/LBJ	Black Creek/Hiking	4	H
	Coffeemill/Hiking (P)	6	H
	*Horse	35	H
	*Mountain Bike (P)	18	H
	Lake Traverse (P)	19	M

(P) - Proposed
* Horse, mountain bike, and ORV use can be planned as multiple use trails, but each may be designed with some trail length for exclusive use

Structures

The Forest has approximately 110 administrative structures including offices, work center buildings, lookout towers, and communications facilities currently in active use on the NFGT

The NFGT Supervisor's Office is located in Lufkin, Texas The present facility includes offices in the Homer Garrison Federal Building and at the Administrative Site located on North Raguet Street (also in Lufkin)

There are eight Ranger District Offices on the NFGT. Six are leased, privately-owned facilities, and two are Forest Service owned facilities The leased facilities are all located some distance from the work centers

There are seven recreation lakes with Forest Service owned and maintained dams on the NFGT There are also 15 USDA Soil Conservation Service (SCS) Dams (flood control dams) located completely or partially on U S Department of Agriculture (USDA) Forest Service land on the LBJ National Grasslands The SCS constructed structures are operated and maintained by the Wise County Commissioners' Court

Fire, Administrative, and Other Facilities (FA&O)

The following is a list of FA&O facilities scheduled for replacement on the Forest during the Plan period Some of these facilities are currently remote leased and will be replaced with co-located Forest Service owned space as funding becomes available Each facility is identified in the Facility Master Plan for that Forest

Angelina National Forest office and work center

Davy Crockett National Forest office

Sabine National Forest office

Work centers on the Forest will be replaced at a rate of one per period, beginning in the third period of the Forest Plan Offices will be replaced as these structures reach the end of their design lives Completion of all FA&O projects during the planning period will be dependent on the availability of funding

Appendix F

Soil Tolerance Tables

The following tables are provided to estimate tolerance limits for general soil types found on the four National Forests (Table 1), and the Caddo and Lyndon Baines Johnson (LBJ) Grasslands (Table 2) These tolerance limits are used during project planning, implementation, and monitoring to ensure soil and water standards and guidelines are followed

PLAN APPENDIX F
EROSION AND SEDIMENT COEFFICIENTS
NATIONAL FORESTS IN TEXAS
TABLE 1

SILVICULTURAL STRATEGIES	SOIL	UNIT	T	SOIL	UNIT	W	SOIL	UNIT	X	SOIL	UNIT	V	SOIL	UNIT	Z	SOIL	UNIT	S
	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr	Ero Rate Tn/Ac/Yr	Sediment	Tolerance Tn/Ac/Yr
Geologic Erosion	0 014	0 300		0 008	0 002		0 013	0 003		0 011	0 002		0 011	0 002		0 008	0 002	
Pre-commercial Thinning	0 200	0 050	4 100	0 100	0 200	4 800	0 180	0 040	5 400	0 160	0 040	5 400	0 150	0 030	6 200	0 100	0 020	4 800
Commercial Thinning	0 130	0 030	4 100	0 070	0 016	4 800	0 120	0 030	5 400	0 100	0 023	5 400	0 100	0 023	6 200	0 070	0 016	4 800
Prescribed Burns	0 180	0 040	4 100	0 180	0 040	4 800	0 180	0 040	5 400	0 160	0 040	5 400	0 150	0 030	6 200	0 180	0 040	4 800
Site Preparation																		
Shear/Burn	2 200	0 510	4 100	1 100	0 250	4 800	2 000	0 460	5 400	1 700	0 390	5 400	1 600	0 380	6 200	1 100	0 250	4 800
Shear/Window	3 250	0 750	4 100	1 600	0 380	4 800	3 000	0 690	5 400	2 200	0 500	5 400	2 500	0 570	6 200	1 600	0 380	4 800
Shear Only	1 800	0 040	4 100	0 800	0 180	4 800	1 650	0 380	5 400	1 430	0 330	5 400	1 380	0 320	6 200	0 800	0 180	4 800
Burn	1 800	0 040	4 100	0 370	0 090	4 800	1 650	0 380	5 400	1 430	0 330	5 400	1 380	0 320	6 200	0 370	0 090	4 800
Chopping	0 720	0 170	4 100	0 680	0 160	4 800	0 660	0 150	5 400	0 550	0 130	5 400	0 550	0 130	6 200	0 680	0 160	4 800
Hand Tools	0 014	0 003	4 100	0 008	0 002	4 800	0 013	0 003	5 400	0 011	0 003	5 400	0 011	0 003	6 200	0 008	0 002	4 800
Access Roads	19 800	4 550	4 100	10 200	2 340	4 800	18 100	4 160	5 400	15 800	3 630	5 400	20 400	4 690	6 200	10 200	2 340	4 800
Skid Trails	26 400	6 070	4 100	13 600	3 120	4 800	24 100	5 540	5 400	21 200	4 870	5 400	15 300	3 510	6 200	13 600	3 120	4 800

T = VERTIC SOILS
W = SANDY/LOAM <15%
X = CLAY
V = FLOODPLAINS
Z = CRITICAL SOILS AND WETLANDS
S= SANDY >15%

PLAN APPENDIX F
EROSION AND SEDIMENT COEFFICIENTS
NATIONAL GRASSLANDS IN TEXAS
TABLE 2

	CR Critical Soil		CM Course-Med Soil		FI Fine Soil		BL Blackland Soil	
	Erosion	Sediment	Erosion	Sediment	Erosion	Sediment	Erosion	Sediment
NATIONAL GRASSLANDS								
GR	0 600	4 858	0 600	0 003	0 500	0 003	0 400	0 003
WD	0 600	4 858	0 600	0 003	0 700	0 003	0 800	0 003
BH	0 400	4 858	0 600	0 003	0 700	0 003	0 300	0 003
LADONIA								
GR	2 500	4 858	0 700	0 003	0 500	0 003	0 400	0 003
WD	0 600	4 858	0 600	0 003	0 700	0 003	0 800	0 003
BH	0 400	4 858	0 400	0 003	0 700	0 003	0 300	0 003
BOIS D' ARC								
GR	0 600	4 858	0 700	0 003	0 500	0 003	0 400	0 003
WD	0 600	4 858	0 600	0 003	0 700	0 003	0 800	0 003
BH	0 400	4 858	0 400	0 003	0 500	0 003	0 300	0 003

GR = Grassland

WD = Woodland

BH = Bottomland Hardwood

Appendix G

Monitoring Summary Table

Appendix G is a Monitoring Summary Table which displays the monitoring questions and general information associated with the questions The Summary Table will be updated periodically in response to the Forest Annual Monitoring and Evaluation Reports, and other indications of the need for change. Appendix G is also a summary of the more detailed Task Sheets described in Chapter V.

The monitoring questions based on the Plans Desired Future Conditions, Goals and Objectives (G&Os), and Standards and Guidelines (S&Gs) are described in Plan Chapter V Table V-1: Monitoring Questions (See Plan-Chapter V-11) displays questions that need to be answered to ensure that the Plan decisions are being implemented, are effective, and are valid The questions in Table V-1 constitute Plan monitoring decisions. Changes to Table V-1 will require a Plan Amendment.

APPENDIX "G": MONITORING SUMMARY TABLE

MONITORING TASK NO.	MONITORING QUESTIONS	MONITORING ITEM	METHOD OF COLLECTION	DURATION/ FREQUENCY	PRECISION/ RELIABILITY	COSTS/NEW Y OR N?	RESPONSIBILITY
1a	Are threatened, endangered, or sensitive species and unique plant communities being properly identified?	TE&S area wide and habitat inventory	Observations and survey during project planning	Annually	Medium		Resources Staff
	Is available training sufficient to meet diverse needs of biologists and rangers?	Wildlife components of project analyses	Review of project plans	Annually	Medium/High	$1,000-$15,000/N	Resources Staff, Districts & RO
	Is consultation between other Federal and State agencies effective?	Process records, correspondence, and reports	Summary documentation and project plans.	Quarterly	High	None	Resources Staff
1b	How is the habitat of any listed species being affected?	Indicator Species & Listed Species habitat	Survey biologists' databases for changes in habitat trends	Annually	Low/Medium	$7,000-$10,000/Y	Resources Staff & Districts
	Are viable populations of indicator species being sustained?	Indicator Species	Census/surveys	Annually	Medium		
	What are the viability trends for selected species?	Indicator Species	Census/Surveys	5 years	Medium/Low	$5-10,000/Y	Resources Staff
	Are Navasota ladies'-tresses populations increasing?	Population assessment and monitoring plan.	Monitor number of individuals and size population (square meters).	Annually (fall)	Medium		Resources Staff
	Is RCW augmentation successful?	Trends in augmentation (duration and reproduction)	Observation, documentation	Monthly to quarterly	High		District Biologists
	Is 1-5%/year increase in RCW obtainable?	Inventory of active, inactive, and recruitment and replacement stands for activity.	Survey/Observation, documentation	Annually (spring)	Medium		Resources and District Staffs

APPENDIX "G": MONITORING SUMMARY TABLE (continued)

MONITORING TASK NO.	MONITORING QUESTIONS	MONITORING ITEM	METHOD OF COLLECTION	DURATION/ FREQUENCY	PRECISION/ RELIABILITY	COSTS/NEW Y OR N?	RESPONSIBILITY
	Are corridors available and RCW genetic exchange taking place between private lands and NFGT?	RCW movement between NFGT and private	Coordination and exchange of information (private and NFGT)	Annually	Medium/Low	New program $25,000	Resources Staff
1c	Are natural processes shaping the wilderness character rather than man's influence?	Vegetation Characteristics	Observation for vegetative changes.	Annually	Low		Wilderness Manager
	Are any activities harming natural processes?	Activities within Wilderness	Visual review of management activities	Annually	Medium/High	$5,000/Y	Wilderness Manager
	Are wilderness RCW clusters declining?	Annual wilderness cluster checks (spring)	Consus/Survey	Annually	High		District Biologists
1d	Is landscape diversity being maintained?	Forest type and age class distribution	Annual CISC update	Annually	High		Timber
1e	Are significant longleaf and shortleaf pine ecosystems being successfully restored as per restoration priority levels?	Acres planted to shortleaf and longleaf forest type in CISC	Query CISC by forest type and compare to previous year's acres.	Annually	High/High		Timber
	Are restored acres producing the desired habitat?	Survival checks and follow-up assessment	Survey/Cruise	Every 3-5 years	Medium	New program costs unknown	District Resource/ Timber Staffs
1f	Are riparian areas being managed to provide important corridors for biological exchange between mature forest areas?	Corridor conditions between mature forests	Observations	5 years	High		
	Are target species using the riparian areas?	Riparian Indicator Species	Samples-transects, listening stations	Annually	Medium	$20,000/Y	Resource Staff
	Are management techniques achieving the desired results and trends?	Vegetation Composition	Samples Transects	5 years	Medium	$20,000/Y	Resources Staff & Districts

APPENDIX "G": MONITORING SUMMARY TABLE (continued)

MONITORING TASK NO.	MONITORING QUESTIONS	MONITORING ITEM	METHOD OF COLLECTION	DURATION/ FREQUENCY	PRECISION/ RELIABILITY	COSTS/NEW Y OR N?	RESPONSIBILITY
	Are management techniques achieving the desired results and trends?	Vegetation Composition	Samples Transects	5 years	Medium	$20,000/Y	Resources Staff & Districts
	Are streams and corridors maintaining desired wildlife, plants, and fish populations?	Riparian zones - wildlife populations	Wildlife surveys, fish and invertebrate samples, water quality samples	Annually	Medium	$10,000-$20,000	Resources Staff & Districts
1g	Are fire dependent ecosystems being managed to maintain, improve, or restore the desired ecological processes?						
	Is frequency and timing of burning sufficient to achieve desired results?						
	Are vegetative species and conditions acceptable and meeting the desired conditions?	Establish regeneration, brown spot control, composition of longleaf stands	Plantation survival checks	Annually	High		Timber
1h	Are non-public lands being acquired to enhance important resources or consolidate lands for important ecosystems?	Land tract characteristics	Landscape components and geographic analysis.	Annually	High		
	To the extent funding and private lands are available, are lands being acquired as needed to meet program objectives?	Purchased land tracts.	Tract's characteristics to program objective.	Annually	High	Negligible	Lands
2a	Is a balance of dispersed and developed recreation opportunities from low scale development to upper scale development being provided within public demand?	Range of recreation experiences - survey, summary	Public meetings/ listening sessions, letters, scoping, personal contacts, recreation site registration, etc	On-going	Medium/Medium	$20,000	

APPENDIX "G": MONITORING SUMMARY TABLE (*continued*)

MONITORING TASK NO.	MONITORING QUESTIONS	MONITORING ITEM	METHOD OF COLLECTION	DURATION/ FREQUENCY	PRECISION/ RELIABILITY	COSTS/NEW Y OR N?	RESPONSIBILITY
2b	Are management activities meeting the VQO?	Project Activities	Comparison to VQO standards	Annually	High		
	Have actions accomplished the intended need and met mitigation standards?	Visual quality objective	Site evaluations	Annually	Medium		
	Is the form, line, color, and texture of activities meeting acceptable design quality?	Review of proposed activities and on the ground visual check	Review on the ground actions, look at on-going timber sales, road projects, or other ground disturbing activities	On-going	High	$35,000/?	
2c	*Are openings and harvesting activities performed to enhance scenic quality?*	*Water quality, vegetation or wildlife damage, user complaints.*	*Establish monitoring stations, visual, soils measurement correspondence.*	*Ongoing*	*Medium/Medium*	$20,000/?	
2d	Do projects plans adequately consider other resources and minimize conflicts with other users?	Project Plans	Review Project Plan narrative and mitigation measures On-going	High			
	Is unacceptable damage occurring to the resources?	*Trail and area conditions*	*Field observations*	*Annually*	High		
	Are there unacceptable conflicts with other users?	Corridor management plans, recreation area vegetation management plan.	Field review, review of law enforcement reports and letters	On-going	High/High	$10,000/?	Landscape Architect and/or ORA
2e	Are significant archeological and historical sites being identified through the completion of inventories conducted according to the Forest Heritage Resource Plan?						

APPENDIX "G": MONITORING SUMMARY TABLE (continued)

MONITORING TASK NO.	MONITORING QUESTIONS	MONITORING ITEM	METHOD OF COLLECTION	DURATION/ FREQUENCY	PRECISION/ RELIABILITY	COSTS/NEW Y OR N?	RESPONSIBILITY
	Are significant heritage resources being protected from adverse impacts due to the project implementation, vandalism, and natural forces?	Protection of significant archeological and historical sites	Site visits and assessments before and after project implementation.	Annually	High/High	$5,000 per site/?	Zone/Forest Archeologists
	Is application of the Forest Heritage Management Plan and research design resulting in the identification of significant heritage resources prior to project implementation?	Identification and evaluation of archeological and historical sites	Archival searches, field surveys, site evaluations based on research designs developed in accordance with Forest Heritage Plan and Northeast Texas Preservation Plan.	Annually	High/High	$25,000 per site/?	Zone/Forest Archeologists
	Are heritage resources being properly identified, protected, and interpreted at selected important sites?	Heritage sites	Review of site managements.	Annually	High		
2f	Is law enforcement provided at sufficient levels for visitor protection, enforcement of resource regulations, and facility protection?						
	Are safety and maintenance items noted in inspections of Administrative Facilities being accomplished?	Administrative sites	Inspection	Annually	High/High	$8,000/N	Engineering
	Are dams operated and maintained in accordance with the Dams Operation and Maintenance Plan?	Dams	Inspection	3 years	High/High	$1,000/N	Engineering
	Are trails maintained to the standards planned in the annual maintenance planning process?	Trails	Inspection	Annually	Medium/Medium	$5,000/N	Recreation/ Engineering