FINAL REPORT

As Required By

THE ENDANGERED SPECIES PROGRAM

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ENDANGERED AND THREATENED SPECIES CONSERVATION

Project E041: Red-cockaded Woodpecker Colony Survey and Management

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FINAL REPORT

State: Texas Grant Number: E-1

Grant Title: Endangered and Threatened Species Conservation

Project Title: Red-cockaded Woodpecker Colony Survey and Management

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ABSTRACT

The Red-cockaded Woodpecker Colony Survey and Management Project began September 1, 1989, and formally concluded on August 31, 1997. During the span of the project Department personnel and contractors provided survey and management for Red-cockaded Woodpecker (RCW) groups on private and state lands, and ultimately worked with representatives from the RCW management community at all levels to draft a *Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods* (RCW HCP). The RCW HCP was ultimately approved by the U. S. Fish & Wildlife Service, and a Section 10 (a)(1)(B) Permit was issued by the Service to the Texas Parks and Wildlife Department and the Texas Forest Service on March 6, 1998.

SECTION 6 FINAL REPORT

State: Texas
Project Number: E041
Project Title: Red-cockaded Woodpecker Colony Survey and Management
Project Period: September 1, 1989, through August 31, 1997
Principal Investigators: Ricky W. Maxey, M. Melissa Parker, Margaret A. Horner, Lee Ann Johnson Linam, and Brent Ortego
Final Report Prepared By: Ricky W. Maxey

I. OBJECTIVES

Project Objectives:

A. Initial Objective (09/88 - 08/90): Coordinate and perform site management practices on state and private forest lands to increase the longevity of active Red-cockaded Woodpecker (*Picoides borealis*) colonies (present term is clusters).

B. Interim Objective (09/90 - 08/95): To gather specific Red -cockaded Woodpecker (RCW) habitat Information on clusters identified in previous segments. To implement specific management practices on the above clusters for RCW protection, consistent with the recovery plan and recent research.

C. Final Objective (09/95 - 08/97): Develop a habitat conservation plan for the RCW on private lands in eastern Texas.

Segment Objectives:

1. Coordinate and perform site management practices on Department lands to increase the longevity of active RCW clusters.

2. Coordinate and perform site management practices on private forest lands to increase the longevity of active RCW clusters.

3. Complete assessment of RCW cluster status on the Jones and Fairchild State Forests.

4. Identify RCW habitat with a potential to serve as a corridor connecting three RCW populations in Montgomery County.

5. Identify and survey RCW habitat on private lands with landowner permission.

6. Produce an RCW management brochure to provide information for private landowners.

7. Monument and map RCW trees on the Cook's Branch property. Obtain population estimate for Cook's Branch Property. Produce a GIS map depicting land use alternatives for the long-term conservation of RCWs on Cook's Branch

8. Draft a regional habitat conservation plan (HCP, see Appendix A) for RCWs in east Texas in which the Woodland's Corporation can participate.

9. Hold scoping meetings to develop a strategy for conservation of RCW on private lands in the pineywoods in eastern Texas.

10. Form Steering Committee (see Apprndix A) composed of representatives of state government, federal government, forest industry, environmental groups and private landowners to participate in process to develop a Habitat Conservation Plan (HCP) in eastern Texas.

11. Form a Scientific Advisory Board (see Appendix A) composed of knowledgeable professionals and university academicians to ensure that HCP is developed utilizing the best science concerning RCW biology and management.

12. Develop HCP and its Environmental Assessment to be submitted to the Service for review and approval.

13. Work with TFS and private landowners to implement the RCW HCP with the following goals: contribute to the overall recovery of the RCW population in Texas, contribute to the overall conservation efforts for endemic southern pine ecosystems (longleaf and shortleaf being most at-risk) in the Pineywoods of eastern Texas, and ensure that significant amounts of mature pine systems exist with characteristics necessary for utilization by RCW.

II. JUSTIFICATION

The RCW was first listed as an endangered species on October 10, 1970. Since that time there has been a tremendous amount of research on its biology, habitat and management requirements. The Service published two recovery plans for the RCW (USFWS 1979 and 1985), and is currently drafting a third recovery plan. The Service also produced and maintains a publication entitled *A Current Bibliographic Resource for the Red-cockaded Woodpecker* (USFWS 1996), which outlines over 772 publications on the RCW, its biology, habitat and management needs. A great deal of information is known about the RCW, but there is still a significant amount of information about these interesting creatures and their management that is not known.

The RCW evolved in, and is a "keystone" species for, mature upland "park-like" pine forests of the southeastern United States. These upland pine forests were fire-disclimax forests which required periodic fire events to maintain their pine overstories with understories composed primarily of grasses and herbaceous plants. These upland pine forests included longleaf pine forest types that have long been recognized by the Natural Heritage Program as major vegetative communities in need of conservation. Management of RCW habitat is ecosystem management for these upland pine fire-disclimax communities which also provide habitat for several rare species including Bachman's sparrow (*Aimophila aestivalis)*, Henslow's sparrow *(Passerherbulus henslowii)*, scarlet snake (*Cemophora coccinea)*, Louisiana pine snake (*Pituophis melanoleucus ruthveni*), Texas trailing-phlox (*Phlox nivalis ssp. texensis)* and Navasota ladies'-tresses (*Spiranthes parksii).*

Major RCW population declines in the past resulted from extensive timber harvesting throughout the South and loss of old growth pines that serve as cavity trees (USFWS 1985). Valid data for RCW populations on National Forest lands in eastern Texas studied by the Southern Forest Experiment Station suggested that a primary reason for RCW decline was hardwood midstory encroachment in cluster (formerly colony) areas resulting from a lack of frequent prescribed fire (Conner and Rudolph 1989). RCW do not tolerate the presence of hardwood trees well, particularly in the immediate vicinity of the group of pines that form the cluster (Conner and O'Halloran 1987). In addition, statistical analyses indicated that cluster isolation was another reason for the decline in RCW (Conner and Rudolph 1989).

The bonanza era of timber harvesting in Texas occurred between 1880 to 1930 (Maxwell and Baker 1983). This boom era of Texas lumbering ended around 1924 when timber supplies were exhausted and many large mills closed (McWilliams and Lord 1988). The forests that occur in the region today, and their spatial arrangement, are not necessarily representative of what occurred here historically. How RCW survived the 50 years of bonanza era harvesting is unknown. The ages of many existing RCW cavity trees today indicate that not all pines were cut during the initial harvest of virgin timber (Conner and O'Halloran 1987). Longer rotation ages and conservation practices on National Forest lands in Texas and throughout the south are the major reasons why RCW are more abundant on National Forest lands than on private lands today.

The demand for southern pine timber today is high, and it is being harvested on commercial and private forest lands at a phenomenal rate. This high demand has resulted in current harvesting of timber at much shorter rotation ages which results in fewer trees suitable for utilization by RCW. In addition, societal demands upon open space by the ever-growing human population have resulted in a decreasing land base dedicated to production of timber. Both of these forces, combined with long-term fire suppression, have result in significant loss of both quantity and quality of habitat utilized by RCW for nesting and foraging.

Although the bulk of currently active RCW clusters exist on National Forest lands in Texas, there is still a significant need for conservation strategies for RCW nesting and foraging habitat on private lands in Texas. The land ownership patterns of National Forests are not contiguous blocks of land, they are blocks of varying sizes interspersed with similar sized blocks of private land. The RCW utilize these blocks without regard for ownership; they utilize them with regard for habitat quality. Because of a real or perceived fear of loss of control of their property, private landowners may take actions or make management decisions that render their lands as unsuitable habitat for RCW. In addition to that, there are landowners that have converted their lands to other non-forest uses in order to eliminate the potential for occupation by RCW.

Recovery of the bird is not likely to take place primarily on private lands, but those lands interspersed within National Forest lands containing active clusters or foraging habitat become very important. The designated recovery population in Texas occurs on the Sam Houston National Forest, with other significant populations occurring on the Angelina, Davy Crockett and Sabine National Forests, and on the W. Goodrich Jones State Forest. A conservation strategy, like the "safe harbor" strategy contained in the *Regional Habitat Conservation Plan for RCW on Private Lands in the East Texas Pineywoods* (see Appendix A) will hopefully allow management of existing RCW clusters on private lands while removing the disincentive, real or perceived, to produce forest habitat suitable for occupation by RCW.

III. PROCEDURES

The following section addresses each of the segment objectives, previously outlined in section I, by providing a description of procedures or actions taken to address each objective. Results from these procedures, if they contain different information, will be presented in Section IV.

Objective 1: Coordinate and perform site management practices on Department lands to increase the longevity of active RCW clusters.

Time Period from September 1, 1989, through August 31, 1990

Huntsville State Fish Hatchery - A 0.1 acre southern pine beetle (*Dendroctonus frontalis*) infestation was controlled in September, by cutting and spraying infested trees with an insecticide (Dursban) and applying a buffer of chemical repellant (Verbanone) around the edge of the infestation. The infestation started in an RCW cavity tree which was dead by October. The RCW roosting in this tree continued to do so until February. The hatchery area was inspected during spring and summer of for further beetle infestations. Only one spot containing three trees was detected, and it didn't require treatment.

The proposed lake basin at the fish hatchery was cleared of pine trees and remaining pine stands were thinned to a pine basal area of about 80 square feet per acre during December, and January. All cut timber was removed from the property, except trees felled, cut into 16-foot lengths, and left on the ground at: (1) the 15 acre northeastern corner because of lack of vehicle access, and (2) 5.5 acres in 5 sites because of restrictions imposed by staff archaeologists.

Hardwood midstory and canopy trees identified for control in the management plan for the site were injected with Velpar-L (hexazenone) during March.

RCW were monitored each quarter. Three adults and a subadult female remained in the group until March, when the subadult female dispersed. The group successfully nested in May, and fledged at least two young in June. During the last survey in August, five RCW were still in the group.

Objective 2: Coordinate and perform site management practices on private forest lands to increase the longevity of active RCW colonies.

Time Period from September 1, 1989, through August 31, 1991

The Department met with two landowners to plan projects for midstory control in RCW colonies on their properties. Highest priority management needs at both sites were midstory control.. Both landowners were shown examples of appropriate midstory control on nearby National Forest property. A contract was approved with one landowner to conduct midstory control on a 17-acre RCW cluster site during Texas FY 1991. Two enlarged RCW cavities were repaired with cavity restrictors on one private site, and RCW continued to use those cavities.

In August, 1991, the Department contracted with TFS to perform hardwood midstory reduction on 24 acres of old-growth longleaf pine located on Longleaf Trail, a public use facility in Polk County, Texas, owned by Champion Paper Company (Champion). All hardwood up to 10 inches in diameter (dbh) was felled. RCW cavity trees were marked, and care was taken to avoid damage to cavity trees. All cut trees were hauled at least 50 feet from each cavity tree.

The Longleaf Trail Tract supported two RCW groups in 1969, but only supports one group at present (Ortego, pers. comm). The suitability of this site as RCW habitat had deteriorated over time due to hardwood midstory encroachment. This work was performed for Champion to serve as a demonstration site for the company, as well as to visitors utilizing the trail, for RCW management and longleaf pine forest restoration.

Objective 3: Finish assessment of RCW colony status on the Jones and Fairchild State Forests.

Time Period from September 1, 1990, through August 31, 1991

The W. Goodrich Jones State Forest (Jones) is located in Montgomery County, Texas. It is a contiguous forest of approximately 1,600 acres and is located just south of Conroe, Texas (Figure 1). The I. D. Fairchild State Forest (Fairchild) is located in Cherokee County, Texas, and is composed of several tracts located both west and east of Maydelle, Texas. Total Acreage of the Fairchild is approximately 2,700 acres. Stand ages range from 58 to 100 years on the Fairchild (Table 1). Both the Jones and Fairchild are managed by the Texas Forest Service (TFS).

In 1990 the TFS began to intensively monitor RCW activity on the Jones. Field personnel made special efforts during the breeding season to visit cluster sites, attempting to locate nest trees and observe other signs of reproductive activity, such as parents feeding young. Cavity tree activity (new starts, abandonment, etc.,) was also noted. Analyses of RCW group and individual numbers was based upon behavioral and reproductive observations. Behavioral observations in the Fairchild State Forest were less intensive, with more conclusions based upon cavity tree activity.

In 1990 the Department contracted Dr. Robert Benson of Texas A&M University to perform a status survey of RCW on the Jones and Fairchild. Initially, an experienced team of observers was deployed to search for, locate and map all active and inactive cavity trees. Status (active vs. inactive) of cavity trees was determined by presence or absence of active resin wells, including sap flow and bark color. Enlarged cavities which still exhibited resin flow were classified as active.

Next, a large number of trained observers was placed in the field to observe each cavity tree from mid-afternoon until dark during June and July, 1990. The objective was to determine which active cavities were being used for roosting and to estimate the total number of birds in various clans. All sightings of RCW were recorded, including notes about time and direction of movement. Those data were compiled into timing tables in chronological order, allowing identification of movement patterns for individual birds. Birds were also observed going into a cavity to roost. These activity patterns were used to estimate the total RCW population. The roost sites were plotted on maps of cavity trees. The spatial clustering was used to estimate numbers of territories and propose cluster boundaries, following separation distanced proposed by Conner and Rudolph (1989).

An Analysis of availability of foraging habitat and habitat fragmentation was also begun for the Jones. Stand characteristics were overlayed on cluster maps, along with definintion of the 1,200 meter foraging zone. An aerial color video was taken of the forest to determine fragmentation.

Objective 4: Identify RCW habitat with a potential to serve as a corridor connecting thee RCW populations in Montgomery County.

Time Period from September 1, 1990, through August 31, 1992

Initial work on this objective was begun on September 1, 1990, to identify an RCW habitat corridor in Mongomery County, Texas. Aerial photographs were obtained, and photo-interpretation of habitats was begun. A search of current literature and other recent records of RCW in east Texas, especially Montgomery County was conducted. An evaluation procedure for potential RCW habitat was developed.

Photo-interpretation of the Woodlands at Cook's Branch and surrounding properties was completed and field checked. The photo overlays were digitized into GIS, then plotted at 1:24,000 scale. The 1:24,000 cover map was used to produce a mylar overlay of cover types to fit over a 7.5 minute topographic map. This method was used for the entire corridor.

Land ownership information was obtained at the Montgomery County Tax Appraisal Office in Conroe. Due to copyrights, reproduction of landowner maps cannot be made. Maps can be bought, but are cost-prohibitive. Due to these constraints, pertinent tracts were hand-traced. The area containing and surrounding the Woodlands at Cook's Branch was traced, entered into GIS, and reproduced on a mylar overlay at 1:24,000. Other sections, deemed pertinent, were traced by habitat analysis.

Aerial photographs for the rest of the Montgomery County corridor zone arrived in mid-October. These photographs were used to roughly outline the preferred corridor 1 location by habitat Habitat mapping was then begun on the photos beginning at the Jones State Forest.

A list of known RCW sites on private land was compiled in Quattro Pro using data from Texas Natural Heritage and communication with Brent Ortego. The preliminary list contained 71 sites with a 1,2 or 3 ranking based on presence of active and inactive cavity trees and verification by Department personnel. There wer 39 priority 1 sites (those with active trees), 12 priority 2 sites (inactive or not verified by Department personnel), and 20 priority 3 sites (cavity trees no longer found)

Documentation of sites was begun, starting with clusters in the Woodland's at Cook's Branch. Two cluster sites on the Cook' Branch property were documented. A cluster site and nearby longleaf pine site were also documented in Hardin County.

Objective 5: Identify and survey RCW habitat on private lands with landowner permission.

Time Period from September 1, 1990 through August 31, 1992

Trip taken on September 17, 1991, to the Woodlands at Cook's Branch. This trip was to meet Joe Mock, Ranch Manager, and become familiar with the property. Two areas with cavity trees were examined.

Trip taken on October 2, 1991, by Department and Service personnel to document reported cavity tree. Property was 150 acres on Lake Livingston between Coldspring and Pointblank, Texas. The property owner was present. The suspect cavity tree had a number of pileated woodpecker feeding holes. One hole was of the right size and shape to have been made by an RCW. However, there was little resin flow and no resin wells evident. Basal area was high with a heavy hardwood component. Midstory was dense. No other indications of RCW were found on the property after several hours of searching.

Trip taken on October 25, and 26, 1991, to Cook's Branch. Most of time was spent with TNC Board members, but there was time for some field work. Area near south border of property was surveyed. An unreported cavity tree was found. Performed field verification of aerial photographs on 30 points.

Trip taken on November 20, 1991, to Cook's Branch. Finished field verification of aerial photos for this section. Documented cluster site on Old Kurth Place.

Trip taken on November 21, and 22, 1991, to Hardin County. Toured Sandylands Sanctuary west of Silsbee. Discussed management of longleaf pine with Ike McWhorter, East Texas Land Steward for TNC. Documented one cluster site and one longleaf pine stand north of Silsbee with Mr. McWhorter.

Objective 6: Produce an RCW management brochure to provide information to private landowners.

Time Period from September 1, 1993, through August 31, 1994

A brochure entitled *The Woodpeckers of the Pineywoods*, was completed. The brochure featured the nine species of woodpeckers endemic to eastern Texas. This brochure should reduce the amount of erroneous calls reporting RCW by the general public. The brochure provided another tool for Department personnel, and others working with RCW, to provide information to the public concerning RCW and the other eight endemic woodpeckers.

Objective 7: Monument and map RCW trees on the Cook's Branch property (Cook's Branch). Obtain population estimate for Cook's Branch. Produce a GIS map depicting land use alternatives for the long-term conservation of RCWs on Cook's Branch.

Time Period from September 1, 1993, through August 31, 1995

A global positioning unit was used to document the location of each monumented tree. With this information, a map showing the location of RCW cavity trees, vegetative cover, and soil type was prepared and presented to the Mitchell's Ranch Managers (Figures 2a, 2b and 2c).

Twenty-two RCWs were counted in pre-breeding 1995 roost checks, and additional cavity trees were added to the GIS maps using a GPS unit.

Objectives 8 through 13.

Following is a summary of the events that took place which ultimately led to completion of the *Regional Habitat Conservation Plan for Red-cockaded Woodpecker in the East Texas Pineywoods*. A copy of the final plan is attached in Appendix .

Segment Objectives

- Draft a regional habitat conservation plan (HCP) for RCWs in east Texas in which the Woodland's Corporation can participate.

- Hold scoping meetings to develop a strategy for conservation of RCW on private lands in the Pineywoods of eastern Texas.

- Form Steering Committee composed of representatives of state government, federal government, forest industry, environmental groups and private landowners to participate in process to develop a Habitat Conservation Plan (HCP) in eastern Texas.

- Form a Scientific Advisory Board composed of knowledgeable professionals and university academicians to ensure that HCP is developed utilizing the best science concerning RCW biology and management.

- Develop HCP and its Environmental Assessment to be submitted to the Service for review and approval.

- Work with TFS and private landowners to implement the RCW HCP with the following goals: contribute to the overall recovery of the RCW population in Texas, contribute to the overall conservation efforts for endemic southern pine ecosystems (longleaf and shortleaf being most at-risk) in the Pineywoods of eastern Texas, and

ensure that significant amounts of mature pine systems exist with characteristics necessary for utilization by RCW.

Summary of Events

Time Period from September 1, 1993, through August 31, 1994

In a meeting with the Woodlands Corporation, the Service, and the Department, the corridor initiative was presented. A letter to the Woodlands Corporation following the meeting elicited a favorable response from the corporatioin for drafting an HCP for an RCW corridor. Upon receiving this news, an extensive literature search was conducted to gather information on the HCP process.

Time Period from September 1, 1994, through Present

Following is a timeline of activities and events, involving Department personnel, which have occurred in the development of a Habitat Conservation Plan for RCW in the Pineywoods of Texas (adapted from Consultation History in Biological Opinion on RCW HCP for Texas, USFWS).

OCTOBER, 1994: Many participants expressed the desire to develop a strategy to address RCWs on private land in the context of species recovery at an annual RCW meeting hosted by the U. S. Forest Service (USFS).

FEBRUARY, 1995: The Department, the TFS and the Service hosted a meeting specifically to address the RCW conservation needs on private land and to highlight the need for a multi-party effort to recover this species in Texas.

JUNE, 1995: TPWD/TFS hosted an HCP development scoping meeting. At this meeting a steering committee was formed to develop a plan for east Texas with representatives from the Service, Department, TFS, USFS, Texas Forestry Association (TFA), International Paper, Louisiana Pacific, Temple-Inland, Champion International, The Woodlands Corporation, Big Thicket National Preserve, the Houston Audubon Society and non-industrial private landowners. Additionally, a scientific advisory board was formed with representative from agencies, local universities, and others with experience with RCW in east Texas. Prior to the first steering committee meeting, TPWD drafted a preliminary HCP based upon the USFWS "Safe Harbor" concept.

SEPTEMBER, 1995: A Steering committee meeting was conducted and the preliminary draft HCP was reviewed. The committee voted to include provisions for incidental take of isolated RCW groups in addition to the safe harbor component of the preliminary draft HCP.

NOVEMBER, 1995 A revised draft HCP with two separate components (safe harbor and incidental take of isolated groups) was distributed to steering committee and scientific advisory board members.

MARCH, 1996: Based upon consideration of all prior input, a third draft RCW HCP was distributed for review and comment.

MAY, 1996: A combined steering committee and scientific advisory board meeting was conducted to discuss the HCP and address the comments on the third draft HCP.

MAY, 1996: Final Draft HCP was submitted to all steering committee and scientific advisory board members for review and approval via a vote.

JULY, 1996: Review of Final Draft RCW HCP completed.

SEPTEMBER, 1996: Presentation was given to Conroe Chapter of the Society of American Foresters concerning the RCW HCP.

OCTOBER, 1996: The Department advised app participants in the HCP that the HCP had been approved (voted acceptable) with some minor revisions based upon final comments regarding demographically isolated groups.

OCTOBER, 1996: Presentation was given at the Big Thicket Science Conference in Beaumont, Texas, concerning the RCW HCP

OCTOBER, 1996: Presentation was given at the Texas Organization for Endangered Species Annual Meeting at the Pineywoods Conservation Center, Broaddus, Texas, concerning the RCW HCP.

NOVEMBER, 1996: Presentation was given at the Birdlife of Texas Conference in Austin, Texas, concerning the RCW HCP.

DECEMBER 5, 1996: The Department submitted the *Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods* (HCP), Draft Environmental Assessment (EA), and a letter requesting Endangered Species permits under Section 10 of the Endangered Species Act to Mr. Jeff Reid of the USFWS East Texas Field Office in Lufkin, Texas.

JANUARY 22, 1997: The Department and the Service met to discuss formal application package and recommended revisions of the HCP, Cooperative Agreements, etc.

JANUARY 23, 1997: Melissa Parker presented the proposed HCP at the TPWD Commission Meeting in Austin, Texas.

FEBRUARY 5, 1997: The Department sent a revised Texas RCW HCP to the Service's Lufkin Field Office.

APRIL 23, 1997: The Department published an article in the May, 1997, issue of Texas Parks and Wildlife Magazine entitled, *SOS for the RCW*.

MAY 2, 1997: Assisted Service and TFS with workshop on the RCW, and the RCW HCP for a monthly meeting of the Texas Chapter of the Association of Consulting Foresters at the Cudlipp Forestry Center, Lufkin, Texas. Gave presentation on the RCW HCP.

MAY 15-16, 1997: A training meeting for Department and TFS employees was held to advise them of the RCW HCP and provide basic RCW biology in the field. Instructors were employees of the Department, TFS, the Service, USFS, and Champion International.

MAY 20, 1997: The Service published a Notice of Availability of an Environmental Assessment and Finding of No Significant Impact, and receipt of an Application for an Incidental Take Permit for the Regional Habitat Conservation Plan for the Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods published in the Federal Register. This publication initiated the thirty day comment period.

JUNE 20, 1997: A draft copy of the Department's response to comments concerning the *SOS for the RCW* article contained in a letter to the editor of TPWD Magazine from Mr. Ned Fritz was provided to the Service's Lufkin Field Office.

JUNE 23, 1997: Received a copy of the comments received on the RCW HCP from the Service's Lufkin Field Office.

JULY 2, 1997: The Department's Endangered Species Ecologist for the Pineywoods met with Mr. Jeff Reid of the Service's Lufkin Field Office to discuss the comments received on the RCW HCP.

JULY 14, 1997: Mr. Jeff Reid of the Service's Lufkin Field Office requested assistance from the Department's Endangered Species Ecologist in responding to allegations regarding public involvement in the RCW HCP.

JULY 25, 1997: The Department's Endangered Species Ecologist provided a draft copy of a response to Mr. Jeff Reid of the Service's Lufkin Field Office concerning allegations that the Department and the Service conspired to stack the deck against the conservation community.

JULY 29, 1997: The Department held a meeting in Nacogdoches, Texas, to discuss how to proceed with the Texas RCW HCP. The applicants decided to go forward with pursuit

of a permit from the Service authorizing Safe Harbor Conservation Agreements and modify the Isolated Group Addendum based upon valid public concerns.

August 13, 1997: The Department's RCW HCP Coordinator met with the Department's Endangered Species Branch Chief regarding the Texas RCW HCP, the public comments, and the proposed plan to proceed with the safe harbor Cooperative Agreements while modifying the Isolated Group Addendum.

September 22, 1997: The Department and TFS provided correspondence requesting that the Service continue the process to issue a permit for the "Safe Harbor" portion of the RCW HCP. Additionally, the State will improve the "Isolated Group Addendum" to reflect suggestions received during the public comment period.

March 6, 1998: Service approved RCW HCP and issued Section 10 (a)(1)(B) permit to the Department and TFS. Process started to plan for high-profile combined signing ceremony/media event in the near future on the Jones State Forest near Conroe, Texas, with representatives of the Department, TFS and the Service present. Implementation of the RCW HCP has begun, but will formally begin at that time.

IV. RESULTS

Results, if different from previous discussion in Section III (Procedures), will be discussed in the following paragraphs.

Objective 1: Coordinate and perform site management practices on Department lands to increase the longevity of active RCW clusters.

See discussion in Section III, Objective 1.

Objective 2: Coordinate and perform site management practices on private forest lands to increase the longevity of active RCW clusters.

See discussion in Section III, Objective 2.

Objective 3: Complete assessment of RCW cluster status on the Jones and Fairchild State Forests.

In 1990, TFS personnel observed RCW nesting or feeding young at a total of 15 different trees on the Jones State Forest (Jones, Figure 3). Based on their assessment of cluster boundaries, they recorded nesting activity in 6 different clusters, with RCW feeding young

at 8 clusters (actually indicating nesting activity in 8 clusters). During 1991, TFS located 11 nest trees with young (Figure 4), representing 11 clusters, along with three clusters where no nesting was observed. Total cavity trees located on the Jones during 1991 was 105, of which 37 were active. TFS personnel estimate that 34 adult RCW comprising 14 groups in 1991 on the Jones. Specific notes regarding each cluster are included in Appendix B.

Benson and associates located 121 trees with evidence of past or recent RCW activity on the Jones in 1990, and determined that 87 trees were active. They observed 18 RCW go into roost trees during their observations. Their observations of movement patterns yielded a total population estimate of 28 birds comprising 2 groups with 5 birds each, 3 groups with 4 birds each, and 3 groups with 2 birds each.

Historically, up to 12 RCW clusters have been identified on the Fairchild State Forest (Fairchild, Table 2). In 1990, however, Benson and associates estimated only 5 groups comprised of 13 individual RCW, 4 groups with 3 birds, and 1 single-bird group (Figure 5). They identified 74 active cavity trees and observed 6 individuals go to roost. In 1991, TFS personnel also estimated 5 active clusters on the Fairchild, although the clusters were located differently than in the Benson study. The TFS estimate was made from observation of active signs on cavity trees, rather than actual observation of birds.

A review of stand characteristics on the Jones revealed that densities of pines were extremely high except where shelterwood regeneration cuts have taken place (Figure 6). There was nearly complete overlap of 1,200 meter zones for the RCW groups (as described by both TFS and Benson (Figure 7).

Although Benson and the TFS estimated similar total numbers of RCW on the Jones (Benson = 28, in 1990; TFS = 34, in 1991), their interpretation of group numbers varied greatly (Figure 1 vs. Figure 5). The TFS data on actual nests observed lends support to their higher estimate of group numbers (although renesting could have occurred, the TFS surveys were made during a relatively short time interval of one month). Although Benson applied accepted guidelines for delineating clusters of trees with different clusters based on distance of separation (Conner and Rudolph 1989), there seems to be evidence for unusual habitat conditions at the Jones contributing to higher than usual RCW densities. The forest supports a high density of mature pine (Table 1), and is situated in an peninsula-like landscape, with development on two sides. These factors may have contributed an increasing density of RCW over time.

The results of the two survey efforts on the Fairchild, on the other hand, would indicate a declining population over time. When the cluster localities of the two surveys are compared, however, there is significant disparity in the locations of the five clusters identified by the two survey efforts (Figures 8 and 9). It seems that more effort should be expended in identifying groups and defining cluster boundaries on the Fairchild.

Only a preliminary look has been taken at habitat fragmentation and foraging needs on the Jones. At the population currently estimated by the TFS, the state-owned land fails to provide the amount of foraging habitat, either in terms of basal area or stems greater than 10 inches dbh, recommended by the Service (1989). The high concentration of RCW on the state forest is further threatened by the extremely high densities of pine stems. Recommended basal area for RCW is 60 to 70 square feet/acre in loblolly forests (Conner and Rudolph 1989). The high densities of old pine are also vulnerable to attack by southern pine beetle (SPB) and , the Jones has in fact experienced some SPB-related tree mortality in RCW clusters recently (Ed Barron, pers. comm., 1992). A need exists to secure the future foraging needs of the Jones' RCW population during the Montgomery County Corridor Project.

Objective 4: Identify RCW habitat with a potential to serve as a corridor connecting three RCW populations in Montgomery County.

Three potential corridors were suggested as part of the original proposal (Figure 10). Upon first review of aerial photographs, the area connecting the Jones State Forest with the Woodlands (Corridor 1) in Montgomery County appeared to be the most promising due to the presence of more mature pine habitat. Corridors 2a and 2b, which connect the RCW populations in Corridor 1 to those existing on the Sam Houston National Forest, appeared to have more developed and open areas, such as pastureland, and were considered marginal RCW habitat. GIS maps were generated to delineate habitat cover types and landowner boundaries within Corridor 1 (see Attachments 11 and 12).

Objective 5: Identify and survey RCW habitat on private lands with landowner permission.

See discussion in Section III, Objective 5.

Objective 6: Produce an RCW management brochure to provide information for private landowners.

See Appendix C for copy of brochure entitled *The Woodpeckers of the Pineywoods*.

Objective 7: Monument and map RCW trees on the Cook's Branch property. Obtain population estimate for Cook's Branch property. Produce a GIS map depicting land use alternatives for the long-term conservation of RCWs on Cook's Branch.

Figures 2a, 2b and 2c contain maps generated by GIS hardware showing the location of RCW cavity trees, vegetative cover, and soil types. This information was provided to the Ranch Managers at Mitchell Ranch (Woodlands Cook's Branch property). Appendix D

contains a copy of the draft RCW Management Plan for The Woodlands at Cook's Branch.

Objectives 8 through 13: Relate specifically to the development of a regional Habitat Conservation Plan for Red-cockaded Woodpecker on private lands in eastern Texas.

See time-line in Section III, Procedures, Item Number 8-13.

The Environmental Assessment for the RCW HCP is contained in Appendix E.

LITERATURE REVIEW

Conner, R. N. and K. A. O'Halloran. 1987. Cavity-tree Selection by Red-cockaded Woodpeckers as Related to Growth Dynamics of Southern Pines. Wilson Bulletin. 99:398-412.

Conner, R. N. and D. C. Rudolph 1989. Red-cockaded Woodpecker Colony Status and Trends on the Angelina, Davy Crockett and Sabine National Forests. U. S. Forest Service, Southern Forest Experiment Station, New Orleans L ouisiana. Research Paper SO-250.

Diamond, D. D., D H. Riskind and S. L. Orzell. 1987. A Framework for Plant Community Classification and Conservation in Texas. The Texas Journal of Science. 39:203-221.

Maxey, R. W. 1997. SOS for the RCW. Texas Parks & Wildlife Magazine. Texas Parks and Wildlife Department, Austin, Texas. May, 1997. Pp 24-27.

Maxwell, R. S. and R. D. Baker. 1983 The Saw-dust Empire: The Texas Lumber Industry, 1830-1940

McWilliams, W. H. and R. G. Lord 1988. Forest Resources of East Texas. Resources Bulletin S)-136. New Orleans, Louisiana: USDA Forest Service, Southern Forest Experiment Station. 61 Pp.

Texas Parks and Wildlife Department. 1990. Performance Report. Red-cockaded Woodpecker Colony Survey and Management. Project E-1-2 and W-125-R-1, December 20, 1990.

Texas Parks and Wildlife Department 1992. Performance Report. Red-cockaded Woodpecker Colony Survey and Management. Project E-1-3. January 28, 1992.

Texas Parks and Wildlife Department 1992. Performance Report. Red-cockaded Woodpecker Colony Survey and Management. Project E-1-4. November 30, 1992.

Texas Parks and Wildlife Department. 1994. Performance Report. Red-cockaded Woodpecker Colony Survey and Management. Project E-1-6. November 30, 1994.

Texas Parks and Wildlife Department. 1996. Performance Report. Red-cockaded Woodpecker Colony Survey and Management. Project E-1-7. March 27, 1996.

Texas Parks and Wildlife Department. 1997. Performance Report. Habitat Conservation Plan for Red-cockaded Woodpeckers in the East Texas Pineywoods Region. April 16, 1997.

Texas Parks and Wildlife Department. 1997. Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Lands in the East Texas Pineywoods. Texas Parks and Wildlife Department, Austin, Texas.

Texas Parks and Wildlife Department 1997. Texas Threatened and Endangered Species. Texas Parks and Wildlife Department, Austin, Texas. PWD-LF-W3000-017 (11/97)

U. S. Fish and Wildlife Service. 1970. Listing of Red-cockaded Woodpecker as Endangered Species. Federal Register. October 13, 1970.

U. S. Fish and Wildlife Service. 1979. Red-cockaded Woodpecker Recovery Plan. U. S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia. 38 Pp.

U. S. Fish and Wildlife Service. 1985 Red-cockaded Woodpecker Recovery Plan. U. S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia. 88 Pp.

U. S. Fish and Wildlife Service. 1996 A Current Bibliographical Resource for the Red-cockaded Woodpecker. U. S. Fish and Wildlife Service, Red-cockaded Woodpecker Field Office, Clemson, South Carolina. 105 Pp.

U. S. Fish and Wildlife Service. 1998. Consultation History from Biological Opinion on the Issuance of an Incidental Take Permit Authorizing Safe Harbor Cooperative Agreements Based Upon the *Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods (Texas RCW HCP)*. U. S. Fish and Wildlife Service. Arlington Ecological Services Office, Lufkin Sub-office, Lufkin, Texas. January 22, 1998.

LIST OF APPENDICES, FIGURES AND TABLES

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APPENDIX A

REGIONAL HABITAT CONSERVATION PLAN FOR THE RED-COCKADED WOODPECKER ON PRIVATE LAND IN THE EAST TEXAS PINEYWOODS

FINAL
REGIONAL HABITAT CONSERVATION PLAN FOR THE RED-COCKADED WOODPECKER ON PRIVATE LAND IN THE EAST TEXAS PINEYWOODS

Prepared By:
Red-cockaded Woodpecker Habitat Conservation Plan Steering Committee

September 1997

(Amended September 22, 1997, to include only Safe Harbor Agreements)
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(First Draft Prepared: September, 1995)

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Antitrust Statement: *It is the policy of the East Texas RCW Steering Committee to comply with all antitrust trust laws. Participants in meetings should not discuss marketing and pricing strategies, territories, or other aspects of products traded in interstate commerce. No agreements will be made that are in constraint of such trade.*

PREFACE

This habitat conservation plan for the red-cockaded woodpecker (RCW) is intended to provide for conservation of the RCW, while offering management options for private landowners with RCWs and/or RCW habitat on their land.

The "safe harbor" program is unique because it offers landowners an incentive to provide habitat for threatened or endangered species, in advance of any specific activity that may harm the species. Conversely, standard habitat conservation plans are typically designed to offset or "mitigate" some adverse impact to endangered species. The primary objective of the "safe harbor" conservation plan is to encourage voluntary RCW habitat restoration or enhancement activities. This will be accomplished by relieving a landowner who enters into a cooperative agreement with the Texas Parks & Wildlife Department (Department)/Texas Forest Service (TFS) from any additional responsibility under the Endangered Species Act (Act), beyond that which exists at the time a landowner enters into the agreement, i.e., to provide a "safe harbor." While participating landowners will be required to protect the habitat of any active RCW clusters at the time the agreement is signed (their baseline responsibilities), they are under no obligation to protect any additional RCWs that may be attracted to the land by the habitat improvements. Participating landowners will enter into a cooperative agreement with the Department/TFS and receive a "Certificate of Inclusion" under a permit that authorizes the future removal, alteration, or elimination of any RCW groups or habitat resulting from the habitat improvements carried out under this plan (above baseline). Thus, as long as a landowner carries out the agreed upon habitat improvements and maintains his or her baseline habitat responsibilities, that landowner may develop, harvest trees upon, or make any other lawful use of the property, even if such use incidentally results in the loss of RCW habitat, and its associated RCWs. The participating landowner will be required to notify the Department and/or the TFS to give them the opportunity to relocate any woodpeckers expected to be impacted by such actions.

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SAFE HARBOR PROGRAM FOR THE RCW IN EAST TEXAS

I. Background

The western Gulf coastal plain of east Texas supports scattered populations and sub-populations of federally endangered RCW and is identified in the 1985 RCW recovery plan as 1 of the 15 populations across the species' range that must be viable to recover the species. Currently, the designated recovery population in Texas is on the Sam Houston National Forest; however, a significant portion of the land base within the proclaimed boundary of the national forest is private land which could potentially contribute to the Sam Houston National Forest recovery population. Thus, the recovery of the RCW in east Texas is likely to be influenced significantly by the land management decisions of private landowners.

In February 1995, the Department and the TFS, in coordination with the U.S. Fish and Wildlife Service (Service), hosted a meeting specifically to address RCW protection needs on private land and to highlight the need for a coordinated multi-party effort to protect this species in east Texas. A follow-up meeting was held on June 1, 1995, and a steering committee was formed to develop a plan for east Texas with representatives from the Service, Department, TFS, U.S. Forest Service, Texas Forestry Association, International Paper, Louisiana Pacific, Temple Inland. Champion International, The Woodlands Corporation, Big Thicket National Preserve, the Houston Audubon Society, and non-industrial private landowners. Additionally, a scientific advisory board was formed with representatives from agencies, local universities, and others with experience with the RCW in east Texas.

A significant component of this conservation strategy is the development of a program under Section 10 (a)(1)(B) of the Act that encourages voluntary enhancement and restoration of RCW habitat on private and certain other land in return for protection--a "safe harbor"--from any additional future liabilities under the Act.

II. Purpose and Need

The purpose of this conservation plan is to encourage and facilitate the restoration and enhancement of nesting and foraging habitat for the RCW on privately owned and city/county land in the Pineywoods Region of East Texas. There are a variety of actions that private landowners could take to provide suitable nesting or foraging habitat on their land. Such actions could result either in the use by RCWs of currently unused land parcels or in the use by greater numbers of RCWs on land parcels currently used by at least one group. Not only do landowners have little legal or economic incentive to undertake such actions at present, they actually may

brings with it a responsibility to avoid harming the species and its habitat. These responsibilities, depending on the number of RCW groups involved and the landowner's tract size and land management or land use objectives, can limit or modify a landowner's land use alternatives. To minimize these responsibilities under the Act, private landowners have generally refrained from taking the types of actions that would benefit the RCW. Some landowners may in fact be taking actions designed to reduce the likelihood that their land will be used by RCWs in the future, such as harvesting their timber sooner than they would have otherwise, allowing hardwood midstory to encroach on open pine forests, eliminating potential cavity trees, and destroying abandoned clusters (a cluster is defined as the aggregate of cavity trees [active and inactive] including a 200-foot buffer around the aggregate currently or formerly used by an RCW group).

Some east Texas landowners may be willing to implement actions that would benefit the RCW on their property if the possibility of future land use limitations can be reduced or eliminated. Such actions could include midstory removal and control through prescribed burning or mechanical manipulations, installing new RCW nesting and roosting cavities, or improving abandoned cavities through the placement of restrictors, pine tree planting and thinning, restoration of native ecosystems, and other activities.

The primary objective of this HCP is to encourage voluntary RCW habitat restoration or enhancement activities by **relieving a landowner who enters into a cooperative agreement with the Department/TFS from any additional liability for RCW under the Act beyond that which exists at the time the agreement is signed (these responsibilities, if any, are referred to in this document as "baseline" responsibilities).** In other words, the objective is to give such landowners "safe harbor" from additional responsibility. A landowner may agree to provide habitat even if he/she does not have active clusters on site at the time the agreement is signed, giving him/her a zero baseline. If RCWs were to inhabit the site after the landowner enters into the agreement, the landowner would not be required to protect them from incidental take. As long as a landowner carries out the agreed-upon habitat improvements and maintains baseline habitat responsibilities (if any) on the property, the landowner may develop, harvest trees upon, or make any other lawful use of the property, even if such use incidentally results in the loss of RCW habitat and its associated RCWs. There are only two qualifications with this program. First, RCWs may not be shot, captured, or otherwise directly "taken." Second, a participating landowner who plans to carry out an action likely to result in the incidental taking of an RCW (i.e., an action that would not be permissible, except for this plan and agreement) can do so only in the nonreproductive season (August through February) unless otherwise authorized by the Department/TFS and must give a 45-day advance notice in writing for the agencies to decide on the proper course of action. If the Department/TFS does not respond to a landowner within 45 days, the landowner may carry out the planned activities on schedule. All correspondence should be certified with return receipt to document delivery.

Thus, under the safe harbor program, participating landowners will be required to sign cooperative agreements with the Department/TFS that will identify any existing RCW baseline

responsibilities, specify proposed habitat improvements, and record the general condition of the site (i.e., through maps, photos, and biological surveys). Cooperative agreements may be for varying periods of time, subject to potential repayment obligations (discussed below) if Federal funds are involved, and shall be revocable by the landowner. A proposed cooperative agreement is included in Appendix 2. No incidental taking of any existing RCW group is contemplated or permitted under this program except in the special circumstances described below (see the section entitled "Shifting RCW Baseline Responsibilities to New Groups").

To illustrate, take the hypothetical example of a landowner who, at the time of entering into a cooperative agreement hereunder, has no active clusters on his or her land (no RCWs known within one-half mile of the property). That landowner has no existing responsibility to provide either nesting or foraging habitat on the property and thus has an RCW baseline of zero. If, after carrying out the management practices agreed upon, an RCW group is established on the property, the landowner may carry out any land use that results in the incidental taking of the group thus established without violating the Act provided prior notification of activities is provided to responsible agencies.

The RCW baseline for any participating landowner will be determined according to the Service's 1992 Draft RCW Procedures Manual for Private Lands (Costa, 1992) or any subsequent document that may be in effect at the time a landowner enters into a cooperative agreement under this plan. So long as a participating landowner's future land use practices maintain the RCW baseline established at the time the cooperative agreement was signed, any subsequent incidental taking of RCWs by the landowner will be authorized by the Section 10 (a)(1)(B) permit granted hereunder (a participating landowner will only be subject to one set of guidelines during the life of the agreement--those in effect at the time the agreement is signed).

Participating private landowners who enter into cooperative agreements with the Department/TFS, as well as their successors in interest (should they choose to become involved), will be included within the scope of the permit by Certificates of Inclusion (see Section IX, Paragraph A). A proposed Certificate of Inclusion is included in Appendix 3. In order to give assurance that voluntary habitat improvements made by the landowner do not restrict present and subsequent owners, the Department/TFS will honor the agreement until the landowner decides to terminate the agreement, or until the species is delisted.

III. Geographic Scope

The geographic scope of the conservation plan encompasses the southeastern portion of the Pineywoods Ecoregion of Texas; it generally consists of a twenty-two-county area within the Pineywoods that includes all or parts of Anderson, Angelina, Cherokee, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, Tyler, and Walker counties. The plan area boundary includes land south of US Highway 84/59 in Shelby County; south of US Highway 59 and State Highway 204 in Nacogdoches County; south of US Highway 79 in Cherokee County;

south of US Highway 79 and east of State Highway 19 in Anderson County; east of State Highway 19/ US Highway 287, east of State Highway 21, and east of the Trinity River in Houston County; south and east of State Highway 19/30 in Walker County; east of State Highway 30/90, State Highway 105, and Farm Road 1774 in Grimes County; east of State Highway 149 in Montgomery County, north of Farm Road 2920, east of Interstate Highway 45, and north of Farm Road 1960 in Harris County; north of US Highway 90 in Liberty County; north of US Highway 90 and Interstate Highway 10 in Jefferson County; and north of Interstate Highway 10 in Orange County. The eastern boundary will be east of the Sabine River in Orange, Newton, Sabine, and Shelby Counties (see map in Appendix 4). Within this specific plan area, lands potentially eligible for inclusion in the conservation plan include all privately owned lands and public lands owned by cities, counties, and municipalities. In short, essentially all land within the designated geographic area other than Federal land and State Lands are potentially eligible for inclusion in the plan. Priority will be placed on securing cooperative agreements with landowners where the land has the potential to benefit the RCW, particularly land with abandoned or inactive clusters, especially when these lands occur near the National Forests.

IV. Impacts Likely to Result from the Proposed Taking

Although incidental taking of RCWs is to be authorized as part of the safe harbor program, it is important to note that such taking may or may not necessarily occur. The expectation underlying this program is that the management measures to be undertaken on participating land will result in the use of some or most of the land by RCWs and that without those measures such land will not otherwise be utilized by RCWs. While landowners will be permitted under this program to carry out activities that could result in the incidental taking of RCWs on their land, they may choose not to do so at all or not to do so for many decades.

Because the landowner agreements contemplated for the program are of limited duration and are revocable by the participating landowners, the program's benefits for the RCW may appear quite transitory. However, the favorable habitat conditions created through the program will not necessarily cease to exist upon expiration or termination of the individual agreements. Those conditions may persist for many years thereafter, unless the affected landowner elects to eliminate them. If the program continues for an extended period of time (e.g., for 99 years), with new land parcels constantly coming under agreement as agreements covering other land parcels expire, the net effect will be a shifting matrix of land being managed for RCW conservation, with a net beneficial impact upon the status quo. In addition, feasibility studies are being conducted to determine what, if any, economic benefits to the landowner can be implemented.

Even if all the landowners who participate in the program eventually drop out, their responsibility to maintain their RCW baseline will mean, at the very least, a return to the same circumstances that would have existed without the plan. Even in this worst-case scenario, the program will have had the potential to provide interim benefits in the form of population and

demographic maintenance throughout its duration. Such benefits would include temporarily halting or reversing the fragmentation of overall RCW habitat, creating or strengthening dispersal corridors between subpopulations, contributing some offspring that may either reoccupy previously abandoned clusters or that may be used for relocation to land protected by longer-term conservation arrangements and providing a form of "insurance" against the possibility of a disastrous event that could significantly reduce the number of RCWs on public land in east Texas. In short, it will have provided a hiatus in the long-term decline of the Pineywoods RCW population and thereby will have "bought time" for other conservation strategies to be tested or implemented.

V. Measures to Monitor, Minimize, and Mitigate Negative Impacts

All participating landowners will sign cooperative agreements with the Department/TFS. Such agreements will include a description of the property to which the agreement applies and an explanation of the landowner's RCW baseline responsibilities toward RCWs on or near the property. The agreement will also describe the actions that the landowner commits to implement to improve RCW habitat on the property and the time period within which those actions will be taken and maintained. The agreement will also grant to the Department/TFS, after notifying and securing permission from the landowner, the right to enter onto the property for the purpose of ascertaining compliance with the agreement and for censusing, banding, and in certain circumstances, translocating RCWs. In return for the landowner's commitments, the agreement will extend to the landowner the benefit and protection of "safe harbor" through a "certificate of inclusion" under the Section 10(a)(1)(B) permit issued by the Service to the Department and the TFS.

The certificate of inclusion extends to the participating landowner the right under the Section 10 (a)(1)(B) permit to incidentally take (i.e., defined by the Act as take that is incidental to, and not the purpose of, otherwise lawful activities) RCWs on the described property, so long as the RCW baseline responsibilities applicable to the property as clearly stated in the cooperative agreement, are maintained. Subject to maintenance of RCW baseline responsibilities, a participating landowner may (except in and around the cavity trees during the RCW reproductive season from March to July 31, unless otherwise authorized by the Department/TFS), remove trees as part of a timber harvest operation or a conversion to nonforest use, where such tree removal is expected to impact the RCW(s) on the described land. A provision to allowing incidental take is that the Department/ TFS be notified 45 days in advance of such tree removal to allow translocation of effected RCW.

> The above restriction against tree removal during the reproductive season is intended to minimize the impact of the authorized incidental taking by eliminating the possibility that reproductive efforts will be disrupted and nestlings destroyed. Additionally, the participating landowner's duty to notify the TFS or the Department in advance of activities likely to result in the loss of active clusters and the permittee's right to capture

and relocate the affected birds are also intended to mitigate the impact of the authorized incidental taking.

This habitat conservation plan will incorporate adaptive management strategies, which will allow for modification to the mitigation strategy as new information is obtained. If new strategies are incorporated (such as a new technique for installing inserts or new thoughts on insert placement), they will only be applied to new participants, while landowners who joined the program before the new technique will not be required to make any changes. They would, of course, be more than welcome to incorporate the changes on a voluntary basis.

In assessing the impact of the authorized incidental taking in the safe harbor program, it is important to emphasize that the only RCW habitat that will be authorized to be eliminated is habitat that would almost certainly not be utilized by RCWs but for the voluntary participation by the landowner in the "safe harbor" program described here. Unlike most other programs within habitat conservation plans, where some loss of existing habitat is authorized in return for the protection of other existing habitat, no loss of existing RCW groups (i.e., occupied habitat) is to be allowed as part of this safe harbor program. Thus, the net impact of the incidental taking authorized under this program is, at the very least, a return to the status quo ante or "baseline". The more likely net impact is an improvement over the current situation in terms of the number of RCW groups and the total area of suitable, actively managed nesting and foraging habitat in the designated geographic area.

Monitoring of incidental take and implementation of the program will be the responsibility of the Department/TFS. As noted above, the cooperative agreements signed by participating landowners will grant to the permittees (i.e. the Department and/or the TFS) the right to enter onto the property for the purpose of ascertaining compliance with the agreement. **Under no circumstances will personnel from either agency enter a landowner's property without prior notification and written permission.** RCW populations in the eastern Texas Pineywoods have been well-studied, with significant, longstanding monitoring and research efforts by the US Forest Service Southern Research Station, the Texas Parks and Wildlife Department, Stephen F. Austin State University, Texas A&M University, and others. The location and status of most RCW clusters in the Pineywoods are already known and have been monitored for many years. These established efforts provide a significant source of information about the location and status of RCW groups throughout the Pineywoods and thereby provide a means of periodically assessing the effect of the program on a population level.

VI. Funding

The implementation of this plan will require the full time duties of a qualified individual to provide technical assistance to landowners, write cooperative agreements, identify suitable relocation sites, and move birds. The absence of such funds may limit the size and scope of the

plan. However, it will not preclude the implementation of this conservation plan for the following reasons:

(1) the Texas Forest Service Staff Forester, the Department's Endangered Species Ecologist, and the Service's East Texas Endangered Species Biologist with existing funds, will contact landowners to determine whether there is interest in the program and will be responsible for monitoring compliance of any cooperative agreements signed with landowners; both the Department and the TFS will sign the cooperative agreements, so that each agency will have a record of all agreements with private landowners. The Department will be responsible for housing original copies and will maintain all records of participation.

(2) some landowners may be willing to enter the program without funding assistance.

(3) there are several existing funding opportunities to assist landowners. These options are further detailed below.

In some situations, landowners may be willing to participate only if part or all of the management costs are paid for by others. This may be the case where the costs of the management measures are more substantial, such as when significant hardwood midstory is to be removed. Funding from at least three existing sources may be available for such landowners. One source is the Service's Partners for Wildlife program, through which cost-sharing assistance is available to carry out habitat and other wildlife improvements on private land. A second potential program is the Texas Forest Service's Forest Stewardship Incentives program. This program, available to nonindustrial private forest landowners with less than 1,000 acres (up to 5,000 acres in certain circumstances), provides cost-sharing assistance for management actions described in forest stewardship plans. Conserving endangered species is one of the purposes for such plans. A third source may include the new Wildlife Habitat Incentives Program (WHIP) created by the 1996 Farm Bill. The Farm Bill makes $50 million available for WHIP implementation during the period of 1996-2002. The WHIP program is to be implemented through the Natural Resource Conservation Service and is to "make cost-share payments to landowners to develop upland wildlife, wetland wildlife, threatened and endangered species, fish, and other types of wildlife approved by the Secretary." Under these programs, participating landowners are typically required to maintain the agreed-upon actions for 10 years and are required to repay the government its costs in the event they fail to do so. Should funds be available specifically for the "Safe Harbor" program, the Service would require repayment obligations comparable to those of the Partners for Wildlife and Stewardship Incentives Programs in the event of noncompliance by participating landowners.

Finally, other financial incentives are available through private organizations (e.g., The Nature Conservancy's Pineywood's Conservation Initiative) which can purchase conservation easements for exceptional habitat. These private organizations and several state agencies (e.g., the Texas

Forest Service and the Department) and Federal agencies may also provide either funding or management assistance (e.g., assistance with prescribed burning).

VII. Unforeseen Circumstances

This section addresses the implications of several hypothetical situations that occur relating to the RCW population and the implementation of this plan. The situations include the follows:

(A). A major loss of RCWs on public land in east Texas as a result of a catastrophic event.

(B). A redistribution of RCW groups in east Texas without any net increase in the number of those groups.

(C). A loss of groups upon which a participating landowner's RCW baseline responsibilities were calculated.

(D). How RCW groups that are established as a result of this program will be counted toward the recovery objectives for the east Texas RCW population.

(E). How the HCP will support the Department of the Interior's "No Surprises Policy."

A. Major Loss of RCWs on Public Land in the east Texas Pineywoods Ecoregion

The assumption underlying this conservation program is that it will provide significant benefits to the RCW in the Pineywoods ecoregion. even though on any given parcel of land those benefits may not be permanent or even long term. The expectation is that, even with this program, the bulk of the Texas RCW population will remain on public land, specifically on the Sabine, Angelina, Davy Crockett, and Sam Houston National Forests. It is conceivable, though unlikely, that as a result of a disastrous event (e.g., Hurricane Hugo's impact on RCWs at the Francis Marion National Forest in South Carolina), RCWs on the National Forests in Texas could be so significantly reduced in numbers that the RCWs found on private land would become far more important to the future of the population than they were thought to have been previously.

If a situation such as that described above were to arise, the terms of the permit and conservation plan would preclude the imposition upon participating landowners of a duty to maintain habitat beyond their RCW baseline responsibilities. It would be the Department/TFS responsibility, in such circumstances, to use other means of ensuring the conservation of the RCW, which may include acquisition of conservation easements or fee title interests and the renegotiation of cooperative agreements with a willing landowner so as to give additional protection to the RCWs on the participating land. This is consistent with the Service's "No Surprises" policy with respect to habitat conservation plans. Moreover, it should be recognized that without the conservation plan

described here, the consequences of the hypothesized disastrous event would be even more dire for the RCW in east Texas. Indeed, without the conservation plan, the pool of additional RCWs this program is expected to create would not exist.

B. Redistribution of Existing RCW Groups without Net Gain

Although the purpose and expectation of this program is to increase the number of RCW groups in east Texas, it is conceivable that it will simply redistribute existing groups in a new configuration. This could occur if the habitat restoration undertaken as part of the program were to induce birds in existing clusters located in nearby degraded habitat to abandon those clusters and relocate to the newly restored habitat.

While this possibility cannot be dismissed altogether, there are ways to reduce its likelihood. Where the nearby existing cluster is on the landowner's own land, habitat improvement measures that will ensure that the existing cluster is not abandoned will be included in the cooperative agreement. If, despite efforts to ensure that the effect of the program is a net increase in active clusters, the Department/TFS determines that the program is redistributing existing birds without any net benefit to the population as a whole, it can cease entering into any additional cooperative agreements.

C. Loss of RCW Baseline Groups

As noted above, the right of a participating landowner to take RCW habitat and its associated RCWs incidentally under this program is contingent upon their maintaining certain baseline responsibilities established at the time the cooperative agreement is signed. Those responsibilities will be clearly expressed in the cooperative agreement (e.g., maintaining some minimal pine basal area of foraging habitat for active clusters located within one half-mile of their property). For landowners with existing baseline responsibilities, the cooperative agreement negotiated with the Department/TFS will address not only enhancing and restoring habitat for other RCWs but also sustaining existing clusters. In spite of management and protection efforts, there may be circumstances, through no fault of the landowner, where one or more of the active groups that gave rise to the landowner's RCW baseline responsibilities ceases to exist after the landowner signs a cooperative agreement. If the landowner decides to reduce his or her baseline responsibilities for an RCW group that no longer exists, he/she can contact the Department/TFS and request that the baseline be reduced. The Department/TFS upon notification that a formerly active cluster, upon which part or all of a participating landowner's RCW baseline responsibilities were premised is no longer active, should arrange for an on-site evaluation of the cluster. Upon Department/TFS verification that the cluster has been abandoned, the landowner will be advised in writing of that fact and furnished with a revised assessment of his or her RCW baseline responsibilities.

Ordinarily, a landowner's RCW baseline responsibilities will be associated with specific RCW clusters in existence at the time they entered into the cooperative agreement. In certain limited circumstances, however, participating landowners may shift their cluster baseline responsibilities to

a new group that was formed on their property subsequent to the cooperative agreement. This issue is discussed at greater length in Part IX, below.

D. Meeting the Recovery Objective for the eastern Texas Pineywoods

In east Texas, the National Forests in Texas are committed to recover the RCW since they have the largest RCW populations, have significant land base with suitable RCW habitat, and are the only Federal landowner within this recovery population that has the additional responsibility under Section 7 (a)(1) of the Act to assist in endangered species conservation. The Texas Forest Service has a significant subpopulation of RCWs on the Jones State Forest. However, the National Forests and the Jones State Forest are thought to function as separate RCW subpopulations because the present RCW distribution and potentially suitable habitat are fragmented. Until private land between these public landholdings is in long-term protection, the Jones State Forest will be considered as a separate. supporting subpopulation.

The above discussion invites the question of how, if at all, birds established on private land pursuant to this program should be counted toward the east Texas RCW recovery objective. This question is important for two reasons. First, under the RCW recovery plan, downlisting and delisting of the RCW can occur when viable populations of RCWs are established at 6 and 15 of the locations referenced in the recovery plan, respectively. Second, even without downlisting or delisting, establishment of a viable population of RCWs in east Texas would relax Section 7 requirements for Federal actions affecting birds in this population.

The 1985 RCW Recovery Plan specifies a minimum viable population size of 250 groups of breeding pairs are needed to represent a recovered population. According to the best information available, based on data collected in North Carolina Sandhills subpopulations, between 310 and 390 potential breeding groups are required to meet the viability threshold of 250 successfully reproducing groups (Reed et al. 1993). The Service has required, in the absence of population-specific nesting data and following the intent of the recovery plan, that 400 potential breeding pairs be used as the standard to achieve 250 reproducing groups. Additionally, because up to 25 percent of groups may contain single birds (usually males), most RCW biologists have agreed, and the Service concurs, that viable populations should contain 500 active clusters (Southeast Negotiation Network 1990). Stevens (1995) recommends that, until more realistic spatially explicit models which incorporate the key social and ecological characteristics of the RCW are developed, 250 breeding groups should be considered a minimum.

Because participating landowners are free at the termination of their cooperative agreements to eliminate the nesting or foraging habitat they have restored or enhanced beyond their established baseline, RCWs occupying that habitat have no assurance of long-term protection. For that reason, within the proclaimed boundary of the Sam Houston National Forest in Montgomery, San Jacinto, and Walker Counties, the permit holder (Department/TFS) proposes to count toward the above recovery goal any active RCW clusters on land enrolled in this program where (1) all necessary foraging and nesting habitat is protected on such land through a **permanent agreement** or until the

RCW is delisted, (2) the cluster is not demographically isolated, and (3) such agreement runs with the land. Baseline groups permanently protected could be added to USFS population objectives.

E. Adherence to the Secretary of Interior's "No Surprises Policy"

On August 11, 1994, Department of the Interior Secretary Babbitt and Department of Commerce Secretary Brown announced a policy entitled "Assuring Certainty for Private Landowners in Endangered Species Act Conservation Planning", or the "No Surprises Policy." The Endangered Species Habitat Conservation Planning Handbook (U. S. Fish and Wildlife Service and National Marine Fisheries Service, 1996) states:

> *"....the government will honor its agreements under an approved HCP for which the permitee is in good faith implementing the terms and conditions of that HCP."*

VIII. Alternative Actions Considered That Would Not Result in Take

The safe harbor program described here authorizes the future incidental taking of RCWs on land that is currently unoccupied by RCWs. No incidental taking of any existing groups of RCWs is contemplated or permitted under this program (except as described in section IX, paragraph B, entitled "Shifting RCW Baseline Responsibilities to New Groups"). It is anticipated that the maximum number of groups that can be incidentally taken in the future will be no more than the number created through this program. In eastern Texas there are approximately 53 known inactive RCW clusters on private and non-federal land, most of which are potentially restorable and, if restored, and subsequently occupied by RCWs, could be incidentally taken at some point in the future with this program. Even considering the fact that new RCW clusters could be established, inhabited by RCWs, and then incidentally taken, it is still very likely that significantly less than 53 groups will be incidentally taken over the permit period.

The only way to prevent <u>any</u> incidental taking, whether on currently occupied or unoccupied land, is to either continue the status quo (i.e., not create this program), or subject participating landowners to the same legal responsibilities with respect to RCWs using their land as a result of this program as they have with respect to RCWs generally. If there were a significant number of landowners willing to restore or enhance habitat for RCWs in the designated geographic region of east Texas regardless of the legal responsibilities, one would expect to see such restoration and enhancement under way now, and there would be no need for this program. Clearly, however, that is not the case.

The purpose of this program is to reach exactly those landowners whose land management practices could benefit the RCW but who are unwilling to carry out those practices because of concerns about the legal responsibilities. In order to persuade such landowners to carry out those practices, they will need either a financial or regulatory incentive to do so. The alternative of paying landowners for desired management practices could be accomplished without allowing any incidental taking, however; the cost of such a program is likely to be

commensurate with the cost of a program to acquire conservation easements in the east Texas Pineywoods. At present, monies are not available to fund such a program, although feasibility studies for a wide variety of economic incentives are being implemented. Instead, the regulatory incentive proposed here, though it authorizes future incidental taking, is expected to attract sufficient interest among east Texas landowners to generate real benefits for the RCW.

IX. Additional Measures

As discussed above, participating safe harbor landowners will be authorized to incidentally take RCWs via elimination of nesting or foraging habitat on their land, so long as such landowners maintain the RCW baseline responsibilities determined at the time they enter into a cooperative agreement. This section first addresses the implications of implementation of the RCW HCP on the landowner's neighbors and their successors in interest, and their notification. That is followed by a related discussion of the possibility for some participating landowners to shift their RCW baseline responsibilities from one group to another. The section concludes with a discussion of the treatment of other listed or candidate species that may occur on participating land.

A. Neighboring Landowners and Successors in Interest

The clear purpose of the program is to encourage beneficial action by landowners who are willing to voluntarily carry out actions that are not required of them by law and that are expected to result in the use of their land by RCWs that would not otherwise use it. To achieve this purpose, it is necessary not only to relieve the landowner from certain land use limitations but also to extend this relief to his/her neighbors and successors in interest as well. Otherwise, participating landowners, in order to ensure that the land was unencumbered by RCW-based land use limitations in the event of their death or sale of the property to another owner, would have an incentive to eliminate the habitat they had restored or enhanced prior to transferring the land. In order to increase the likelihood that participating landowners will continue to manage their land to benefit the RCW, the Certificate of Inclusion will be extended to both the participating landowner and to interested successors in interest. The participant will be asked to notify the Department/TFS of a transfer of ownership. Upon transfer of the property to another owner, the Department/TFS will attempt to contact the new owner, explain the baseline RCW responsibilities applicable to the property, and seek to interest the new owner in signing a new cooperative agreement to benefit the RCW on the property.

The permit and certificate of inclusion extends to successors and assigns (should they choose to participate) the same right to incidentally take RCWs (and associated nesting and foraging habitat) that the original landowner had been granted. The successors and assigns can establish their baseline at the same level specified in the original agreement.

A related issue pertains to neighboring landowners. For the purposes of this program, clusters established above baseline impose no additional land use restrictions on the participant or their neighbors and their successors in interest.

B. Shifting RCW Baseline Responsibilities to New Clusters

Ordinarily, landowner's RCW baseline responsibilities attach to specific RCW clusters in existence at the time they enter into a cooperative agreement. In certain limited circumstances, however, participating landowners may, with agreement from the Department/TFS, shift their RCW baseline responsibilities to a new cluster that was activated on their property subsequent to the cooperative agreement. Specifically, when a new active cluster is established on a participating landowner's land after they have entered into a cooperative agreement and where the landowner agrees to provide all the nesting and foraging habitat needed for the resident group, that new group may replace any other group of similar status (i.e., breeding pair, single male, etc.) that was within the landowner's original baseline responsibility.

The above possibility can be illustrated with the following example. A landowner has one RCW group (composed of a breeding pair) on his/her property at the time he/she enters into a cooperative agreement and provides all the nesting and foraging habitat needed for that group. The baseline RCW responsibilities, therefore, are to maintain that cluster and its associated foraging habitat on the property. If, as a result of participation in the program, a second breeding pair is established on the property for which the landowner provides all needed nesting and foraging habitat, the landowner may, with Department/TFS concurrence, switch the baseline responsibilities from the first cluster to the new cluster. This flexibility may be to the landowner's advantage if, for example, he/she wants to develop the portion of the property where the original cluster occurred. The reason for requiring the landowner to maintain all the habitat needed for the new group is that, as described above, neighboring landowners are not required to maintain habitat for groups established pursuant to this program. Thus, without this requirement, the result might be that two groups would exist, neither of which would have sufficient foraging habitat. If desired, a landowner may artificially shift a baseline cluster through the installation of inserts and translocation of juvenile RCWs, provided Department/TFS concurrence is granted. The reason for requiring agency concurrence prior to a landowner's shifting RCW baseline requirements from one cluster to another is that there may be circumstances in which maintenance of the preexisting cluster is necessary in order to maintain contiguous habitat, dispersal habitat, or other desirable features of the landscape or population. When a landowner receives the Department/TFS concurrence to transfer baseline responsibilities, the landowner will be provided a written statement describing the revised baseline responsibilities.

C. Other Listed Species and Species of Special Concern; Contribution to Protection of the Southern Yellowpine Ecosystem

The conservation program described here is aimed at encouraging habitat restoration and enhancement for the RCW. The permit sought for this program will authorize the incidental taking of RCWs through future actions that eliminate or diminish the habitat restored or enhanced under this program. No authority to take other federally listed endangered or threatened animal species is to be conferred by this plan. However, as explained below, take of other federally listed animal species may be covered through an incidental take statement developed under a separate consultation conducted prior to the signing of a cooperative agreement. That is, the Service will develop a biological opinion on the effects of the action and enter into a cooperative agreement with a Department/TFS on federally listed animal species. The biological opinion will identify the reasonable and prudent measures that must be implemented to minimize take (in a non-jeopardy biological opinion), or the reasonable and prudent alternatives that must be implemented to avoid jeopardizing the continued existence of the species (in a jeopardy biological opinion). The Department/TFS will then have the authority to extend cooperative agreements to landowners allowing the implementation of the HCP.

The possibility exists that the following federally listed species may occur on some of the land that might be considered for participation in this HCP:

Louisiana black bear (Ursus americanus luteolus) - threatened
bald eagle (Haliaeetus leucocephalus) - threatened
White bladderpod (Lesquerella palida) - endangered
Navasota ladies'- tresses (Spiranthes parksii) - endangered
Texas trailing phlox (Phlox nivalis var. texensis) - endangered.

It should be noted that there are no restrictions regarding federally listed plants on private land, other than prohibiting them from commerce.

Where federal plant or animal species of special concern are known to occur on the parcel, voluntary measures will be recommended in the cooperative agreement to aid in the conservation of those species. This is supportive of the Service's "No Surprises" policy. The designation of a Watch List species indicates the species may be declining, but persuasive data on biological vulnerability and threat are not currently available to support listing.

The following species of special concern are known to occur in east Texas: Big thicket hog-nosed skunk (Conepatus mesoleucus telmalestes), Rafinesque's big-eared bat (Plecotus rafinesquii), Southeastern myotis (Myotis austroriparius), Bachman's sparrow (Aimophila aestivalis), Henslow's sparrow (Ammodramus henslowii), Southeastern American kestrel (Falco sparverius paulus), Louisiana pine snake (Pituophis melanoleucus ruthveni), alligator snapping turtle (Macroclemys temminckii), paddlefish (Polyodon spathula), blue sucker (Cycleptus elongatus), white firewheel (Gaillardia aestivalis var. winkleri), Slender gay-feather (Liatris tenuis), Incised groovebur (Agrimonia incisa), Bog coneflower (Rudbeckia scabrifolia), Tiny bog-buttons (Lachnocaulon digynum), Drummond's yellow-eyed grass

(Xyris drummondii), Rough-leaf yellow-eyed grass (Xyris scabrifolia), Scarlet catchfly (Silene subciliata). **Currently, no federal protection is afforded to the fore listed species, therefore protection and conservation is voluntary.**

The Service, Department, and the TFS believe it is likely that the program will result in net benefits to many of the above-mentioned listed and Watch List species associated with pine habitats. Indeed, management activities such as prescribed burning will enhance habitat for most of the above-mentioned plant species, and perhaps will assist in keeping them from being listed.

LITERATURE CITED

Costa, R. 1992. Challenges for recovery. Pages 37-44 *in* Proc. Sandhills red-cockaded woodpecker conference. D.J. Case and Assoc., Mishawaka, In.

U.S. Fish and Wildlife Service. 1995. Final environmental impact statement for the management of the red-cockaded woodpecker and its habitat on national forests in the southern region. U.S. For. Serv. Manage. Bull. R8-MB 73 (3 volumes). 407pp and appendices.

Southeast Negotiation Network. 1990. Summary report: scientific summit on the red-cockaded woodpecker. Southeast Negot. Net., Ga. Inst. of Tech., Atlanta, Ga. 36pp.

Stevens, E.E. 1995. Population viability considerations for red-cockaded woodpecker recovery. Pages 227-238 *in* D.L. Kulhavy, R. G. Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology and management. Center for Applied Studies in Forestry, College of Forestry, Stephen F. Austin State Univ., Nacogdoches, TX.

APPENDIX 1

SAFE HARBOR RED-COCKADED WOODPECKER HABITAT IMPROVEMENT COOPERATIVE AGREEMENT BETWEEN THE US FISH & WILDLIFE SERVICE AND THE TEXAS PARKS & WILDLIFE DEPARTMENT/TEXAS FOREST SERVICE

This Agreement, dated _____, between the Texas Parks & Wildlife Department (Department) /Texas Forest Service (TFS) and the US Fish & Wildlife Service (Service), pursuant to authority conferred by Permit No._____, issued pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, 16 U.S.C. 1539(a)(1)(B), is entered into in order to improve habitat for the red-cockaded woodpecker (RCW) on private land in east Texas.

Under Permit No. _____, the Department/TFS shall be given the authority to carry out, or give authority for private cooperators to carry out, any activity on the property that will or may result in the incidental taking of RCWs or their habitat, subject to the following conditions: (1) the agreed-upon habitat improvements have been carried out by the cooperator; (2) Cooperator agrees to maintain applicable RCW baseline responsibilities; (3) activities expected to result in incidental taking of RCW clusters may be carried out only during the nonreproductive season (August through February); and (4) not less than 45 days prior to commencing any such activity, Cooperator or his or her successors and assigns shall notify the Department/TFS in writing and provide the agencies with the opportunity to translocate any RCWs, if deemed necessary.

This agreement shall be in effect until its expiration on date and may be amended at any time by mutual agreement of the parties.

Department/TFS assumes no jurisdiction or obligation over cooperator'
s Property for the purpose of controlling trespass, controlling or eradicating noxious weeds, granting rights-of-way, and other incidents of ownership.

At expiration or termination of this agreement, Cooperator assumes full and complete responsibility for all habitat improvements on Property made during this agreement. The Department/TFS shall have no obligation under this agreement after it has been terminated.

Department/TFS will be responsible for securing any permits (e.g., Section 10 (a)(1)(A) research permit) prior to activities such as monitoring nestlings, banding, and translocating RCWs.
In addition, the Department/TFS will coordinate/participate in extensive training sessions for the above activities, including determining foraging criteria and demographic isolation, for their own employees as well as private consultants. The Service will be invited to be an integral part of this training. The Department/TFS is prohibited by law from obligations that exceed available funds; and therefore can do only that work for which funding is available.

APPENDIX 2

SAFE HARBOR RED-COCKADED WOODPECKER HABITAT IMPROVEMENT COOPERATIVE AGREEMENT BETWEEN THE PARTICIPATING LANDOWNER AND THE TEXAS PARKS & WILDLIFE DEPARTMENT/TEXAS FOREST SERVICE

This Agreement, dated _____, between the Texas Parks & Wildlife Department (Department) /Texas Forest Service (TFS) and [name of cooperator] (Cooperator), pursuant to authority conferred by Permit No._____, issued pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, 16 U.S.C. 1539(a)(1)(B), is entered into in order to improve habitat for the red-cockaded woodpecker (RCW) on land owned by the Cooperator.

Cooperator agrees to undertake [or allow Department/TFS] and maintain, for the duration of this agreement, habitat improvements described in the attached document on Cooperator's property indicated on attached map (Property). Cooperator further agrees to allow the said agencies to enter onto the property after contacting the landowner in advance and obtaining written permission to [undertake the agreed upon habitat improvements,] ascertain compliance with this agreement; band and census RCWs on the property; and, in certain circumstances, translocate RCWs from impending harm.

In consideration of the foregoing, the Department/TFS has issued to Cooperator a "Certificate of Inclusion" under Permit No. _____. Such certificate authorizes Cooperator, or his or her successors and assigns, to carry out any activity on the property that will or may result in the incidental taking of RCWs or their habitat, subject to the following conditions: (1) the agreed-upon habitat improvements have been carried out; (2) Cooperator agrees to maintain [here describe applicable RCW baseline responsibilities]; (3) activities expected to result in incidental taking of RCW clusters may be carried out only during the nonreproductive season (August through February); and (4) not less than 45 days prior to commencing any such activity, Cooperator or his or her successors and assigns shall notify the Department/TFS in writing and provide the agencies with the opportunity to translocate any RCWs, if deemed necessary.

This agreement shall be in effect until its expiration on date and may be amended at any time by mutual agreement of the parties. Notwithstanding the foregoing, the agreement may be terminated by Cooperator by giving 45 days advance written notice to Department/TFS. Such termination shall not affect Cooperator's rights under the Certificate of Inclusion, provided that agreed upon habitat improvements have been carried out. In the event of Cooperator's termination of this agreement prior to its expiration date or completion of agreed upon habitat improvements, Cooperator agrees to return to Department/TFS any sums expended by it or paid by it to Cooperator to carry out specified habitat improvements.

Cooperator guarantees that he/she is sole owner of the property and warrants that there are no outstanding rights that will interfere with Department/TFS's rights under this agreement. In the

event Cooperator transfers part or all of Property, he or she shall inform the Department/TFS and shall take such steps as are necessary to inform the purchaser of existence of this agreement.

Department/TFS assumes no jurisdiction or obligation over Property for the purpose of controlling trespass, controlling or eradicating noxious weeds, granting rights-of-way, easements, and other incidents of ownership, including access to and development of mineral interests.

At expiration or termination of this agreement, Cooperator assumes full and complete responsibility for all habitat improvements on Property made during this agreement. The Department/TFS shall have no obligation under this agreement after it has been terminated.

Cooperator will be responsible for securing any necessary permits incidental to specified work to be completed. Department/TFS will be responsible for securing any permits (e.g., Section 10(a)(1)(A) research permit) prior to activities such as monitoring nestlings, banding, and translocating RCWs. Department/TFS is prohibited by law from obligations that exceed available funds; and therefore can do only that work which is funded. In the event funds are not available to Department/TFS to do specified habitat improvements, Cooperator will be advised accordingly.

_____ _____

Texas Parks & Wildlife Department Cooperator(s)

_____

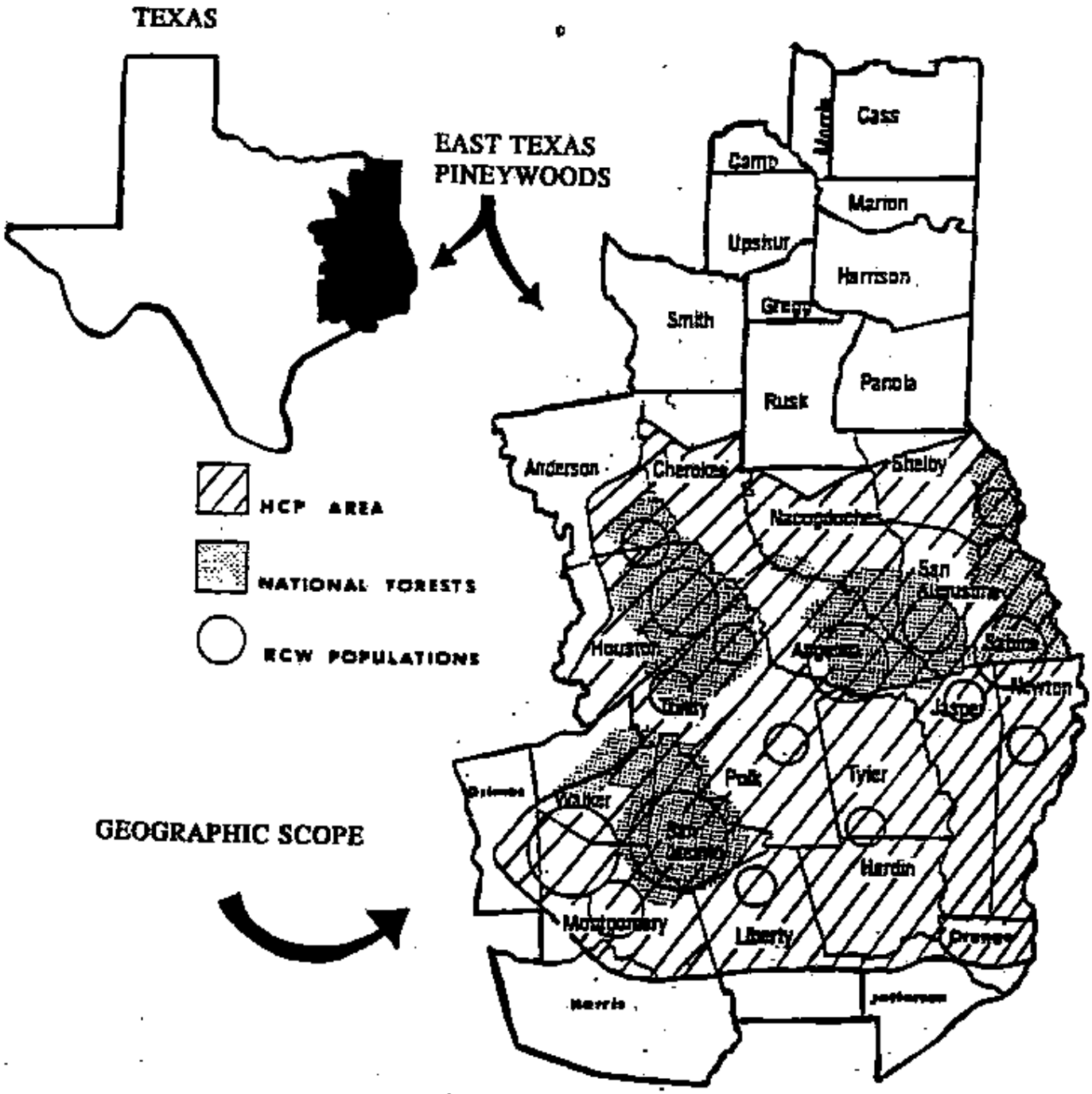
Jim Hull
Director, Texas Forest Service

APPENDIX 3

SAFE HARBOR CERTIFICATE OF INCLUSION

This certifies that the current and future owners of the following property [describe] are included within the scope of Permit No. _____, issued on [date] for a period of [99] years to the Texas Parks & Wildlife Department (Department) and the Texas Forest Service (TFS) under the authority of Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1539(a)(1)(B). Such permit authorizes certain activities by participating landowners as part of a conservation plan to restore and enhance habitat for the endangered red-cockaded woodpecker. Pursuant to that permit and this certificate, the current and future owners of the above-described property are authorized to engage in any activity on such property that may result in the incidental taking of red-cockaded woodpeckers, subject only to the terms and conditions of such permit and the cooperative agreement entered into pursuant thereto by the Department/TFS and [name of cooperator] on [date].

APPENDIX 4: Map depicting the geographic scope of the final Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods.



APPENDIX B

TEXAS FOREST SERVICE OBSERVATION NOTES FOR RED-COCKADED WOODPECKER CLUSTERS ON THE W. GOODRICH JONES STATE FOREST

JUNE 24, 1991

TEXAS FOREST SERVICE

The Texas A&M University System

Area V
(409) 273-2261

Route 7, Box 151
Conroe, Texas 77384

3.3315

June 24, 1991

MEMORANDUM

To: Head, Forest Resource Development Dept.

Re: RCW Nesting Survey - Jones State Forest

Since the latter part of April, we have been checking and monitoring the RCW colonies in order to update our information on activity, nesting, active trees, new cavities, cavity tree loss, etc.

The following is a brief summary of our observations on each colony (see attached map for colony locations):

Colony #1 - No RCW activity observed. Tree #1-1 died back in September of last year due to the stress of dry hot weather and the heavy flow of sap from cavity and sap wells. The only other active tree was #1-4. In January 1991, it was noted that no evidence of recent activity could be detected. It is unknown why this tree was abruptly abandoned. Currently, there appears to be no activity in this colony.

Colony #2 - This colony has one new cavity tree (#2-14) and one new cavity in a previously old cavity tree (#2-6). On May 13th, adults were observed feeding young in Tree #2-14. The young had fledged by June 10. Total of 3 active cavity trees in this colony.

Colony #3 - This colony has one new cavity tree (#1-6). This tree was observed with adults feeding young on May 24th. They appeared about ready to fledge by June 11th. Probably have fledged by now.

Colony #4 - This had previously been considered one colony, but this year has two clans of RCW's, so we are now dividing it and referring to them as Colony #4-a and Colony #4-b.

Colony 4-a has one new cavity in an existing cavity tree (#2-9). This cavity was first observed with young on June 10th. Tree #2-10 is also an active tree.

Colony 4-b, Tree #3-9 appears to be the only cavity tree currently being used in this colony. It is a relatively new tree with three cavities. Adults were first observed feeding young in this tree on May 15th and again on May 27th. Young have likely fledged at this time.

Colony #5 - has two new cavity trees (5-5 and 5-8). Tree #5-3 may also be an active (currently used) tree. Young were first observed on May 22nd in Tree #5-8. Young seemed to have fledged by June 11th.

Colony #6 - One tree with two active cavities (#7-1); young first observed June 10th; still in the nest on June 17th. Considerable work on a new cavity is presently underway on a nearby tree.

Colony #7 - Trees #8-2 and 8-11 appear to have the only active cavities, however, no nesting activity has been detected as of this date.

Colony #8 - Young were first detected on May 28th in Tree #9-7. No feeding activity was observed on June 11th; the young may have fledged, although it does not seem they would be old enough. Tree #9-8 is dying of a very recent lightning strike. Tree #9-11 may still be an active cavity tree.

Colony #9 - Trees #9-3 and 9-14 appear to be active cavity trees, but no nesting activity has been observed.

Colony #10 - All three of these trees are active, but no definite nesting activity has been observed. RCW's have been observed at all the trees and a new cavity has been worked on nearby.

Colony #11 - Trees #13-6, 8, 9, and 11 all appear to be active trees. RCW observed feeding young in tree #13-9 on June 10th.

Colony #12 - Tree #13-15 is a new cavity tree and young were observed being fed on May 22nd. (Probably have fledged by this date.) The other cavity trees in this colony appear unused.

Colony #13 - Trees #12-5 and 12-7 appear used. Young were observed being fed by adults at Tree #12-7 on May 27th.

Colony #14 - All cavity trees in this colony are now dead. Only Tree #14-6 looked to be an active cavity tree. It is possible it is still being used, but no RCW activity has been observed around this colony since about April.

Colony #15 - All cavities appear old and unused. No RCW activity has been observed around this colony in over a year.

Colony #16 - Two trees appear to have currently used cavities. They are Trees #11-6 and 16-8. Lots of RCW activity around both trees. There appeared to be young being fed in Tree #11-6 on June 18th. This was confirmed on June 20th.

APPENDIX C

WOODPECKERS OF THE EASTERN TEXAS PINEYWOODS

APPENDIX D

CONCEPTUAL DRAFT

FOREST MANAGEMENT GUIDELINES FOR THE WOODLANDS AT COOK'S BRANCH

CONCEPTUAL DRAFT

FOREST MANAGEMENT GUIDELINES
THE WOODLANDS AT COOK'S BRANCH
MONTGOMERY COUNTY, TEXAS

Prepared by: Tom Hayes
Stewardship Ecologist
Texas Nature Conservancy
November 1990

INTRODUCTION

Due to the careful stewardship of the Mitchell family and their ranch managers over the last several decades, The Woodlands at Cook's Branch, Montgomery County, Texas, supports a unique remnant of Texas' natural heritage. The value of remaining old-growth forest habitat is increasingly recognized as this resource so quickly disappears throughout Texas. Private landownership with a sense of responsibility for the health of the land, as evidenced at The Woodlands at Cook's Branch, is the best hope for preserving our natural heritage. It is from this perspective that the Mitchell family requested the Texas Nature Conservancy to provide advice relative to the long-term maintenance of the 5,000-acre ranch's natural diversity.

The Texas Nature Conservancy is a chapter of The Nature Conservancy (TNC), an international membership organization committed to the global preservation of natural diversity. Its mission is to find, protect, and maintain the best examples of communities, ecosystems, and endangered species in the natural world. Also a private landowner, TNC owns more than 1,200 preserves - the largest private system of nature sanctuaries in the world. Since 1951, TNC has helped identify and preserve more than 5.5 million acres in 50 states and Canada, including over 210,000 acres in Texas.

The purpose of the following draft Forest Management Guidelines is to provide requested guidance relative to management of the forest resources on The Woodlands at Cook's Branch. The ranch encompasses an old-growth upland forest dominated by loblolly pine. Besides being a unique and valuable resource in its own right, this forest apparently supports the largest cluster of red-cockaded woodpecker (RCW) colonies on private land in Texas. A survey covering approximately one-third of the ranch conducted by the Texas Parks and Wildlife Department in October 1989 indicated approximately 12 RCW colonies. Another relatively large cluster of RCW colonies exists on the Jones State Forest about ten miles east-southeast of the ranch. The largest RCW population in Texas survives on the Sam Houston National Forest, whose closest boundary lies approximately ten miles to the north of the ranch. RCW is a colonial species which is critically endangered and continues to decline precipitously in population. RCW is officially listed as endangered by both federal and state authorities, and is recognized as globally imperiled by TNC.

Other biotic resources maintained within the old-growth forest habitats of The Woodlands at Cook's Branch are also unique and valuable. The entire forest community of plant and animal species is interdependent and necessary for the long-term viability of ecosystem functions. As the management program conceptualized below is gradually implemented, the diversity and productivity of the entire biotic community will be enhanced. More particularly, as the forest becomes more open by means of mechanical thinning and prescribed burning, many uncommon wildlife and wildflower species indicative of interior forest habitats should become more prevalent. It is as a refuge for these many rare species that the highest natural value of the ranch will be realized.

When finalized, these management guidelines will serve as a conceptual framework for the development of site-specific management prescriptions. Baseline information is needed soon, especially in regard to RCW nesting and foraging habitat, forest stand composition and structure, and complete inventories of plant and animal species. An explicit management scheme cannot be developed without more baseline information.

SILVICULTURAL RECOMMENDATIONS

All forest management should be conducted under the guidance of trained personnel experienced with RCW habitat management and conservation practices. Training of ranch personnel should be accomplished both through the literature and by consultation with government agencies, consulting biologists, and TNC. Due to the need for project continuity, the retention of a consulting RCW biologist on a part-time basis would be desirable. The general intent of the recommendations is to maintain an open, uneven-aged pine stand with a significant old-growth component by means of a selection management system which incorporates regulated natural regeneration. The elimination of all hardwood overstory within 50 feet of all active and inactive cavity trees within colony sites is a top priority. Pine and hardwood midstory throughout colony sites should also be eliminated or minimized, with some pine retained for regeneration. Hardwood overstory within colony sites should not exceed 10 square feet per acre (10 BA). The other top priority is the reduction of tree density over the entire ranch to a minimum average spacing of 20-25 feet, while retaining clumps of potential nesting trees.

In forest areas throughout the ranch, pine basal area should be maintained at 60-90 BA. In forest areas outside RCW colony sites, midstory hardwoods should be controlled while maintaining large

overstory hardwoods up to approximately 10-20 BA for other wildlife. However, existing hardwood stands on hardwood sites along drainages should be maintained in a natural condition with no timber harvesting. Step-wise thinning of overstocked pine and pine-hardwood stands should occur as necessary to prevent the removal of more than 30 BA during any given year, in order to not disturb RCW. Once a given stand or compartment is initially thinned to the minimum average spacing of 20-25 feet regardless of the basal area, all residual trees should remain uncut, except as necessary for a regulated system of selective silviculture, to assure that future RCW nesting and foraging habitats are in adequate supply. In any case, thinning should occur only when 90 BA is exceeded. The normal cycle of such thinnings is expected to be approximately 10 years. Management should emphasize maintenance of a constant supply of older pine trees throughout all compartments with suitable average pine densities and multiple age classes of pine to insure replacement of senescent trees. This emphasis will assure RCW cavity excavation sites and foraging substrate throughout the ranch, in perpetuity.

In addition to improving habitat for most wildlife species, this thinning program will benefit overall resource management in several significant ways: by enhancing RCW nesting and foraging habitats; preventing castastrophic fires; and reducing future southern pine beetle (SPB) outbreaks. Old-growth pine forests which are dense and uniform in age are particularly susceptible to SPB. Old-growth forest stands with basal areas greater than 100 BA are at considerable risk to SPB attack. The maintenance of a vigorous stand by thinning and multiple age classes is the best method of reducing the risk of SPB attack. Stand resistance to SPB is also greatly increased when logging damage to residual trees and soil is minimized. By allowing more sunlight to penetrate the tree canopy, thinning will also allow for greater development of the herbaceous and shrub layers, leading to enhanced wildflower, fruit and browze production.

Personnel trained in RCW biology and habitat management should mark all individual trees to be thinned prior to any thinning activity. During thinning operations, retention of pine trees with the following characteristics should be favored:

1. Suppressed trees with reduced diameter growth but greater than 40 years old which will benefit from release.

2. Mature trees with red heart.

3. Trees greater than 70 years old with larger crowns, longer boles, and adequate spacing.

4. Clumps of pine trees that are less than 30 years old should not be thinned so as to provide for suppressed trees that can be released through later thinnings as potential RCW cavity trees.

All construction, timber management activities (except prescribed fire), and other disturbance should be prohibited within 0.25 mile of an active colony site during the RCW breeding season to preclude possible disruption of reproductive activity. If reproductive activity, such as a second nesting, occurs beyond the defined breeding season, then disturbances should be further prohibited in this zone until reproductive activity ceases. Within this zone during the non-breeding season for RCW, such disturbances should be limited to daylight hours as defined in the glossary. Exceptions to these prohibitions would include the need to prevent adverse impacts to RCW habitat due to wind-throw, pest outbreaks, or other emergencies. An important exception would be the need to control an SPB outbreak. However, when controlling SPB outbreaks within 0.25 mile of an active or inactive colony, the cutting of green-tree buffers should be avoided. Techniques which rely on the cutting of recently attacked trees in conjunction with selective pesticide or pheromone applications are preferred within this zone. Such techniques have been developed by the Texas Forest Service (Dr. Ron Billings, 409/639-8170) and the U.S. Forest Service's Southern Forest Experiment Station in New Orleans (Dr. Forest Oliveria, 318/473-7294 or 7160). In no instance should pesticides be applied to standing timber or vertical stems within RCW nesting and foraging habitats.

Regeneration of forest areas on the ranch should be by natural regeneration to the maximum extent possible. All compartments should be surveyed to produce stand tables and develop a regulated system of selective harvest and regeneration to maintain RCW nesting and foraging habitats on a continuous basis. During thinning and other timber operations, adherence to the following guidelines would minimize damage to RCW habitat and residual trees:

1. In order to prevent root damage and soil compaction, heavy equipment and vehicle traffic should not be allowed within 20 yards of RCW cavity and start trees, nor should vehicles and equipment be parked or serviced within 100 yards of such trees. No log landings should be located within 100 yards of such trees. Maximum size of log landings should be 0.25 acre.

2. No roads or skid trails should go through an RCW colony site. All trees harvested within the colony site should be felled away from cavity and start trees and then skidded to the nearest colony site boundary, prior to being skidded to log landings.

3. In order to avoid adverse impact to residual trees due to sedimentation, erosion, and root damage, normal erosion control practices should be followed during timber activities. Equipment operation should be avoided when wet soil conditions will result in excessive damage. Erosion control structures should be constructed and maintained during and following such activities.

4. Skidders (less than 120 horsepower and without bulldozer blade) and other equipment should be the minimum size to accomplish the management tasks. Cable skidders should be used in lieu of grapple skidders as necessary to avoid damage to residual trees and their root systems. All logs should have green tops removed prior to skidding. Skidding of logs longer than 35 feet should be prohibited.

5. Slash treatment should be used within RCW colonies and considered in all other areas, if feasible, to minimize the potential for insect, fire, and other damage to residual trees. Slash remaining after timber cutting should be lopped and scattered to lie within 2 feet of the ground and not closer than 6 feet to any residual tree and 12 feet to any cavity tree.

PRESCRIBED BURNING PROGRAM

A prescribed burning program needs to be implemented in order to reinstitute the presettlement cyclic occurrence of low-intensity ground fires within upland forest habitats. Such fires have been suppressed for several decades. Burn units should be determined for all forest areas, using roads, stream courses, pastures, and other existing fire breaks as boundaries to the extent possible. Burn unit boundaries should correspond to compartment boundaries, when feasible. Prior to a prescribed burn, burn unit boundaries should be mowed, raked, "wet-lined", back-fired and otherwise prepared to serve as safe and effective fire breaks. Special care will be taken to assure that all buildings and other improvements will be fully protected by fire breaks and buffers, prior to any

prescribed burning. Unburned buffers can be maintained along roads and in other selected areas, if desired, to maintain a visual buffer or high densities of flowering shrubs. Plowed and bladed fire breaks should not be used, in order to avoid root damage, soil compaction, erosion and loss of herbaceous species.

The first burn in a given compartment will be a cool winter burn to reduce fuel loads and stimulate herbaceous and shrub regrowth. The regrowth of herbaceous and shrub species will provide more evenly distributed fuel for subsequent burns. The burning program should be continued at intervals of 2-4 years on a random cycle, using growing-season burns whenever possible to maintain an open forest. Otherwise, early fall and late spring burns should be used for enhanced control of hardwood encroachment. Prescribed burns should be coordinated with the tree-thinning operations, so that burns are conducted prior to thinning a given stand. Otherwise, burns will need to be deferred for approximately two years following a thinning operation, to allow slash to decompose and, thereby, reduce the fuel load. Pine sapling clumps larger than 1/4 acre which are required for regulated regeneration, all RCW cavity and start trees, and all hardwood sites should be protected from fires. However, brush-hogging, raking, wetting, and slash removal should be used in lieu of discing or other activities which may disturb the root zone when protecting areas from fire.

RCW MONITORING RECOMMENDATIONS

A routine record-keeping process should be installed to monitor the effects of the overall management strategy on a quarterly basis. Monitoring of the colony sites should include behavior and site use by RCW plus a dawn or dusk examination of RCW activity to verify normal colony use. In addition, monitoring of the effects of midstory control, tree thinning and other timber or construction activities within 0.25 mile of colony sites should occur 2-4 weeks following each such activity. Whenever logging or construction activities occur within 100 yards of active RCW cavity trees, responsible personnel experienced in RCW behavior and habitat management should be present each day to oversee activities. Such personnel should maintain the ability to contact an experienced RCW biologist "on call". On-site personnel should also be authorized to alter or stop activities that may threaten a colony or deviate from the stated provisions of the site-specific management plan.

TNC could be included in ongoing consultations regarding the above activities. Also, it may be appropriate for TNC to receive both quarterly and annual overview reports covering all of the above by the end of the month following each reporting period.

SUGGESTED WORK SCHEDULE

Short Term Objectives:

1) Identify and mark all active and inactive cavity trees and start trees with a green band and locate on a map.

2) Mark 200-foot buffer strip zones around colony sites.

3) Control midstory and overstory hardwoods in colony sites as specified above. Initially use mechanical control for larger hardwoods to deter cavity competitors. Long-term control of midstory hardwoods in colony sites will depend upon prescribed burning program.

4) Initiate burning program on all compartments containing colony sites. Brush-hog, rake, and remove slash around active and inactive cavity trees and start trees prior to any prescribed burn.

5) Initiate basal area reduction and mid-story control on all compartments containing colony sites.

6) Develop an SPB control protocol which avoids buffer cuts of unattacked trees. Drs. Billings (TFS) and Olivieria (USFS So. For. Exp. Sta.) are most knowledgeable of such techniques with respect to RCW. No pesticides should be applied to vertical stems.

7) Produce stand tables and develop a regulated system of selective harvest and regeneration to assure perpetual maintenance of RCW and other forest resources. Significant timber income will be produced during initial thinning operations over several years. Timber income will be maintained over the long-term during periodic thinnings to maintain optimal habitat conditions.

8) Restrict all timber-harvesting and heavy-equipment use within 0.25 mile of RCW colonies between April 1 and August 1, or for an extended period should RCW reproductive activity extend beyond this period.

Long Term Objectives:

1) Implement basal area reduction, mid-story control and burning rotation on all remaining forest compartments, excluding all hardwood sites.

2) Continue selective cutting operations on all forest compartments.

3) Vehicle access should be reduced as possible in RCW colony sites to that necessary for RCW habitat enhancement.

PLAN IMPLEMENTATION

If desired, TNC can assist in the coordination of a cooperative inventory and management effort on the ranch by public agencies and institutions and private contractors. Such an agreement between the Mitchell family and TNC would depend on the commitment of adequate stewardship funds and the long-term protection strategy adopted for The Woodlands at Cook's Branch. Several potential cooperators have been contacted and indicate that such a coordinated effort can be accomplished. Such an effort would complement two regional protection projects which are in the planning and fund-raising stages.

The Montgomery RCW Corridor Project:

The colony clusters on The Woodlands at Cook's Branch, the Jones State Forest, and the Sam Houston National Forest are isolated from each other. More intensive land-use practices on these intervening lands have resulted in lower quality habitat for RCW and other species dependent upon old-growth forest habitats. Fragmentation and isolation of nesting and foraging habitats are major threats to the RCW. The identification and protection of contiguous blocks and connective corridors of such habitat is essential. Buffer areas adjacent to existing colonies are required to assure sufficient foraging habitat and future nesting habitats. Midstory encroachment is another major threat to the RCW. This problem needs to be controlled in both existing and future nesting habitats identified in this large-scale protection effort.

TNC is currently seeking federal funding to delineate protection strategies for RCW colony clusters in Montgomery County. The proposed project includes remote-sensing studies by Texas A & M University and landowner contact and consultation by TNC. A major objective of the proposed landowner contact and related public relations tasks is to establish cooperative management partnerships

USFWS ?

between TNC, TFS, TPWD, USFS, and the private owners of RCW habitat. Remote sensing and landowner contact is required to delineate available habitat in order to protect buffer areas adjacent to these colony clusters and corridors connecting these two areas to other colony clusters in the Sam Houston National Forest to the north. Only in this manner can these isolated clusters be interconnected into a viable population with long-term survivability. The initial study area thus encompasses approximately 250,000 acres in Montgomery County.

Dr. Robert Benson at Texas A&M University is completing an RCW inventory in the Jones and the Fairchild State Forests of East Texas. Objectives of this study include a detailed mapping of all cavity trees within the forests (active and inactive), an evaluation of the actual number of birds present, and a documentation of the habitat structure which currently supports the existing clans.

Satellite imagery can provide important baseline data on available habitat. Texas A&M University has an extensive visualization laboratory which houses the most modern GIS hardware and software. The use of these facilities is free of charge to researchers at A&M, however, the satellite imagery will need to be purchased. High-resolution (10-meter) imagery will be necessary. This can be especially useful in determining the amount of habitat fragmentation and in the identification of possible corridors linking suitable habitat patches. Coupled with the work currently underway and ground- truthing on private lands where access is possible, this proposed study could significantly improve the baseline data available to resource managers.

Dr. Robert Benson will direct the proposed remote-sensing study. Ground-truthing will be carried out by Michael Scully, a graduate student at Texas A&M University. Mr. Scully is currently working on Dr. Benson's RCW study and has extensive experience in both the Jones and the Fairchild state forests. Using their current knowledge of the habitat in active colonies, GIS techniques, and precise mapping of the locations of active colonies in the Jones and Fairchild Forests, projected suitable habitat will be delineated in the project area. Several suitable sites will be ground-truthed where access is available. This work will be documented in a final report.

TNC's landowner contact component of this project will include researching and providing landowner tract information within preliminary preserve design boundaries, assisting in the development of protection strategies for identified key tracts, and

initiating and maintaining contact with key tract owners in order to obtain access for preserve design and verification of habitat maps. Ultimately, this should lead to the establishment of cooperative management agreements between private landowners, participating agencies and organizations and the preparation of an educational pamphlet for private landowners covering basic RCW biology and forest management considerations and advice.

A two-year budget of $45,000 will be required to accomplish this project.

The Longleaf-Bluestem Bioreserve Project:

The Woodlands at Cook's Branch lies within the western portion of another, much larger landscape protection initiative of both the Texas and Louisiana chapters of TNC. This initiative is called the Longleaf Pine-Bluestem Bioreserve. Its mission is:

> To protect and restore a functional landscape within the range of Longleaf Pine in the West Gulf Coastal Plain, including all indigenous species and natural communities, while promoting sustainable human uses and considering long-term global climatic change.

Significant opportunities exist to accomplish important conservation work in the Longleaf Pine-Bluestem region. There are large amounts of public land suitable for biodiversity-oriented management. Private timber companies own thousands of acres of restorable timberlands in the region. Key parcels owned by private individuals can be combined with public lands to create large tracts managed for conservation purposes.

To accomplish the mission of protecting and restoring a functional landscape within the Longleaf Pine-Bluestem region, a comprehensive, five-year effort must be initiated. The effort will involve numerous public and private landholding agencies, private corporations, individual landowners, scientific institutions, and resource management agencies.

Primary responsibility for accomplishing project goals will reside with a multi-disciplinary project team of TNC staff. A five-year budget of $6,700,000 will be needed to implement the program.

GLOSSARY
(based, in part, on U.S. Forest Service's Environmental Assessment, January 1990)

ABANDONED COLONY - A colony site determined to be abandoned because of inactivity over an extended period of time.

ACTIVE COLONY - It denotes that a specific colony is occupied in a given survey year. A colony is determined to be active when there are nesting or roosting red-cockaded woodpeckers present, or when one or more cavity trees exhibit fresh pitch wells and resin flow, reddish under-bark appearance and/or fresh chipping of cavity entrance or plate. It is synonymous with clan in recovery goal attainment report and population monitoring.

BASAL AREA - This is the cross-sectional area based on the diameter at breast height (DBH) of any tree tallied at a sample point. Basal area is usually expressed as square feet per acre.

BREEDING SEASON - The RCW breeding season is April 1 through August 1 in order to include critical periods of courtship behavior and post-fledgling care. (Note: characteristics of individual years may extend this time period either forwards or backwards.)

CAVITY TREE - The tree that contains a red-cockaded woodpecker cavity or start hole. Frequently, nest competitors will enlarge a RCW cavity. Enlarged RCW cavities will still be considered RCW cavities for inventory and management purposes.

CLAN - A breeding pair of red-cockaded woodpeckers plus helpers living as a family group. Clan size can vary from just a mated pair to as large as nine individuals, but averages about three birds. Occasionally, clan size may be reduced to a single individual (usually a male). This is usually a temporary phenomenon with either successful mating or colony abandonment occurring in a short period of time.

COLONY OR COLONY SITE - A site in which a clan of red-cockaded woodpeckers nest or roost. It includes the aggregate of cavity trees plus at least a 200-foot zone around them. The cavity trees used by a clan tend to be clustered and in most cases are clumped within an area that can be encompassed by a circle 1,500 feet in diameter.

DAYLIGHT HOURS - These hours for activities within 0.25 mile of the active colonies are from one hour after sunrise until two hours before sunset.

FORAGING HABITAT - Pine and pine-hardwood forest stands 30 years of age and older within 1/2 mile of a colony are considered foraging habitat for the RCW. At least 6,350 pine stems equal to or greater than 10 inches DBH and 8,490 square feet of pine basal area are required as foraging substrate within this area to support a colony. Consider only those stands, with 24 or more pine trees per acre 10 inches or larger DBH, which are contiguous with the colony site in this foraging substrate calculation. The number of acres required to produce this number of trees will vary on site and stand conditions but will normally be available within 125 acres of well-stocked (70 or more square feet pine basal area per acre) pine or pine-hardwood stands if 40 percent of which is more than 60 years of age. The actual foraging substrate equivalents (number of pine trees greater than or equal to 10 inches DBH) should be calculated to ensure that adequate foraging habitat is provided when foraging habitat appears limiting. See USDI, Fish and Wildlife Service Guidelines For Preparation of Biological Assessments and Evaluations for the Red-Cockaded Woodpecker for details.

HABITAT - The physical and biological environment of a plant or animal where all essentials for its development and existence are present.

INACTIVE COLONY - A colony site is determined to be inactive when there are no red-cockaded woodpeckers present and when none of the cavity trees exhibit active resin wells. Active resin wells are noted by recent pecking and clear, fresh resin flowing from the well, reddish under-bark appearance or fresh chipping of cavity entrance or plate. Inactive status denotes that a specific colony is unoccupied in a given year. Inactive colonies often become active in subsequent years.

MIDSTORY - A middle canopy layer of smaller trees that occur under an overstory of trees. These "midstory" trees are usually of a different species than the large trees and can grow in almost total shade. Some trees in this category include red maple, sourwood, holly, some hickories, oaks and gums. Usually these trees never develop into large, dominant forest trees.

OLD GROWTH - Old-growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function.

POTENTIAL CAVITY TREE - A pine tree which currently exhibits (or is likely to in the future) characteristics of high quality red-cockaded woodpecker cavity trees: presence of red-heart fungus at average cavity height, 14 inches DBH or larger, high ratios of heart wood to sap wood, clear and straight boles and large, flat topped crowns with large limbs. Loblolly trees will usually start showing incidence of red-heart at 60 years of age (five percent of trees) and the incidence quadruples by age 100. Potential cavity trees are often trees that were suppressed until 30-60 years of age and then responded to subsequent release by increased vigor.

PRESCRIBED BURNING - A controlled application of fire burning under preplanned, specified conditions to accomplish specific objectives of forest or wildlife management and fire hazard reduction.

RECRUITMENT STAND - A stand, at least 10 acres in size, identified as potential nesting habitat required to meet the identified population goal on a compartment basis. Recruitment stands are located between 1/4 mile and 3/4 mile of a colony site. Foraging habitat allocation is required for recruitment stands.

RELICT TREE (Relicts) - A pine tree which is left over from the original forests cut over during the period from 1890-1930. They are usually more than 100 years old and exhibit characteristics of high quality red-cockaded woodpecker cavity trees: presence of red-heart fungus at average cavity height, 14 inches DBH or larger, high ratios of heart wood to sap wood, clear and straight trucks and large, flat-topped crowns with large limbs. Most of the red-cockaded woodpecker cavity trees are relicts.

STAND - Trees that grow in the same location and which are fairly uniform in type, age and risk classes, vigor, stand-size class and stocking class. The similarity of these qualities distinguish the stand from adjacent stands that contain trees with different features.

SUITABLE HABITAT - The most appropriate habitat for a given species of plant or animal.

SUITABLE RCW HABITAT - Consider southern yellow pine (except sand pine) and southern yellow pine-hardwood types as potentially suitable RCW habitat. Suitable RCW foraging habitat is pine and pine-hardwood stands 30 years or greater in age, while suitable nesting is considered pine and pine-hardwood stands 60 years or greater in age or younger stands containing scattered or clumped potential cavity trees or relicts.

Pine Types	Pine-Hardwood Types
Longleaf pine	Shortleaf pine-oak
Loblolly pine	Loblolly pine-hardwood
Shortleaf pine	

APPENDIX E

FINAL ENVIRONMENTAL ASSESSMENT

ON

ISSUANCE OF AN INCIDENTAL TAKE PERMIT UNDER SECTION 10(a)(1)(B) OF THE ENDANGERED SPECIES ACT

FOR

A REGIONAL HABITAT CONSERVATION PLAN FOR THE RED-COCKADED WOODPECKER IN THE EAST TEXAS PINEYWOODS

FINAL ENVIRONMENTAL ASSESSMENT

ON

ISSUANCE OF AN INCIDENTAL TAKE PERMIT
UNDER SECTION 10(a)(1)(B) OF THE ENDANGERED SPECIES ACT

FOR

A REGIONAL HABITAT CONSERVATION PLAN FOR THE
RED-COCKADED WOODPECKER IN THE
EAST TEXAS PINEYWOODS

I. PURPOSE AND NEED FOR ACTION

A. Background

The U.S. Fish and Wildlife Service (Service) proposes to issue a section 10(a)(1)(B) Endangered Species permit to Texas Parks and Wildlife Department (TPWD)/Texas Forest Service (TFS) based upon the Safe Harbor component of the February 1997, Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Lands in the East Texas Pineywoods (Texas RCW HCP). The permit would authorize the state of Texas to enter into Safe Harbor Cooperative Agreements with private landowners in east Texas to protect existing red-cockaded woodpeckers (*Picoides borealis*) (RCW) and conduct activities to maintain and enhance their habitat in return for safe harbor assurances. In effect, the permit would authorize TPWD/TFS to enter into Safe Harbor Cooperative Agreements authorizing future take of the endangered RCW incidental to lawful land-use activities, such as timbering or residential development, on private and other public land (excluding State and Federal land) in the Pineywoods region of east Texas. The permit would only authorize incidental take on specific lands enrolled in this program for which a Safe Harbor Cooperative Agreement has been signed.

The geographic scope of the conservation plan encompasses the southeastern portion of the Pineywoods Ecoregion of Texas; it generally consists of a 22-county area that includes all or parts of Anderson, Angelina, Cherokee, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, Tyler, and Walker counties. The plan area boundary includes land south of US Highway 84/59 in Shelby County; south of US Highway 59 and State Highway 204 in Nacogdoches County; south of US Highway 79 in Cherokee County; south of US Highway 79 and east of State Highway 19 in Anderson County; east of State Highway 19/ US Highway 287, east of State Highway 21, and east of the Trinity River in Houston County; east of State Highway 19/30 in Walker County; east of State Highway 30/90, State Highway 105, and Farm Road 1774 in Grimes County; east of State Highway 149 in Montgomery County, north of Farm Road 2920, east of Interstate Highway 45, and north of Farm Road 1960 in Harris County; north of US Highway in Liberty County; north of US Highway 90 in and Interstate Highway 10 in Jefferson County; and north of Interstate Highway 10 in Orange County. The eastern boundary will be east of the Sabine River in Orange, Newton, Sabine, and Shelby Counties. Within this specific plan area, lands potentially eligible for inclusion in the conservation plan include all privately owned lands and public lands owned by cities, counties, and municipalities. In short, essentially all land within the designated geographic area other than Federal and State lands are potentially eligible for inclusion in the plan. Priority will be placed on securing Safe Harbor Cooperative Agreements with landowners where management actions have the potential to immediately benefit the RCW, particularly land with active, inactive, or abandoned clusters, especially when these lands occur near the National Forests with known RCW clusters.

The primary objective of the Texas RCW HCP is to encourage private landowners to assist in recovery of the RCW in the Pineywoods of east Texas by providing protection from Section 9 liabilities under the Endangered Species Act of 1973, as amended (Act). By encouraging voluntary habitat restoration and enhancement of RCW habitat on private lands through Safe Harbor Cooperative Agreements, the primary objective may be achieved within recovery and support populations in east Texas through additional RCW habitat enhancement and management, and successful breeding group establishment. Through juvenile translocation and additional habitat enhancement, improvement, maintenance, and management on private lands, recovery of the RCW on Federal lands in east Texas may be possible. The Texas RCW HCP is based upon an adaptive management concept to allow changes in the program based upon new scientific information including, but not limited to, biological needs and management actions proven to benefit the species or their habitat. The Service continues to critically evaluate any potential or real biological costs and conservation benefits of current RCW management and research programs. This ensures continuation of activities proven to directly benefit or contribute to species conservation and recovery. Currently acceptable management activities may be modified or eliminated based upon research findings and/or evaluation of the biological costs versus the conservation benefits. The 1985 RCW Recovery Plan is currently undergoing revision to reflect advances in RCW management in the last 12 years. Adaptive management allows the Texas RCW HCP to tier to the revised recovery plan upon issuance.

B. Purpose and Need

The purpose of this program is to reach landowners whose land management practices could benefit the RCW, but who are unwilling to carry out those practices because of concerns about the legal responsibilities. In order to persuade such landowners to carry out those practices, they will need either a financial or regulatory incentive to do so. The alternative of paying landowners for desired management practices could be accomplished without allowing any incidental taking, however; the cost of such a program is likely to be commensurate with the cost of a program to acquire conservation easements in the east Texas Pineywoods. At present, monies are not available to fund such a program, although feasibility studies for a wide variety of economic incentives are being implemented. Instead, the regulatory incentive proposed in the Texas RCW HCP is expected to attract sufficient interest among east Texas landowners to generate real benefits for the RCW.

The State of Texas through TPWD/TFS is pursuing this action for the following reasons:

1. The RCW population on private lands in the Pineywoods of east Texas has experienced an overall population decline;

2. Much of the decline on private lands can be attributed to the lack of active habitat management; and,

3. Presently there is a fear of future regulatory responsibility for private landowners that engage in proactive RCW management activities.

The overall goals are:

1. To contribute to the recovery of the East Texas RCW population;

2. To provide economic certainty to private landowners with current or future RCW habitat; and,

3. To contribute to the overall conservation efforts of the southern yellowpine habitat types (shortleaf and loglеaf pine dominated) in the East Texas Pineywoods region, an identified high priority in the Service's East Texas Ecosystem Management Plan.

II. ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

Alternatives to the preferred alternative were identified and ultimately eliminated from further consideration. The range of alternatives is limited by the rule of reason as provided in the Council on Environmental Quality (CEQ) Regulations, Section 1502.14. The emphasis in determining the scope of alternatives would be on what is "reasonable." Reasonable alternatives include those alternatives that are practical or feasible from a technical and economic standpoint.

Three alternatives were considered in the development of the Texas RCW HCP. The preferred alternative is discussed in detail in the Texas RCW HCP. The action is reiterated below in this document. The other two alternatives included a no-action alternative and an alternative which focused on providing financial incentives. These latter two alternatives and the preferred alternative are discussed separately below.

A. Alternative 1 - The Preferred Alternative

The preferred alternative is the issuance of an incidental take permit under Section 10(a)(1)(B) of the Endangered Species Act to TPWD/TFS to facilitate the implementation of a conservation program for the RCW on private and certain other land in the East Texas Pineywoods Region. Safe Harbor Cooperative Agreements authorize incidental take of future RCW groups resulting from land management activities which create RCW habitat. They also allow take resulting from shifting baseline responsibilities. Landowners who enter into Safe Harbor Cooperative Agreements with TPWD/TFS will be included within the scope of the incidental take permit by Certificates of Inclusion. Under a Safe Harbor Cooperative Agreement, a participating landowner must maintain the baseline habitat requirements on his/her property (i.e., any existing RCW groups and associated habitat) but will be allowed to incidentally take RCWs at some point in the future on other habitat

on the property if they are attracted to the site by the management actions implemented by the landowner. No RCWs may be shot, captured, or otherwise directly "taken". Further, no incidental taking of any existing RCW group is permitted under the Safe Harbor Cooperative Agreement unless participating landowners, with the consent of the TPWD/TFS, are allowed to shift their RCW baseline responsibilities to a new group that was formed on their property subsequent to the Safe Harbor Cooperative Agreement.

Subject to maintenance of RCW baseline responsibilities, a participating landowner may (except in and around the cavity trees during the RCW reproductive season), remove trees as part of a timber harvest operation or a conversion to nonforest use, where such tree removal is expected to impact the RCW(s) on the described land. A provision to allowing incidental take is that the Department/TFS be notified 45 days in advance of such tree removal. The restriction against tree removal during the reproductive season is intended to minimize the impact of the authorized incidental taking by eliminating the possibility that reproductive efforts will be disrupted. Additionally, the participating landowner's duty to notify the TPWD/TFS in advance of activities likely to result in the loss of active clusters and the permittee's right to capture and relocate the affected birds are also intended to mitigate the impact of the authorized incidental taking.

The preferred alternative originally involved a proposal to authorize two programs (Safe Harbor, Isolated Group Incidental Take) under one permit via two separate cooperative agreements. The applicants have decided to proceed with the process to obtain a permit authorizing Safe Harbor Cooperative Agreements, while modifying the addendum for Isolated Group Cooperative Agreements. The applicants are aware that modifications to the proposal associated with the isolated group addendum will require an additional DRAFT environmental assessment and a 30-day public comment period announced through an additional Federal Register notice.

B. Alternative 2 - No Action

Under the no-action alternative, it is expected that RCW habitat on private lands would continue to degrade towards unsuitable habitat and resilient RCW groups would continue to disappear, one by one. This anticipated lack of active habitat management to benefit the RCW relates to a continuing landowner fear and uncertainty regarding the regulatory responsibility for taking actions which would benefit RCWs and/or their habitat.

This alternative is being considered for rejection because it does not meet the purpose and need nor does it meet the overall goals of either TPWD or TFS.

C. Alternative 3 - Provide Financial Incentives

The purpose of this program is similar to the preferred alternative, but instead of providing a regulatory incentive, it focuses on providing a financial incentive. In order to persuade

landowners to carry out habitat management practices that benefit the RCW, the Service, TPWD, TFS, or some other entity would provide a financial incentive (i.e., paying landowners for desired management practices).

This alternative is being considered for rejection because there are no known funds from any source to implement such a program.

III. AFFECTED ENVIRONMENT

A. General Description of the Plan Area

The area to be affected by the preferred alternative includes forested land in the East Texas Pineywoods Region of Texas. Certain private and other lands are encompassed within 22 counties of eastern Texas as follows: Anderson, Angelina, Cherokee, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, Tyler and Walker. The plan boundary includes land south of U. S. Highways 84 and 59 in Shelby County; south of U. S. Highway 59 and State Highway 204 in Nacogdoches County; south of U. S. Highway 79 in Cherokee County; south of U. S. Highway 79 and east of State Highway 19 in Anderson County; east of State Highway 19 and U. S . Highway 287, east of State Highway 21, and east of the Trinity River in Houston County; south and east of State Highways 19 and 30 in Walker County; east of State Highways 30 and 90, State Highway 105, and Farm Road 1774 in Grimes County; east of State Highway 149 in Montgomery County; north of Farm Road 2920, east of Interstate Highway 45, and north of Farm Road 1960 in Harris County; north of U. S. Highway 90 in Liberty County; and north of U. S. Highway 90 and Interstate Highway 10 in Orange County. The eastern boundary would be the Sabine River at the Louisiana State Line in Orange, Newton, Sabine and Shelby Counties (see map in appendix A).

B. Land Use

There are approximately 11,565,000 acres of timberland in east Texas. The majority of timberlands in east Texas are in private ownership; private ownership accounts for 10,802,000 acres (93%) of the total. Of this 10,802,000 acres 3,796,000 (35%) are owned by forest industry; 1,378,000 (13%) are owned by farmers or ranchers; 4,939,000 (46%) are owned by individuals; and 690,000 (6%) are owned by other corporate entities. The majority of forest industry lands are owned by the following corporations: Temple-Inland Forest Products Corporation, Champion International, Kirby-Louisiana Pacific Corporation and International Paper Company (McWilliams & Lord, 1988).

Public lands account for approximately 763,000 acres (7%) of timberland in east Texas. The U. S. Forest Service owns approximately 610,000 acres (80%) of the total public

timberland in four National Forests; those forests are the Angelina, Davy Crockett, Sabine and Sam Houston. Other Federal ownership accounts for approximately 84,000 (11%) acres; it includes the Big Thicket National Preserve managed by the National Park Service, and U. S. Army Corps of Engineers lands adjacent to several reservoirs. There are some 57,000 acres (7%) of land owned and managed by the various agencies of the State of Texas; these include three state forests, numerous state parks and wildlife management areas, and lands owned by the General Land Office and other state agencies. An additional 12,000 acres (2%) are held and managed by the various counties (McWilliams & Lord, 1988).

The major land uses within the region are production of forest products, oil and gas extraction and production, agriculture, manufacturing and tourism.

C. Vegetation, Climate and Soils

The forests of eastern Texas are located in the Western Gulf Coastal Province of the United States, and as such are the western terminus of the forests of the southeastern United States. Vegetative communities of the East Texas Pineywoods Region consist of a variety of upland and wetlands types. Wetland forest types range from small forests around springs, seeps and bogs, to bottomland hardwood floodplain forests, to swamps. Wetland forests are dominated by the oak-gum-cypress and elm-ash-cottonwood forest types. The oak-gum-cypress forest type is present on approximately 1,519,100 acres (13.13%), and the elm-ash-cottonwood forest type is present on approximately 58,500 acres (0.51%). The slope and upland forests are dominated by the loblolly-shortleaf pine, oak-hickory, oak-pine, and longleaf-slash pine forest types. The loblolly-shortleaf pine type is present on approximately 3,936,600 acres (34.04%), the oak-hickory forest type is present on approximately 3,369,300 acres (29.13%), the oak-pine forest type is present on approximately 2,401,800 acres (20.77%), and the longleaf-slash pine type is present on approximately 279,000 acres (2.41%) (McWilliams & Lord, 1988).

The East Texas Pineywoods Region is part of the subtropical-temperate zone and is characterized by hot summers and mild winters. Average annual precipitation for the East Texas and Upper Coast Regions of Texas from 1930 to 1990 was between 45.41 inches (East Texas) and 46.55 inches (Upper Coast Region). Most of the rainfall, except during hurricane events, comes during the late spring and fall months (Texas Almanac, 1996-97). Although there can be several freeze events during the winter, the average winter temperature in Angelina County (central Pineywoods) is 50 degrees F, with an average daily minimum temperature for winter of 39 degrees F. In summer, for the same area, the average temperature is 82 degrees F, with an average daily maximum temperature of 93 degrees (Angelina County Soil Survey).

The topography is gently rolling inland to nearly flat along the Gulf Coast. Soils are generally well-drained sands on the uplands and along the slopes, and poorly-drained silts and clays in the bottomlands. Slope and upland soil types are generally low in organic matter and soil fertility, while bottomland soils are generally higher in both respects.

D. The Status of the Longleaf Pine Community Type

The longleaf pine forest throughout the southeast is under siege. Today, the longleaf pine forest covers less than 3,800,000 acres (only 4.13% of historic coverage); historically this forest once covered approximately 92,000,000 acres. Most of these longleaf forest areas presently are in second-growth, and not typical of those previous longleaf pine forests that had occurred for thousands of years with periodic maintenance by wildfire events. At present, most of the well-managed longleaf pine forests in eastern Texas occur on lands in the National Forest System in Texas (McWilliams & Lord, 1988).

Prior to settlement, east Texas was a wilderness dominated by virgin forests. The longleaf pine forest type occupied roughly 5,000 square miles in southeast Texas, from Hardin, Polk and Angelina Counties east to the Louisiana border. Kept open by recurrent fires, these nearly pure stands often contained trees 150 to 200 feet tall and 4 to 5 feet in diameter. Difficulties in regeneration of longleaf pine, conversion to loblolly and slash pine forests, and suppression of wildfires has reduced this forest type to less than 300,000 acres at present in eastern Texas (McWilliams & Lord, 1988).

E. The Importance of Fire in the Pineywoods Forest Ecology

All aspects of the southern yellowpine landscape are directly tied to fire ecology. Fires are thought to have naturally occurred in these forests every 2 to 7 years, due to summer lightning strikes and/or Native American practices. Fires would often sweep across vast areas, driven by an abundance of highly flammable ground fuels such as pine needles and a well developed herbaceous understory of which little bluestem grass was a major component. In addition, there were virtually no man-made barriers, like highways, to prevent the uncontrolled spread and development of these intense fires. Many plant species, including longleaf pine, shortleaf pine, and little bluestem grass, are dependent upon fire disturbance for their reproduction and survival. In the absence of fires, scrub oaks and other hardwoods become dominant, and out-compete other more desirable species for light, nutrients and water. Aside from land conversion to non-forest uses or other forest types, fire suppression is the greatest threat to the survival of the southern yellowpine ecosystem.

F. The Focal Species - The Red-Cockaded Woodpecker

The east Texas Pineywoods supports an unusual diversity of plant and animal life including some rare, declining, or endangered species. The best known, and most widespread, of

the endangered species is the RCW. The east Texas Pineywoods supports one RCW recovery and two support populations. The 1985 RCW Recovery Plan identifies a requirement for downlisting the RCW from endangered to threatened to include one viable population in the coastal plain of Texas or Louisiana; for the RCW to be considered recovered, one viable population in the coastal plain of Texas and one in Louisiana are required in addition to 13 other populations across the species' range (U.S. Fish and Wildlife Service 1985).

The RCW on the Sam Houston National Forest has been designated as the recovery population in Texas. Two other support populations are located on the Davy Crockett and Angelina/Sabine National Forests. In 1996, the National Forests in Texas designated approximately 277,000 acres of upland pine/pine-hardwood habitat for RCW management. The RCW population objective on the National Forests in Texas is 1,385 active clusters (541 on the Sam Houston, 330 on the Day Crockett, and 514 on the Angelina/Sabine National Forests).

The natural history and ecological requirements of the RCW reveal why the species has been in decline throughout its range. Typically, the RCW excavates its nesting and roosting cavities in living pine trees that are generally 80 or more years old. Each group of RCWs typically consists of a mated pair, young of the year, and one or more male "helper" birds from the previous year's offspring. A group typically occupies a discrete territory consisting of a cluster site and nearby foraging area (see Ligon 1970 for further information on RCW biology).

Preferred foraging habitat consists of at least 125 acres of open parklike pine or pine-hardwood forest within 0.5-mile of a cluster with at least 6,350 pines of 10 inches or more diameter at breast height (dbh), a total pine basal area (BA) of at least 8,940 square feet, and minimal hardwood understory and midstory (Carter 1974, USFWS 1985, Hooper and Harlow 1986, Repasky 1985). Encroachment of hardwoods favors competing cavity dwellers, such as flying squirrels and pileated woodpeckers which displace RCWs (Van Balen and Doerr 1978, Locke et. al. 1983). Historically, the open parklike conditions that favor RCW were maintained by frequent fire events (Komarek 1974).

Among the factors that have contributed to the decline of the RCW are timber harvesting programs that utilize rotation cycles too short to allow trees to reach sufficient age for cavity excavation (Wood et.al. 1985); fire suppression, with the resultant hardwood encroachment; and fragmentation, a result of urban and agricultural growth (Costa and Escano 1989, Conner and Rudolph 1991). As a result of these many factors, despite protection as an endangered species since 1970, the RCW has steadily declined, particularly on private land (Lennartz et. al. 1983, Ligon et. al. 1986, Jackson 1986, Costa 1995).

Once established, cluster sites are often utilized for many consecutive years or even decades (Walters 1989). Cluster site abandonment may occur as a result of understory and midstory encroachment, displacement by competing cavity dwellers, or chance events. A substantial number of abandoned cluster sites could be reoccupied by RCW with implementation of appropriate management techniques.

G. Other Federally Listed Species and Species of Special Concern in the East Texas Pineywoods

Other federally listed endangered species that may occur within the Pineywoods Ecoregion of Texas are the white bladderpod (*Lesquerella pallida*), Texas trailing phlox (*Phlox nivalis ssp texensis*) and Navasota ladies'-tresses (*Spiranthes parksii*).

Federally listed threatened species known to occur within the Pineywoods Ecoregion of Texas are the bald eagle (*Haliaeetus leucocephalus*) and the Louisiana black bear (*Ursus americanus loteolus*). There are random sightings of black bears in the extreme eastern portions of the state along the Louisiana, Arkansas and Oklahoma borders, but these sightings are likely the result of reintroduction efforts, expansions of endemic populations in the neighboring states, or misidentification of large hogs. Research is being performed to determine the status of the black bear in eastern Texas.

The following species of special concern are known to occur in east Texas: Big thicket hog-nosed skunk (*Conepatus mesoleucus telmalestes*), Rafinesque's big-eared bat (*Plecotus rafinesquii*), Southeastern myotis (*Myotis austroriparius*), Bachman's sparrow (*Aimophila aestivalis*), Henslow's sparrow (*Ammodramus henslowii*), Southeastern American kestrel (*Falco sparverius paulus*), Louisiana pine snake (*Pituophis melanoleucus ruthveni*), alligator snapping turtle (*Macroclemys temminckii*), paddlefish (*Polyodon spathula*), blue sucker (*Cycleptus elongatus*), white firewheel (*Gaillardia aestivalis* var. *winkleri*), slender gay-feather (*Liatris tenuis*), incised groovebur (*Agrimonia incisa*), bog coneflower (*Rudbeckia scabrifolia*), tiny bog-buttons (*Lachnocaulon digynum*), Drummond's yellow-eyed grass (*Xyris drummondii*), rough-leaf yellow-eyed grass (*Xyris scabrifolia*), and scarlet catchfly (*Silene subciliata*).

Of those federally listed endangered and threatened species, and species of special concern, Louisiana pine snake and Texas trailing phlox may utilize the same specific mature open park-like pine forest with herbaceous understory conditions that were home to the RCW. These systems were fire sub-climax or disclimax systems that have been altered primarily by suppression of natural wildfire events which has resulted in hardwood encroachment. Management for RCW will promote production of habitat for all of these species, and as such will be ecosystem management for those mature pine and pine-hardwood systems.

H. Overall Biodiversity in the East Texas Pineywoods

1. Introduction

East Texas, which lies within the Gulf Coastal Plain Physiographic Province, contains over 6,070,305 ha (15,000,000 acres) of gently rolling or hilly country ranging from 15 m (50 ft.) to 230 m (755 ft.) in elevation. Differential erosion of the area has been enhanced by the occurrence of many creeks and rivers. Main rivers in the region include the Angelina, Attoyac, Neches, Red, Sabine, Sulphur and Trinity, with all flowing easterly or southeasterly to the Gulf of Mexico. The forests of east Texas (and the western boundary of the forests of the southeastern U. S.) are generally restrained westwardly by precipitation and edaphic (soil) factors (Nixon, 1985).

Because of the diversity of such factors as topography, precipitation, soil, and temperature within east Texas, the vegetation is quite variable. The various vegetative communities can be broken down into the following general site-specific groups: dry uplands, mesic uplands, mesic creek bottoms, wet creek bottoms, pitcher plant bogs and seepages, river bottoms and swamps (Nixon, 1985). The majority of RCW clusters occurred in the dry and mesic uplands, and some possibly in the mesic creek bottoms that were dominated by pine and maintained by periodic fire.

2. Dry Upland Communities

Even though east Texas receives a relatively high amount of annual precipitation, droughts occur quite commonly on certain sites during the summer and fall. Higher uplands, especially those containing deep sands, dry rapidly. As a result, species that are more drought resistant prevail (Nixon, 1985).

The more dominant dry upland tree species include post oak (*Quercus stellata*), black hickory (*Carya texana*), blackjack oak (*Q. Marilandica*), sandjack or bluejack oak (*Q. incana*) and black oak (*Q. velutina*) (Marietta, 1979; Ward, 1984). Pines are occasionally co-dominants within dry upland communities. Shortleaf pine (*Pinus echinata*) is most abundant in the central and northern portions of east Texas whereas longleaf pine (*P. palustris*) is fairly abundant in southeastern Texas. Other common dry upland tree species are sweetgum (*Liquidambar styraciflua*), red mulberry (*Morus rubra*), woollybucket bumelia (*Bumelia lanuginosa*), southern red oak (*Q. falcata*), sassafras (*Sassafras albidum*), winged elm (*Ulmus alata*), and rusty blackhaw (*Viburnum rufidulum*) (Bray, 1906; Tharp, 1925; Sullivan and Nixon, 1971).

3. Mesic Upland Communities

Mesic uplands contain intermediate amounts of soil water. They usually hold sufficient soil moisture during most of the year. The greater amount of moisture may be a result of slope exposure, nearness to a water source, a closed canopy, etc. As a result, mesic upland communities are usually situated on rather flat areas with closed canopies, east- or north- facing slopes, and slopes associated with creeks or river bottoms. Principal tree species found in mesic uplands are southern red oak, sweetgum, flowering dogwood (*Cornus florida*), mockernut hickory (*Carya tomentosa*), winged elm, loblolly pine (*Pinus taeda*), water oak (*Q. nigra*), black cherry (*Prunus serotina*), sassafras, fringetree (*Chionanthus virginica*), blackgum (*Nyssa sylvatica*), sugar maple (*Acer saccharum*) and American elm (*Ulmus americanum*) (Sullivan and Nixon, 1971; Chambless, 1971; Langston, 1974; Nixon et al., 1980).

4. Mesic Creek Bottom Communities

The rather flat, mesic creek bottoms with fairly deep channels contain soils that are well-drained and trees that provide good canopy cover. The upper canopies consist chiefly of red maple (*Acer rubrum*), river birch (*Betula nigra*), American hornbeam (*Carpinus caroliniana*), bitternut hickory (*Carya cordiformis*), American beech (*Fagus grandifolia*), American holly (*Ilex opaca*), silverbell (*Halesia diptera*), sweetgum, sweetbay magnolia (*Magnolia virginiana*), blackgum, eastern hophornbeam (*Ostrya virginiana*), white oak (*Quercus alba*), water oak and prickly ash (*Zanthoxylum clava-herculis*) (Sullivan and Nixon, 1971; Nixon and Rines, 1976).

5. Wet Creek Bottom Communities

Wet Creek bottoms are generally flat and result from seepage areas as well as shallow winding creek channels. Water stands over much of the area. Water tolerant tree species in these bottoms are red maple, sweetbay magnolia, blackgum, sweetgum and red bay (*Persea borbonia*) (Nixon et al., 1980).

6. Pitcher Plant Bog and Seepage Communities

Oftentimes associated with certain geological formations are areas called pitcher plant bogs. Where coarse sands overlie highly impermeable clays the water penetrates the sands to the clays and moves laterally causing seepages on hillsides. These seepage sites are usually wet year round and at times contain pitcher plants (*Sarracenia alata*). Trees associated with these bogs are red maple, sweetbay magnolia, blackgum and red bay (Nixon, 1985).

7. River Bottom Communities

Although bottomland topography is generally flat, significant habitat variations are present. Slight differences in elevation bring about flats, ridges (higher ground between flats), sloughs and swamps and these in turn cause vegetational variation. For example, in the Neches and Angelina River bottoms, American hornbeam, water oak, blackgum and sweetgum were more prevalent on ridge areas whereas Carolina ash (*Fraxinus caroliniana),* red maple, American snowbell (*Styrax americana),* and laurel oak (*Quercus laurifolia)* were more abundant on flats (Nixon et al., 1973; Chambless and Nixon, 1975; Nixon et al., 1977). Some flats sustain large populations of the dwarf palmetto (*Sabal minor)* (Nixon et al., 1973).

When observing bottomlands in general, overcup oak (*Quercus lyrata),* willow oak (*Q. phellos),* water oak, laurel oak, green ash (*Fraxinus pennsylvanica),* sweetgum, American hornbeam, deciduous holly, cedar elm (*Ulmus crassifolia),* Texas sugarberry (*Celtis laevigata),* red maple and hawthorn (*Crataegus spp.)* are usually dominant (Nixon et al., 1973; Nixon and Willett, 1974; Chambless and Nixon, 1975; Nixon et al., 1977).

8. Swamp Communities

Swamps are generally defined as wet areas which contain standing water and trees. Other kinds of woody plants are also present. Shrubs and trees common to east Texas swamps are green ash, bald cypress (*Taxodium distichum),* water tupelo (*Nyssa aquatica),* swamp privet (*Forestiera acuminata),* water elm (*Planera aquatica),* Carolina ash, water locust (*Gleditsia aquatica*) and common buttonbush (*Cephelanthus occidentalis*) (Nixon and Willett, 1974; Burandt et al., 1977). Although these same species are usually present, their occurrence and relative composition vary. Almost pure stands of any one of the aforementioned swamp species can be encountered in addition to more equalized mixtures (Nixon, 1985).

9. Conclusion

The east Texas Pineywoods landscape, with its various vegetative systems as previously discussed, is a very biologically diverse landscape. The fauna and flora associated with these vegetative communities are equally diverse. In addition, this landscape has been altered by logging, agriculture, urbanization, conversion to off-site species, and the absence of fire events.

I. Trends in Forest Resources

Forests cover almost 14% of the land area in Texas. Half of Texas' forests are in the Pineywoods Region of east Texas. The Post Oak region has 3,600,000 acres of trees. The

Cross Timbers region in north central Texas has almost 2,400,000 acres of trees. The Cedar Brakes region, in the east central hill country, has 4,500,000 acres of mountain cedar mixed with oak, elm and other hardwoods. Another 1,500,000 acres of forests are in the mountains of west Texas, the coastal regions, and in flood plains in south central Texas. Extensive areas of rangeland that grow mesquite are not included as forested acreage (Texas Forest Service, 1970).

Of the total forest area in Texas, 12,118,000 acres are considered to be productive timberland (USDA Forest Service, 1987). Of the twelve southern states, Texas ranks eleventh in timberland acreage. Ninety-five percent of the timberland in Texas, or 11,565,000 acres, are in the Pineywoods Region. Timberland is forest land that is producing, or is capable of producing, crops of industrial wood. Land that is otherwise withdrawn from timber utilization, such as legally designated wilderness and preserve areas, are not classified as timberland, regardless of their productive capability. The minimum productivity standard for timberland is annual growth of 20 cubic feet of wood per acre, which is only about one-fourth of a cord. According to the U.S. Forest Service (Land and Bertelson 1987), the "average" acre of Texas timberland can produce 76 cubic feet per year - almost one cord of wood.

There are 43 counties in the Pineywoods Region of east Texas. Considering all land uses, the Pineywoods Region consists of almost 22,000,000 acres. Timberland comprises almost 55% of the land in east Texas. Of the six other states in the south central region, only Alabama has a higher percentage of timberland. There is more pasture land in east Texas than in any other southern state. Of the eleven other states in the south, only eastern Oklahoma has fewer acres of cropland than exists in east Texas (O'Laughlin & Williams, 1988).

The major timber types present in the Pineywoods are pine, oak-pine, upland hardwood and bottomland hardwood. Pine is the principal tree on 36% of the timberland acres. Oak and other hardwoods in association with pine (oak-pine) are the principal forest types on 26% of the timberlands. Pine trees are present to a substantial degree on well over half of the east Texas Pineywoods timberlands. Upland hardwood forests cover 29% of the timberland acres, and bottomland hardwood forests cover the remaining 14% (O'Laughlin and Williams, 1988).

The forest products industry employs almost 60,000 Texans. Approximately 18,000 people are directly involved in the growing, harvesting, and converting of timber into primary wood-based products such as lumber, plywood, and paper. The remaining 42,000 jobs are in manufacturing secondary wood-based products such as doors, cabinets, furniture, treated poles, and consumer paper products and paper packaging. An additional 228,000 Texans transport, sell or use wood-based products in construction activities and in printing and publishing (O'Laughlin & Williams, 1988).

The Texas wood-based industry is the ninth largest in the nation, and the fourth largest in the South, with sales of $5.6 billion and a value added contribution of $2.3 billion in 1984. In Texas, timber consistently ranks among the top four cash crops, with an annual delivered value of approximately $500 million. Timber grown in east Texas is processed into primary wood-based products that had a sales value of $1.6 billion and a value added contribution of $550 million in 1984. State tax revenue generated by wood-based industry was $14.3 billion. Texas wood-based companies made more than $2.0 billion in capital investments (O'Laughlin & Williams, 1988).

The wood-based industry provides more than one-fourth of the manufacturing employment opportunities in rural east Texas. In 72% of the 43 east Texas counties, wood-based industry is the primary or secondary manufacturing employer. Seventeen counties (40%) in east Texas depend upon wood-based industries as their primary manufacturing employer. In addition, in fourteen counties in east Texas (33%), wood-based industries constitute the second largest manufacturing employer. Excluding Houston, Beaumont-Port Arthur-Orange, Longview-Marshall and Tyler, wood-based industry represents 28% of all manufacturing employment in east Texas (O'Laughlin & Williams, 1988).

Texas is one of the top ten states in the United States in primary wood-based manufacturing. Compared to other states Texas ranks fourth among the southern states, and ninth nationwide in value added by manufacture from wood-based industry. Texas ranks second in employment in wood-based manufacturing across the south. Texas ranks second in the south, and third nationally in plywood production; this accounts for 10% of all production in the United States. Texas ranks 6th southwide, and 12th nationally in lumber production. Texas ranks fifth southwide, and seventh nationwide in pulpwood consumption (O'Laughlin & Williams, 1988).

Ownership is a critical factor in determining how timberlands are managed; its importance as a management consideration cannot be overstated. The landowner - within legal, environmental, economic, social and political constraints - decides what happens to the land, including the timber resource attached to it. There are three major categories of timberland owners in Texas; non-industrial private forest landowners (NIPF), forest product companies, and public ownership.

NIPF ownership is the largest segment of Texas' timberland acres. Approximately 7,000,000 acres of timberland is in non-industrial private ownership. By definition, these owners do not process their timber into lumber or other wood-based products. These landowners own more than 60% of the timberland in the Pineywoods Region. The management objectives of these owners are as diverse as the owners themselves. In the northeastern United States these owners own more than 80% of timberlands. Even categorization of these estimated 150,000 owners is difficult. The forest inventory conducted by the U. S. Forest Service now recognizes three sub-groups of NIPFs: farmers, corporate and individuals. The largest of these sub-groups is the individual NIPF; they

own approximately 4,927,000 acres or 42% of the timberland in the Pineywoods Region. Farmers are the second largest group; they own approximately 1,378,000 acres or 12% of that timberland. Corporate NIPF entities own approximately 640,000 acres or 6% of the timberlands in the Pineywoods (O'Laughlin & Williams, 1988).

Forest product companies are the second type of timberland owner in east Texas. These companies own the next highest amount of timberland by landowner type in the Pineywoods. They own approximately 3,796,000 acres or 33% of the timberland in Texas. The major difference in these land holdings and those of the NIPFs above is that these lands occur in large concentrated blocks, rather than in small fragmented blocks across the landscape. The primary objective for these timberlands is to provide supplies of wood for the companies' manufacturing facilities (O'Laughlin & Williams, 1988).

The smallest timberland ownership group in the Pineywoods Region is public ownership. Public ownership accounts for 763,000 acres or 7% of the timberland base in east Texas. Most timberland in this category is managed as National Forest by the U. S. Forest Service; these forests contain 610,000 acres or 5% of the total timberland in the region. Other public holdings account for 153,000 acres or 1% of timberland in the region (O'Laughlin and Williams, 1988).

A Texas Forest Service summary (TFS 1987b) of the 1986 forest survey conducted by the U. S. Forest Service addressed several points regarding the status of timber resources in Texas. Those points were: acreage of pine timber is declining; timber growth has declined; timber mortality has more than doubled in the past decade; annual pine timber removals exceed annual growth; pine timber inventory is declining; tree planting has not kept pace with harvesting; and there are many opportunities to increase timber growth.

The future of the Texas forest economy as described in "The South's Fourth Forest" report (USDA Forest Service 1987a) is not a favorable one. The USFS projects that future demand for timber will increase at a more rapid rate than future timber supplies. If problems - such as higher timber and wood product prices and reduced opportunities for industrial growth - caused by this situation are to be resolved, it is important to understand the objectives of various timberland owners.

IV. ENVIRONMENTAL CONSEQUENCES

A. The Preferred Alternative

The Service proposes to issue a Section 10(a)(1)(B) permit jointly to TPWD/TFS based upon the Safe Harbor Component of the Texas RCW HCP. The permit would allow TPWD/TFS to enter into Safe Harbor Cooperative Agreements authorizing future take of the endangered red-cockaded woodpecker incidental to lawful land-use activities, such as

timbering or residential development, on private and other public land (excluding State and Federal land) in the Pineywoods region of east Texas. The permit would only authorize incidental take on specific lands enrolled in this program for which a Safe Harbor Cooperative Agreement has been signed.

This action is anticipated to result in direct and/or indirect effects on the RCW population, other wildlife, species of special concern, society, trends in local forest use, and overall ecosystem health as discussed below.

1. **Direct and Indirect Effects on the RCW Population, and other Wildlife, in the East Texas Pineywoods.**

   The principal intended effect of the preferred alternative is to benefit the population of RCWs in the East Texas Pineywoods Region by restoring or enhancing habitat capable of serving as nesting or foraging habitat. The benefits intended to accrue to this endangered species include an increase in numbers and distribution of active breeding groups and the maintenance or strengthening of dispersal corridors among subpopulations. By removing a potential disincentive to the types of land management practices that could benefit the RCW, the preferred alternative will encourage the retention of older pine stands, particularly longleaf pine stands, the protection of old and relict trees potentially suitable as RCW cavity trees, and active land management that will result in ecological characteristics more like those that prevailed historically.

   Under a Safe Harbor Cooperative Agreement, a participating landowner must maintain the baseline habitat requirements on his/her property (i.e., any existing RCW groups and associated habitat) but will be allowed to incidentally take RCWs at some point in the future on other habitat on the property if they are attracted to the site by the management actions implemented by the landowner. No RCWs may be shot, captured, or otherwise directly "taken". Further, no incidental taking of any existing RCW group is permitted under the Safe Harbor Cooperative Agreement unless participating landowners, with the consent of the TPWD/TFS, are allowed to shift their RCW baseline responsibilities to a new group that was formed on their property subsequent to the Safe Harbor Cooperative Agreement.

   Subject to maintenance of RCW baseline responsibilities, a participating landowner may (except in and around the cavity trees during the RCW reproductive season) remove trees as part of a timber harvest operation or a conversion to nonforest use, where such tree removal is expected to impact the RCW(s) on the described land. A provision to allowing incidental take is that the Department/TFS be notified 45 days in advance of such tree removal. The restriction against tree removal during the reproductive season is intended to minimize the impact of the authorized incidental taking by eliminating the possibility that reproductive efforts will be

disrupted. Additionally, the participating landowner's duty to notify the TFS or the Department in advance of activities likely to result in the loss of active clusters and the permittee's right to capture and relocate the affected birds are also intended to mitigate the impact of the authorized incidental taking.

The expectation underlying Texas RCW HCP implementation is that the management measures to be undertaken on participating land resulting from Safe Harbor Cooperative Agreements will result in the use of some or most of the land by RCWs and that without those measures such land will not otherwise be utilized by RCWs.

Although the landowner Safe Harbor Cooperative Agreements contemplated for this program are of limited duration and are revocable by the participating landowners, the favorable habitat conditions created or maintained will not necessarily cease to exist upon expiration or termination of the individual agreements. If the program continues for an extended period of time (e.g., for 99 years), with new land parcels constantly coming under Safe Harbor Cooperative Agreements as agreements covering other land parcels expire, the net effect will be a shifting matrix of land being managed for RCW conservation, with a net beneficial impact upon the status quo.

Even if all the landowners who participate in the program eventually drop out, their obligation to maintain RCW baseline responsibilities will mean, at the very least, a return to the same circumstances that would have existed without the plan. In a worst-case scenario, the program will have provided significant interim benefits in the form of population and demographic maintenance during its duration. Such benefits would include temporary halting or reversing the fragmentation of RCW habitat, creating or strengthening dispersal corridors between disjunct populations or subpopulations, contributing some offspring that may either reoccupy previously abandoned clusters or that may be used for relocation to land protected by longer-term conservation arrangements, and providing a form of "insurance" against the possibility of a disastrous event that could significantly reduce the number of RCWs on public lands in east Texas. Thus, this program will likely, at the very minimum, reduce the overall long-term decline of the Pineywoods RCW populations.

Timber management activities involving harvesting of pine trees, have the potential to reduce RCW foraging habitat below the levels currently believed acceptable to support a group of RCWs. Land conversion from pine forest to other uses such as pasture or residential subdivisions remove habitat required by the RCW for subsistence. Much of the private and other land in the east Texas Pineywoods that could participate in the preferred program have pine stands on them that contain significant hardwood understory and midstory. Reduction and continued control

of the hardwood understory and midstory will create favorable habitat conditions for the RCW, will facilitate the use of prescribed fires as a land management tool, and will benefit other species that are naturally adapted to the open parklike pine forests that occurred there historically. Game species that will benefit from this management are northern bobwhite (*Colinus virginianus*) and fox squirrel (*Sciurus niger*).

This conservation strategy for the RCW population in east Texas is supported by representatives from the Service, U.S. Forest Service, TPWD, TFS, and private industry. Implementation should alleviate the fear and hostility towards endangered species conservation efforts by providing private landowners with relief from potential regulatory burdens while promoting the voluntary enhancement and restoration of RCW nesting and foraging habitat on privately owned lands.

2. Direct and Indirect Effects on other Federally Listed Species and Species of Special Concern.

Endangered species known to occur within the action area other than the RCW are the Navasota ladies'-tresses (*Spiranthes parksii*), Texas trailing phlox (*Phlox nivalis var. texensis*), and white bladderpod (*Lesquerella pallida*). Threatened species known or which could occur within the action area are the bald eagle (*Haliaeetus leucocephalus*), and Louisiana black bear (*Ursus americanus luteolus*). No designated critical habitat occurs within the conservation plan area. No proposed species are known to occur within the plan area. The only candidate species known to occur within the geographic boundaries of this plan is the Neches River rose-mallow (*Hibiscus dasycalyx*).

The Service believes that the likelihood of the federally listed animal species (bald eagle, Louisiana black bear) occurring on the lands enrolled in this plan is very low. This is because the species are either transients or are extremely rare and occur in very unique habitats. The bald eagle may nest or roost in large pines adjacent to large water bodies--reservoirs, natural lakes and large rivers and is presently known to nest in the plan area. The possibility exists that the Texas trailing phlox may occur on some of the lands that are enrolled in this plan. To assure that management actions are not likely to adversely affect any federally listed species, the plan requires the TPWD/TFS, prior to entering into a Cooperative Agreement with respect to any land parcel, to ascertain whether listed or candidate species other than the RCW are likely to be present. If other federally listed species are present, the TPWD/TFS will include such measures in the Cooperative Agreement for that land parcel as are necessary to ensure that the preferred plan of action is not likely to adversely affect the species in question. Where candidate plant or animal species or any species of special concern occur on the parcel, TPWD/TFS will make non-binding recommendations in the cooperative

agreement to aid in the conservation of those species. Where the preferred management action may affect listed species other than the RCW, TPWD/TFS will initiate consultation with the Service. The Service will then conduct any necessary intra-Service Section 7 consultation on the preferred alternative. Any anticipated incidental take along with reasonable and prudent measures will be included in a biological opinion. The permit holders (TPWD/TFS) will then be responsible for carrying out the terms and conditions to implement the reasonable and prudent measures.

A majority of the federally listed, candidate plant, and species of special concern that naturally occur within the upland pine ecosystems that provide RCW habitat will benefit from this program overall, especially through an enhanced prescribed burning program.

3. Direct and Indirect Effects on Society

a. Social

(1) Recreational: Recreational use of the affected areas may increase, corresponding to the increased aesthetics of open park-like forested areas. An increase in wildlife viewing and hunting opportunities should accompany the increase in wildlife populations.

(2) Cultural and Historical: Direct and indirect effects may occur as a result of an increased awareness of the uniqueness of the longleaf pine ecosystem. In addition, there may be an increase in both interest and knowledge concerning the historical vegetation types that occurred within the region, including the mature upland pine ecosystems.

b. Economic

The direct effects of the activities associated with this program may encourage some local business interests to expand their services (e.g., landscapers clearing hardwoods) or product lines (e.g., greenhouses producing longleaf pine seedlings, native plants, grasses, etc.). Entrepreneurs may identify a specialty market for goods or services.

The effect of this program on the landscape level may dovetail nicely with local efforts to preserve the unique ambiance and natural beauty of the east Texas landscape in neighborhoods, parks and other areas. Various groups are working across the southeastern U. S. to suggest and provide guidance for methods for conserving naturally occurring resources, like longleaf pines, in the face of economic and urban development.

4. Direct and Indirect Effects on Forest Resources

Proper management for RCW is highly compatible with best forest management practices on upland and upper slope pine forests. Management for RCW is completely compatible with management for southern yellowpine forests. The only differences that will occur between current forest management practices for production of pine timber and RCW management will be an overall increase in rotation age within the designated RCW cluster and foraging habitat and use of seedtree, shelterwood, selection and variations thereof instead of clearcutting within those areas designated as cluster sites or foraging habitat. In areas not designated as cluster sites or foraging habitat, the Texas RCW HCP will not prohibit clearcutting as a silvicultural system. Hopefully this will alleviate an inherent fear that many landowners have in allowing their open park-like pine timber to reach ages where it is more suitable for use by RCW. Increases in frequency, and possibly intensity, of prescribed fire utilized to promote RCW habitat should be beneficial to pine timber production.

Because RCW inhabit open park-like stands of pine timber with little or no midstory vegetation, they generally select for upland and upper slope pine forest systems, and should pose few if any implications to the lower slope and bottomland forests which are either largely or entirely composed of hardwood species.

5. Direct and Indirect Effects on the Southern Yellowpine Ecosystem

a. Forests

The preferred program may result in more frequent use of prescribed burning as a land management tool. Environmental impacts associated with prescribed burning include the ecological benefits of maintaining the natural pine fire sub-climax communities like the upland pine communities that were historically dependent upon frequent fire. Overall, the program should encourage management activities that benefit and help perpetuate longleaf pine, shortleaf pine, loblolly pine, and other fire-dependent ecosystems. These activities should encourage tree growth and regeneration.

b. Physical

(1) Soils

The direct affect of midstory removal on the soil will vary with the methods, topography and soil types. Methods will be favored which minimize soil disturbance, such as with hand tools and

herbicides rather than large-tracked or wheeled machinery. Herbicides may affect soil productivity but will be utilized only at prescribed rates and conditions. The use of prescribed fire may affect soil productivity if improperly applied (during low soil moisture conditions). The intended outcome will be a long-term increase in soil productivity and structure.

(2) **Water**

The use of prescribed fire may increase stream nutrients, storm flows, and sediment loads immediately following burns. However, the net result will likely be a decrease in these rates due to the increase in fire-evolved grassy herbaceous layer and root matting of native vegetation.

(3) **Air**

Prescribed fire will likely affect the air quality in and around the action areas. The affects on air quality will be brief and intermittent in each area affected. The major effects resulting from prescribed burning are reduced visibility and human respiratory impairment. These effects are reduced by following regulations established by the Texas Natural Resource Conservation Commission, and the Texas Forest Service, and coordinating prescribed burning programs with those agencies and the National Oceanic and Atmospheric Administration's weather stations.

6. **Cumulative Effects of the Preferred Program**

The preferred program is a component of an overall conservation strategy for the RCW population in the East Texas Pineywoods Region developed by representatives from the Texas Parks & Wildlife Department, the Texas Forest Service, the U. S. Fish & Wildlife Service, the U. S. Forest Service, and the members of the Steering Committee and Scientific Advisory Board for the development of the HCP for RCWs in Texas. It also complements efforts by these agencies and organizations and others, including the Nature Conservancy, to protect remnants of the longleaf pine ecosystem in Texas.

The Service believes this program will promote an "RCW-friendly" environment, which may alleviate some of the fear and hostility of private landowners toward threatened and endangered species. Implementation would provide private landowners with relief from potential regulatory burdens while promoting the

voluntary enhancement and restoration of RCW nesting and foraging habitat on privately owned lands.

It is anticipated that this program will result in net benefits to other endemic species associated with upland pine and pine/hardwood habitats. Indeed, management activities such as prescribed burning and thinning will enhance habitat for many species of flora and fauna, and perhaps preempt the need to list several of the species dependent upon upland pine and pine/hardwood habitats which are currently considered species of special concern.

B. No-Action Alternative

Under the no-action alternative, incidental taking of RCWs and RCW habitat would not be allowed and would continue the status quo. If there were a significant number of landowners willing to restore or enhance habitat for RCWs in the designated geographic region of east Texas regardless of the legal responsibilities, one would expect to see such restoration and enhancement under way now, and there would be no need for this program. Clearly, however, that is not the case.

The likely effects of the no-action alternative are the continued decline of the east Texas Pineywoods RCW population, the continued loss of its nesting and foraging habitat on private land, and the continued lack of management of many of the mature pine forests that remain in the region. If this alternative is selected, an "RCW-friendly" environment (i.e., positive public relations) with regard to the private sector would not be created and concomitant opportunities for recovery of the region's RCW population would be lost.

C. Alternative 3

The third alternative involves offering interested landowners financial, rather than regulatory, incentives to undertake the desired land management activities for RCWs. If it were feasible to implement the conservation program in this manner, the benefits to the RCW and its habitat would be permanent rather than temporary. The principal difference, therefore, between the environmental impacts of this alternative and the preferred alternative pertain to the duration of those impacts, rather than their nature. The cost of such a program is likely to be commensurate with the cost of a program to acquire conservation easements in the East Texas Pineywoods. The Service, TPWD, TFS or any other entity are presently either unable or unavailable to fund such a program.

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VI. SUMMARY OF PUBLIC INVOLVEMENT

The Texas RCW HCP was developed as the result of many months of coordination and planning with members of the steering committee and scientific advisory board. In the May 1997 issue of Texas Parks and Wildlife Magazine, Texas Parks and Wildlife Department published an article entitled "SOS for the RCW", informing the public of the content of the Texas RCW HCP.

The Service published the Notice of Availability in the Federal Register on May 20, 1997, notifying the public of the availability of the EA and HCP for a 30-day public comment period. Additionally, the National Council of the Paper Industry for Air and Stream Improvement, the Texas Department of Agriculture, and the Endangered Species and Wetlands Report published articles informing of the Federal Register notice and the 30-day comment period.

Sixteen requests for documents were received prior to the close of the public comment period and four requests for copies of the documents were requested after the close of the public comment period. Five letters with comments were received.

Many of the public comments on the Texas RCW HCP were related to the incidental take addendum for isolated RCW groups. Subsequently, the applicants (TPWD and TFS) have decided to modify the proposal to enter into cooperative agreements under the incidental take addendum. The public comments relating to this addendum will be fully considered by the applicant and the proposal will be modified. These modifications will require an additional 30-day comment period which will be announced through an additional Federal Register notice.

Regional Director, Region 2

3/6/98
Date

FINDING OF NO SIGNIFICANT IMPACT

Proposed Issuance of an Incidental Take Permit
Authorizing Incidental Take of the Red-cockaded woodpecker
for a 99-year period beginning on
signature date on the Permit
Permit Issued
to:

TEXAS PARKS AND WILDLIFE DEPARTMENT / TEXAS FOREST SERVICE

The U. S. Fish and Wildlife Service (Service) proposes to issue an incidental take permit to TEXAS PARKS AND WILDLIFE DEPARTMENT / TEXAS FOREST SERVICE in association with the implementation of Safe Harbor Cooperative Agreements in the southeastern portion of the Pineywoods Ecoregion of Texas; it generally consists of a 22-county area that includes all or parts of Anderson, Angelina, Cherokee, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, Tyler, and Walker counties. The plan area boundary includes land south of US Highway 84/ 59 in Shelby County; south of US Highway 59 and State Highway 204 in Nacogdoches County; south of US Highway 79 in Cherokee County; south of US Highway 79 and east of State Highway 19 in Anderson County; east of State Highway 19/ US Highway 287, east of State Highway 21, and east of the Trinity River in Houston County; east of State Highway 19/30 in Walker County; east of State Highway 30/90, State Highway 105, and Farm Road 1774 in Grimes County; east of State Highway 149 in Montgomery County, north of Farm Road 2920, east of Interstate Highway 45, and north of Farm Road 1960 in Harris County; north of US Highway in Liberty County; north of US Highway 90 in and Interstate Highway 10 in Jefferson County; and north of Interstate Highway 10 in Orange County. The eastern boundary will be east of the Sabine River in Orange, Newton, Sabine, and Shelby Counties.

The Service considered a no action alternative and direct financial incentives (in lieu of Service in-kind assistance) as alternatives to the action proposed here.

Implementation of the proposed alternative is expected to result in conservation of the endangered red-cockaded woodpecker and the variety of other listed and non-listed wildlife and plants which occurs in the project area by obtained support and participation of landowners in conservation efforts while meeting the needs of the affected landowner. Based on the analysis conducted by the Service it has been determined that:

1. Issuance of the take permit will not appreciably reduce the likelihood of survival or recovery of the affected species in the wild.

2. The HCP contains provisions which sufficiently minimize or mitigate the impacts of issuing the ITP.

3. Issuance of an ITP would not have significant effects on the human environment in the project area.

4. The proposed take is incidental to an otherwise lawful activity.

5. The Applicant has ensured that adequate funding will be provided to implement the measures proposed in the submitted HCP.

Based on a review and evaluation of these factors and the supporting references listed below, we have determined that the issuance of a Section 10(a)(1)(B) incidental take permit to Texas Parks and Wildlife Department/Texas Forest Service, is not a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(C) of the National Environmental Policy Act of 1969. Accordingly, the preparation of an Environmental Impact Statement is not required.

Supporting References

Fish and Wildlife Service. Permit application, including Habitat Conservation Plan and Environmental Assessment, to the U.S. Fish and Wildlife Service, Lufkin, Texas, March 1997

Fish and Wildlife Service. Environmental Assessment, Issuance of An Incidental Take Permit for the Texas RCW HCP. 24 pp.

Fish and Wildlife Service. Biological Opinion on the issuance of an incidental take permit authorizing Safe Harbor Cooperative Agreements based upon the Regional Habitat Conservation Plan for the Red-cockaded Woodpecker on Private Land in the East Texas Pineywoods.

Susan MacMillan

Assistant Regional Director, Ecological Services

3/4/98

Date

UNITED STATES FISH & WILDLIFE SERVICE

ENVIRONMENTAL ACTION MEMORANDUM

Within the spirit and intent of the Council of Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, we have established the following administrative record and have determined that the issuance of a Section 10(a)(1)(B) Incidental Take Permit and approval of the associated Habitat Conservation Plan to Texas Parks and Wildlife Department / Texas Forest Service to take the endangered red-cockaded woodpecker in a 22-county area that includes all or parts of Anderson, Angelina, Cherokee, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Liberty, Montgomery, Nacogdoches, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Shelby, Trinity, Tyler, and Walker counties.:

____ is a categorical exclusion as provided by 516 DM 6 Appendix 1. No further documentation will be made.

XX is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.

____ is found to have special environmental conditions as described in the attached Environmental Assessment. The attached Finding of No Significant Impact will not be final nor any actions taken pending a 30-day period for public review (40 CFR 1501.4(e)(2)).

____ is found to have significant effects, and therefore a "Notice of Intent" will be published in the Federal Register to prepare an Environmental Impact Statement before the project is considered further.

____ is denied because of environmental damage, Service policy, or mandate.

____ is an emergency situation. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents:

XX Section 7 consultation

XX Environmental Assessment and FONSI

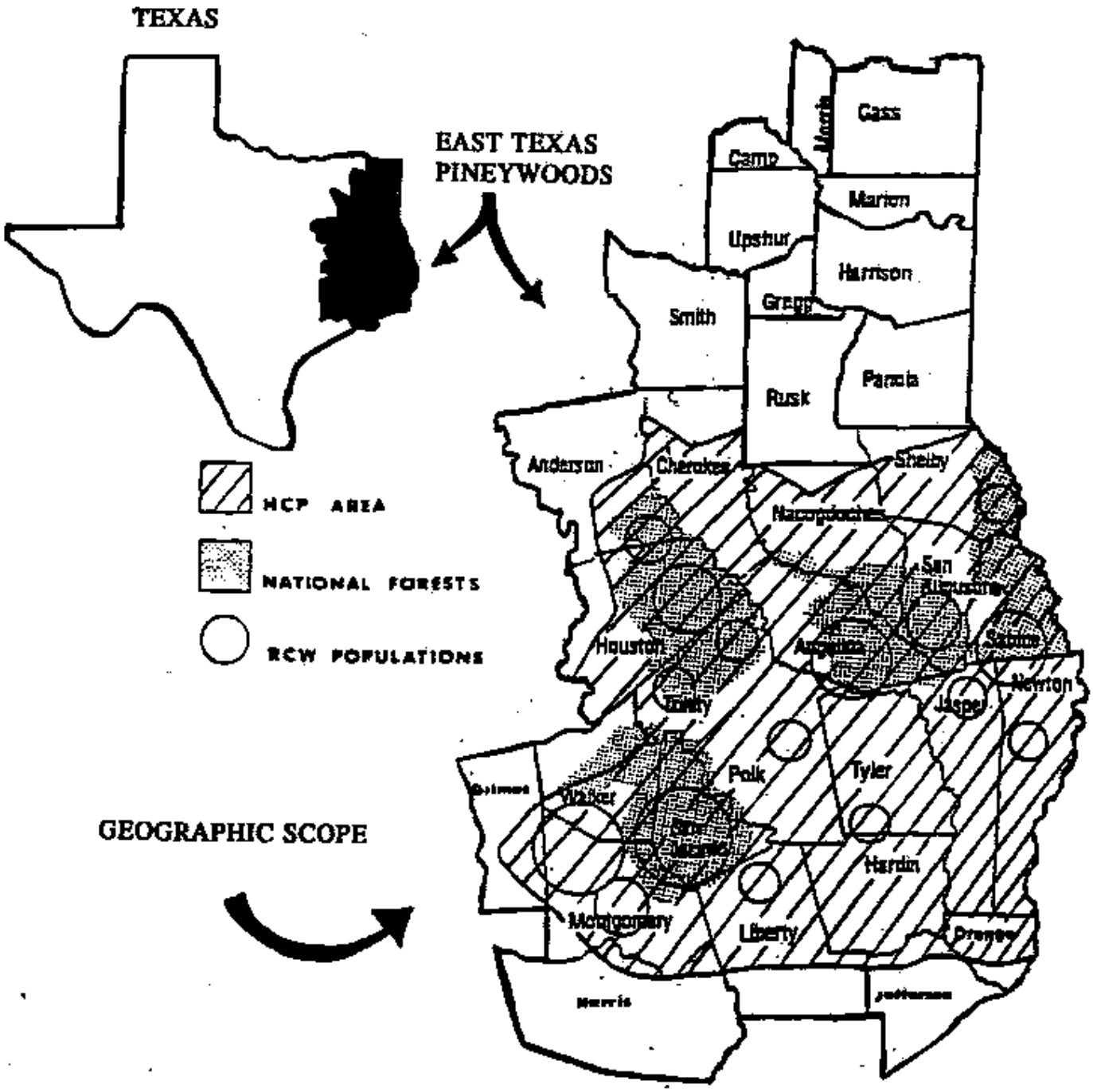
XX Permit terms and conditions

XX Public comments

[signature] 10-15-97		Acting [signature] 3/4/98	
Field HCP Coordinator	Date	ARD, Ecological Services	Date
[signature] 1/27/98		[signature] 2/10/98	
Regional HCP Coordinator	Date	REC, Ecological Services	Date
[signature] 2/23/98		[signature] 2/5/98	
Chief, End. Spec. Div.	Date	Geographic Manager / TX	Date

APPENDIX A

MAP DEPICTING REGIONAL HABITAT CONSERVATION PLAN AREA
FOR THE RED-COCKADED WOODPECKER
ON PRIVATE LAND IN THE EAST TEXAS PINEYWOODS



REFERENCES

Bray, W. L. 1906. Distribution and adaptation of the vegetation of Texas. University of Texas Bull. No. 82.

Chambless, L. F. 1971. The woody vegetation of the Angelina River bottom in Nacogdoches County, Texas. M. S. Thesis. Stephen F. Austin State University, Nacogdoches, Texas.

Chambless, L. F. and E. F. Nixon. 1975. Woody vegetation-soil relations in a bottomland forest of east Texas. Texas J. Sci. 26:407-416.

Conner, R. N., and D. C. Rudolph. 1991. Forest habitat loss, fragmentation and red-cockaded woodpecker populations. Wilson Bulletin 103(3):446-457.

Costa, R. 1995. Red-cockaded woodpecker recovery and private lands: a conservation strategy responsive to the issues. U. S. Fish & Wildlife Service. Unpublished. Manuscript.

Costa, R., and R. Escano. 1989. Red-cockaded woodpecker status and management in the Southern Region in 1986. USDA Forest Service. Tech. Pub. R8-TP12. 71pp.

Coker, Thomas C. Jr. 1990. Longleaf Pine--Myths and Facts, in Robert M. Farrar, Jr., ed. 1990. Proceedings of the Symposium on the Management of Longleaf Pine; April 4-6, 1989; Long Beach, MS. Gen. Tech. Rep. SO-75. New Orleans, LA: U. S. Department of Agriculture, Forest Service, Southern Forest Experiment Station. 293 pp.

Dolezel R. 1988. Soil Survey of Angelina County, Texas. USDA Soil Conservation Service.
203 pp.

Frost, C. C. 1993. Four centuries of changing landscape patterns in the longleaf ecosystem. Tall Timbers Fire Ecology Conference 18.

Hooper, R. G., and R. F. Harlow. 1986. Forest stands selected by foraging red-cockaded woodpeckers. Southeast For. Exp. Sta., Research Paper, Proj. SE-259. 10pp.

Jackson, J. A. 1986. Biopolitics, management of federal lands, and the conservation of the red-cockaded woodpecker. Am. Birds 40:1162-1168.

Kelly, John F., and William A. Bechtold. 1990. The Longleaf Pine Resource, in Robert M. Farrar, Jr., ed. 1990. Proceedings of the

Symposium on the Management of Longleaf Pine; April 4-6, New Orleans, LA: U. S. Department of Agriculture, Forest Service, Southern Forest Experiment Station. 293 pp.

Komarek, E. V. 1974. Effects of fire on temperate forest and related ecosystems: southeastern United States. Pp. 251-277 in Fire and Ecosystems. T. T. Kozlowski and C. E. Ahlgren, eds. Academic Press, New York, NY.

Landers, J. L., N. A. Byrd, and R. Komarek. 1989. A holistic approach to managing longleaf pine communities. Pp. 135-167 in proceedings of the symposium on the management of longleaf pine. USDA Forest Service, Southern Forest Experiment Station. Gen. Tech. Report SO-75.

Lang, L. L., and D. F. Bertelson. 1987. Forest statistics for east Texas counties - 1986. Resource Bulletin SO-118. USDA Forest Service, New Orleans, LA.

Langston, S. A. 1974. Woody vegetation of mesic uplands in Nacogdoches and Rusk counties, Texas. M. S. Thesis, Stephen F. Austin State University, Nacogdoches, Texas.

Lennartz, M. R., H. A. Knight, J. P. McClure, and V. A. Rudis. 1983. Status of red-cockaded nesting habitat in the South. Pp. 13-19 in D. A. Wood, ed., Proc. Red-cockaded woodpecker symposium II. Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

Ligon, J. D. 1970 Behavior and breeding biology of the red-cockaded woodpecker. Auk 98:255-278.

Ligon, J. D., P. B. Stacy, R. N. Conner, C. E. Bock, and C. S. Adkisson. 1986. Report of the American Ornithologist's Union Committee for the Conservation of the Red-cockaded Woodpecker. Auk 103:848-855.

Locke, B. A., R. N. Conner, and J. C. Kroll. 1983. Factors influencing colony site selection by red-cockaded woodpeckers. Pp. 46-50 in D. A. Wood. ed., Proc. Red-cockaded Woodpecker symposium II. Florida Game and Fresh Water Fish Commission. Tallahassee, FL.

Lord, Roger. 1994. Harvest Trends 1992. Publication 151, Texas Forest Service, College Station, Texas. 21 pp.

Nixon, Elray S. 1985. Trees, Shrubs and Woody Vines of East Texas. Bruce Lyndon Cunningham Productions, Nacogdoches, Texas. 240 pp.

Nixon, E. S., L. F. Chambless, and J. L. Malloy. 1973. Woody vegetation of a palmetto area in east Texas. Texas J. Sc. 24:535-541.

Nixon, E. S., K. L. Marietta, R. O. Littlejohn and H. B. Weyland. 1980. Woody vegetation of an American beech community in eastern Texas. Castanea 45:171-180.

Nixon, E. S., and J. A. Raines. 1976. Vegetative analysis of the floodplain for the Trinity River, Texas. U. S. Army Corps of Engineers, Ft. Worth District, Ft. Worth, Texas.

Nixon, E. S., R. L. Willet and P. W. Cox. 1977. Analysis of a virgin forest in the Neches River bottom. Castanea 43:227-236.

McWilliams, W. H., and R. G. Lord. 1988. Forest Resources of East Texas. USDA Forest Service, Southern Forest Experiment Station, New Orleans, LA. Resource Bulletin SO-136.
61 pp.

O'Laughlin, J., and R. A. Williams. 1988. Forests and the Texas Economy. Texas A&M University, College Station, Texas. 64 pp.

Ramos, M. G., R. Plocheck and V. Hayes eds. 1995. 1996-97 Texas Almanac. The Dallas Morning News, Dallas, Texas. 672 pp.

Reed, J. M., P. D. Doerr, and J. R. Walters. 1988. Minimum viable population size of the red-cockaded woodpecker. Jour. of Wildl. Manage. 52:385-391.

Reed, J. M., J. R. Walters, T. E. Emigh, and D. E. Seaman. 1993. Effective population size in red-cockaded woodpeckers: population model and differences. Cons. Biology 7(2):302-308.

Repasky, R. R. 1984. Home range and habitat utilization of the red-cockaded woodpecker. M. S. Thesis. North Carolina State University, Raleigh, NC. 136pp.

Southeast Negotiation Network. 1990. Summary Report: Scientific Summit on the red-cockaded woodpecker. Georgia Institute of Technology. Atlanta, GA. 40pp.

Stevens, E. E. 1995. Population viability for red-cockaded woodpeckers in D. L. Kulhavy, R. G. Hooper and R. Costa eds., Red-cockaded Woodpecker symposium III: Species recovery, ecology and management. Stephen F. Austin State University, Nacogdoches, TX.

Sullivan, J. R. And E. S. Nixon. 1971. A vegetational analysis of an area in Nacogdoches County, Texas. Texas J. Sc. 23:67-69.

Texas Forest Service. 1970. Tree regions of Texas. Circular 75. Texas Forest Service, College Station, Texas.

Texas Forest Service. 1987. Forest products industries in Texas,

1987 directory. Circular 275. Texas Forest Service, College Station, Texas.

Texas Forest Service. 1987. East Texas forests: Status and trends 1986. Circular 276. Texas Forest Service, College Station, Texas.

Texas Parks & Wildlife Department. 1996. Texas threatened and endangered species. Texas Parks & Wildlife Department, Austin, Texas. Pamphlet Number PWD-LF-R3000-017(2/96).

Tharp, B. C. 1925. Structure of Texas vegetation east of the 98th meridian. Ph. D. dissertation University of Texas, Austin, Texas.

U. S. Fish & Wildlife Service. 1985. Red-cockaded Woodpecker Recovery Plan. U. S. Fish & Wildlife Service, Atlanta, GA. 88pp.

U. S. Fish & Wildlife Service. 1995. Final Habitat Conservation Plan to Encourage the Voluntary Restoration and Enhancement of Habitat for the Red-cockaded Woodpecker on Private Land in the Sandhills Region of North Carolina by Providing "Safe Harbor" to Participating Landowners. U. S. Fish & Wildlife Service, Atlanta, GA.

Van Balen, J. B., and P. D. Doerr. 1978. The relationship of understory vegetation to red-cockaded woodpecker activity. Proc. Annu. Conf. Southeastern Assoc. Fish and Wildlife Agencies 32:82-92.

Walters, J. R. 1989. Red-cockaded woodpeckers: a "primitive" cooperative breeder. Pp. 67-102 in Cooperative breeding in birds: long-term studies of ecology and behavior, P. B. Stacy and W. D. Koenig, eds. Cambridge Univ. Press, Cambridge, MA.

Wood, G. W., L. J. Niles, R. M. Hendrick, J. R. Davis, and T. L. Grimes. 1985. Compatibility of even-aged timber management and red-cockaded woodpecker conservation. Wildl. Soci. Bull. 13:5-17.

FIGURE 1

TEXAS FOREST SERVICE OBSERVATIONS OF RED-COCKADED WOODPECKER COLONY ACTIVITY ON THE W. GOODRICH JONES STATE FOREST IN 1991

JONES STATE FOREST

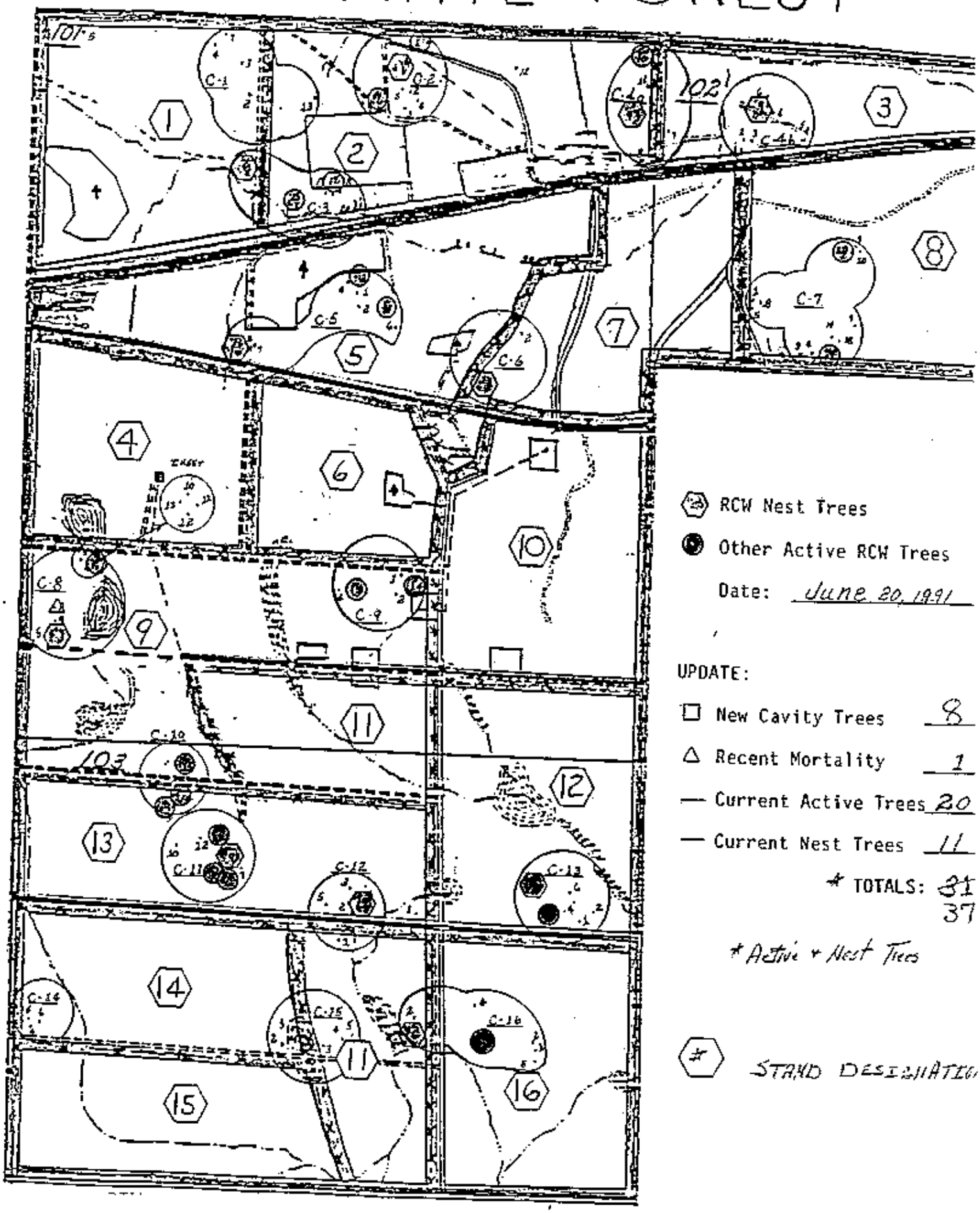


Figure 1. Texas Forest Service observations of Red-cockaded Woodpecker colony activity on the Jones State Forest - 1991.

FIGURE 2a: GIS MAP DEPICTING RED-COCKADED WOODPECKER NEST SITES AT THE WOODLANDS AT COOKS BRANCH

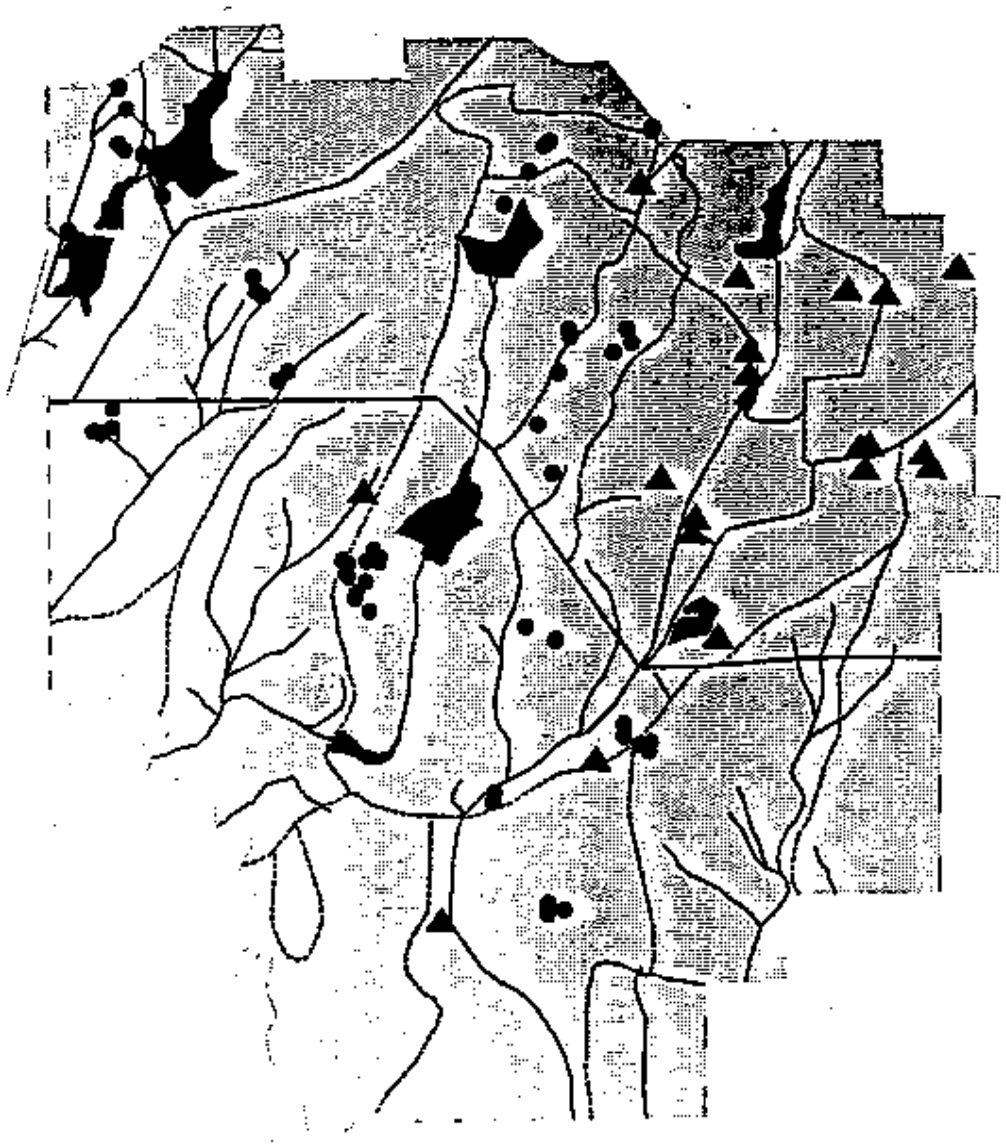
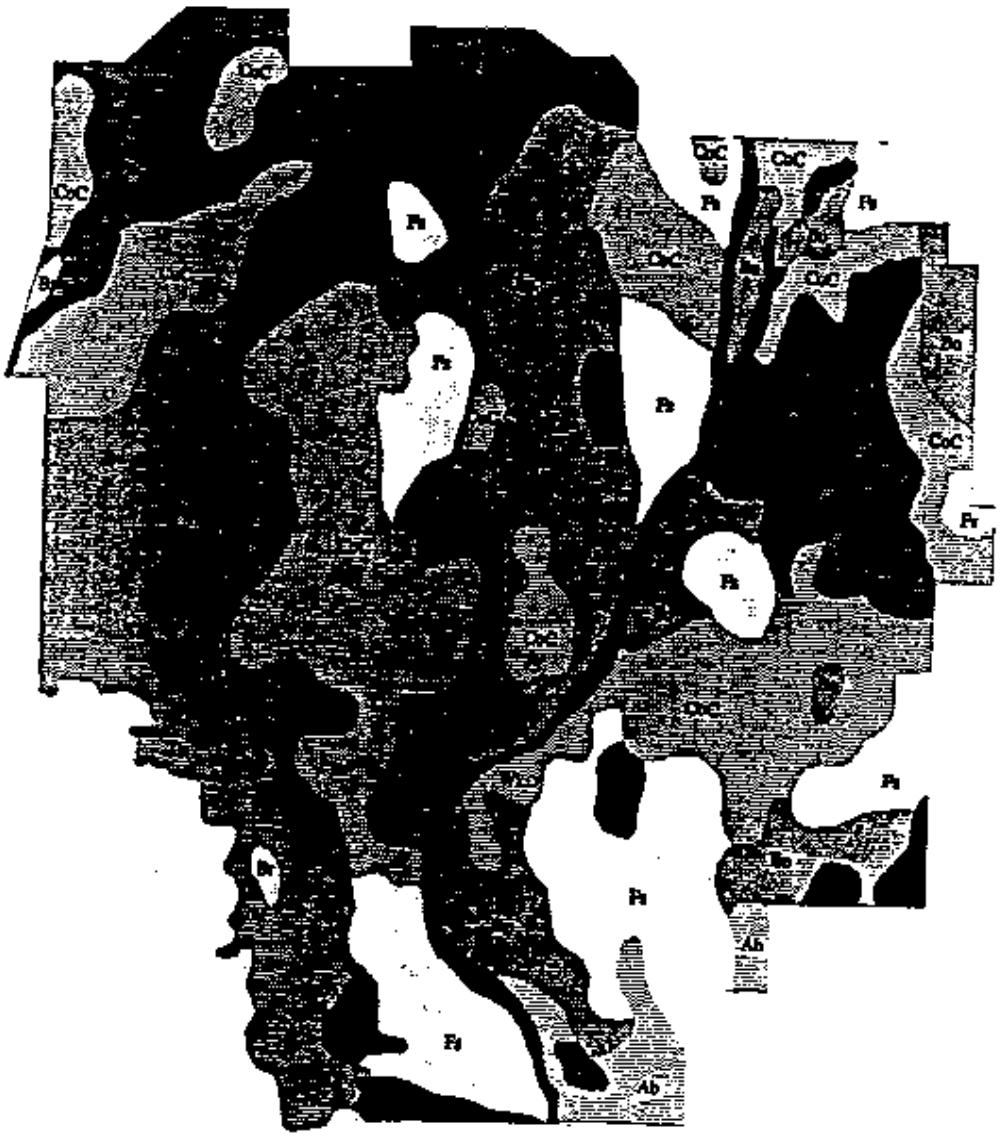


FIGURE 2b: GIS MAP DEPICTING VEGETATIVE COVER AT THE WOODLANDS AT COOKS BRANCH

Vegetation

- Old Growth Conifer (>60 yrs)
- Mature Conifer (30-60 yrs)
- Regeneration Stands
- Conifer/Hardwood (>50% Conifer)
- Hardwood/Conifer (<50% Conifer)
- Pasture/Agricultural
- Water
- Industrial/Commercial
- Residential with Conifer Cover

FIGURE 2c: GIS MAP DEPICTING SOIL TYPES AT THE WOODLANDS AT COOKS BRANCH



Soils

- Ab - Albany fine sand
- Bb - Bibb soils, frequently flooded
- BlC - Blanton fine sand (0-5% slope)
- Bo - Boy fine sand
- Br - Bruno loamy fine sand
- CoC - Conroe loamy fine sand (0-5% slope)
- Cw - Crowley fine sandy loam
- Eu - Eustis loamy fine sand
- Fs - Fuquay loamy fine sand
- Sp - Splendora fine sandy loam
- Tk - Tuckerman loam, heavy substratum
- Tu - Tuscumbia clay, frequently flooded
- WkC - Wicksburg loamy fine sand (1-5% slope)
- WkD - Wicksburg loamy fine sand (5-12% slope)

FIGURE 3: SUMMARY OF RCW NESTING AND FEEDING YOUNG AT W. GOODRICH JONES STATE FOREST, TEXAS FOREST SERVICE, 1990

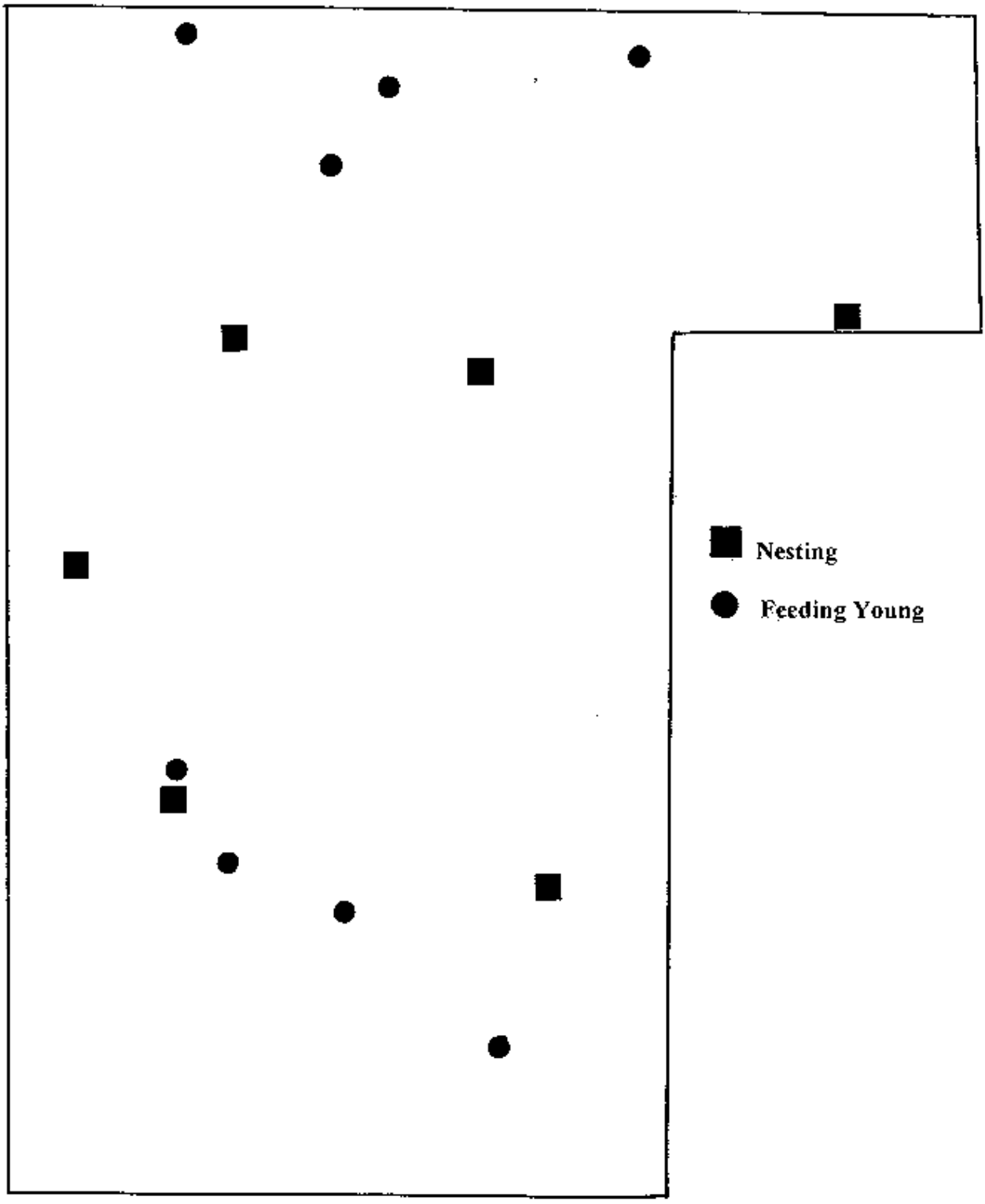


FIGURE 4: SUMMARY OF RCW NESTING AND FEEDING YOUNG AT W. GOODRICH JONES STATE FOREST, TEXAS FOREST SERVICE, 1991

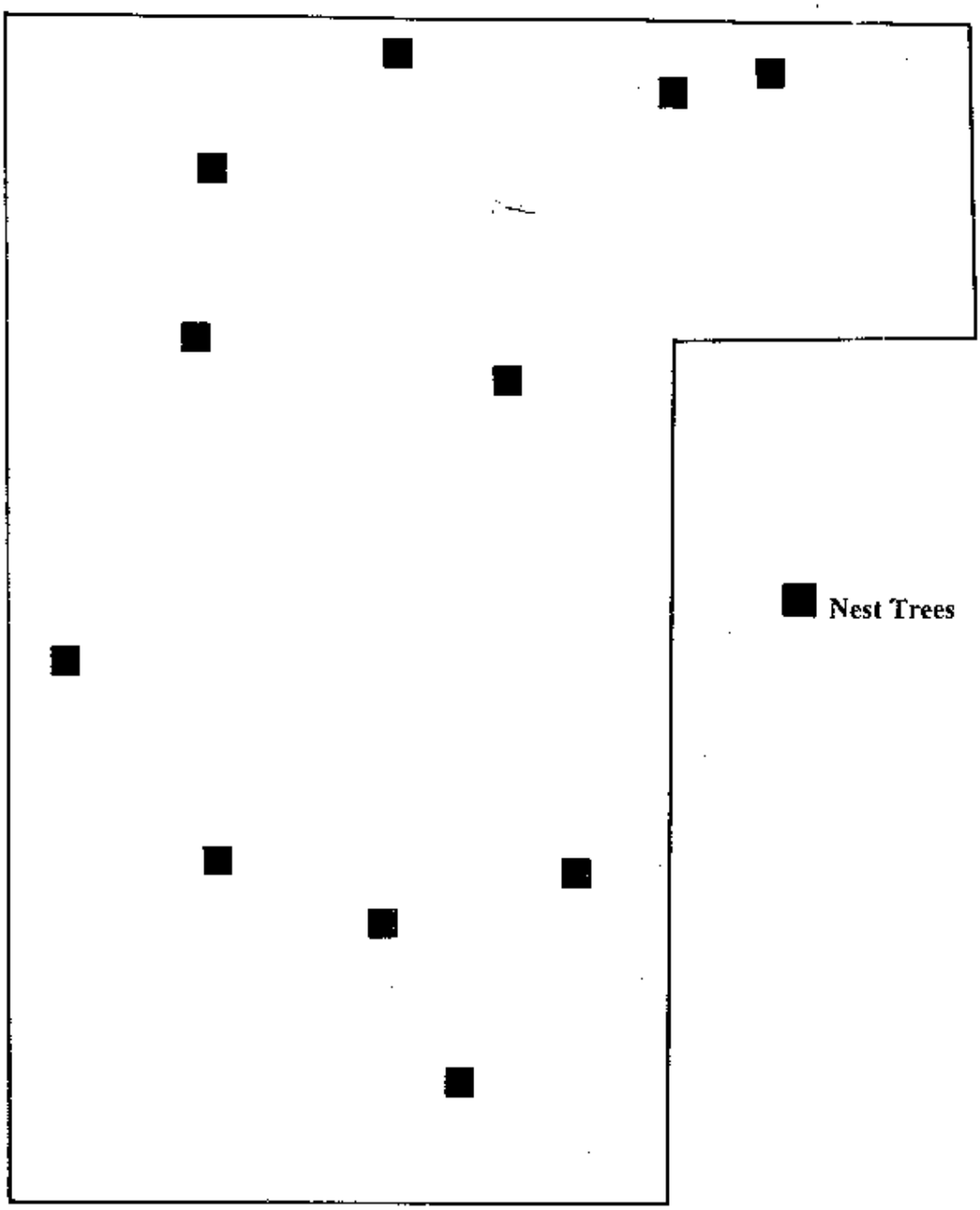


FIGURE 5: ROBERT BENSON'S OBSERVATIONS OF RCW CAVITY TREES ON THE W. GOODRICH JONES STATE FOREST, 1990

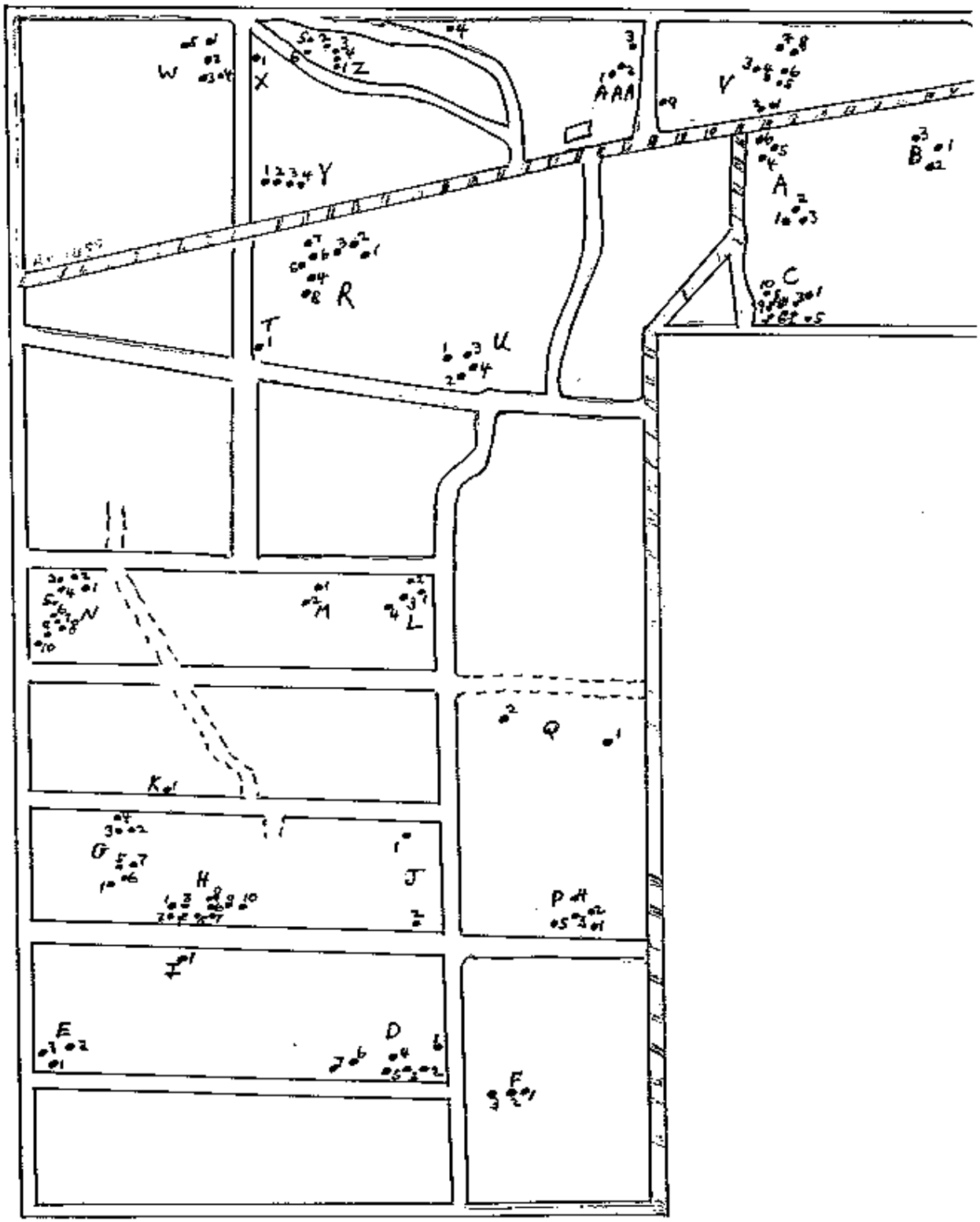


FIGURE 6: DISTRIBUTION OF MATURE PINE DENSITIES ON THE W. GOODRICH JONES STATE FOREST

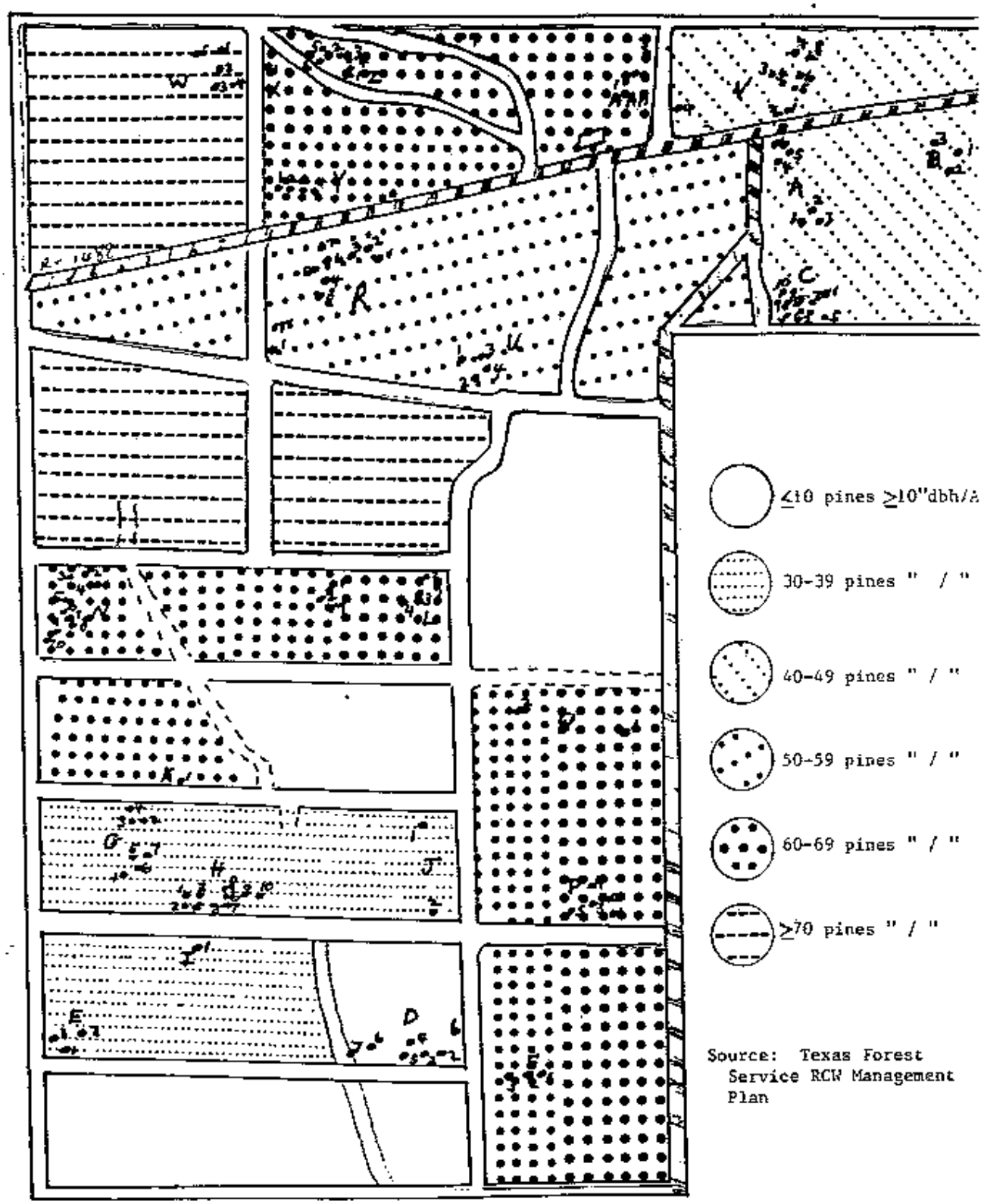


FIGURE 7: 1,200 METER ZONES FOR RCW CLUSTERS ON THE W. GOODRICH JONES STATE FOREST

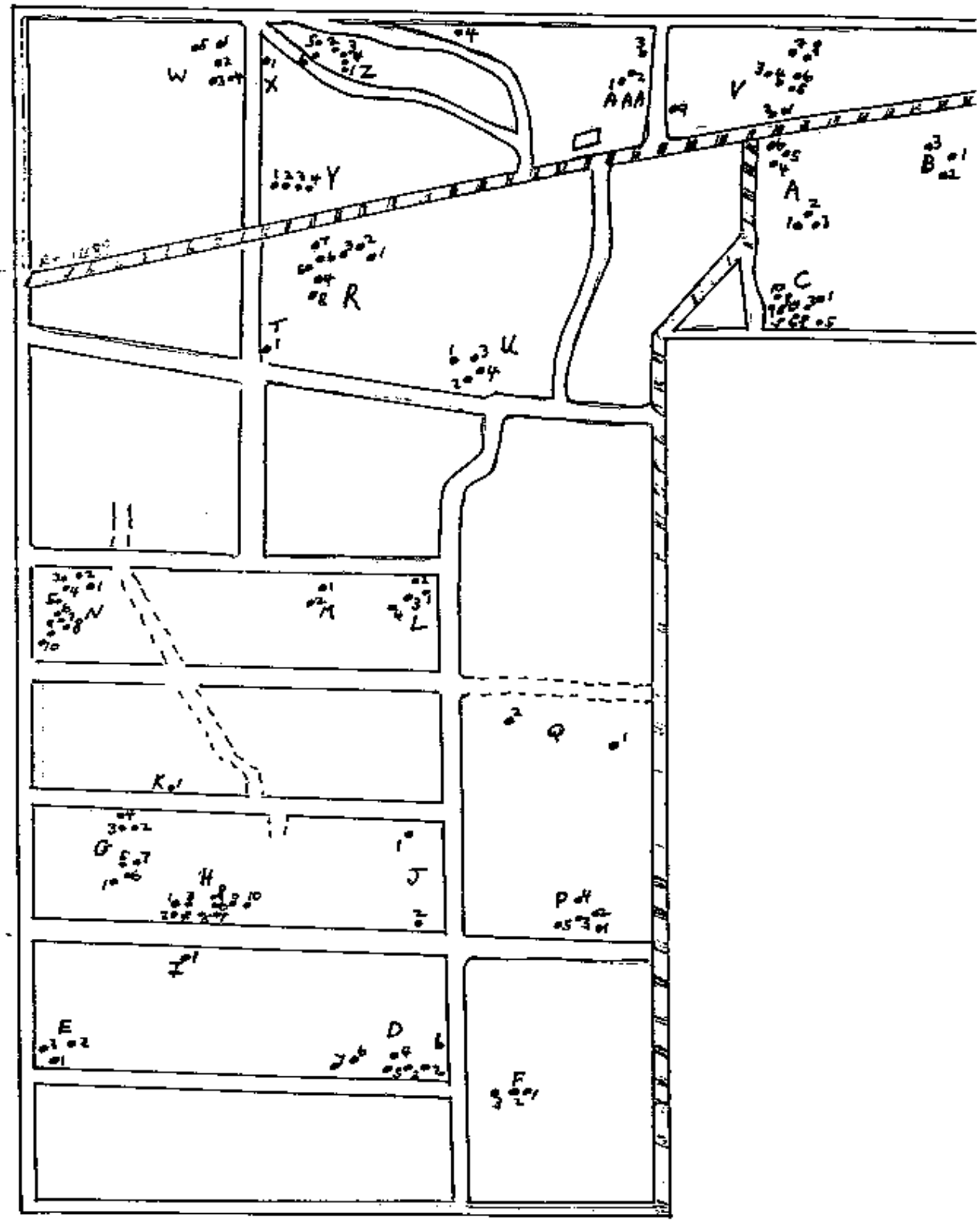


FIGURE 8: TEXAS FOREST SERVICE OBSERVATIONS OF RCW CLUSTERS ON THE I. D. FAIRCHILD STATE FOREST

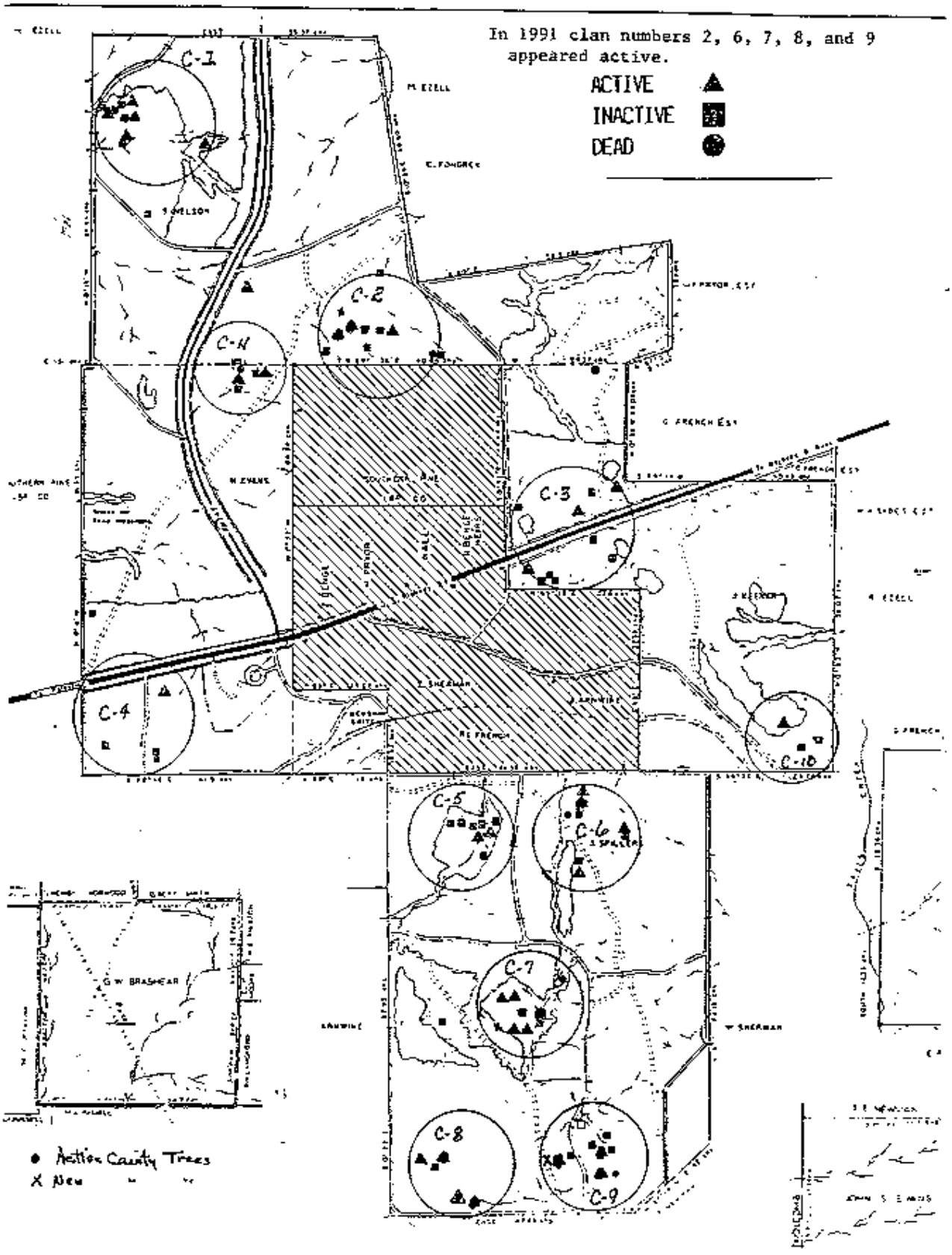


FIGURE 9: ROBERT BENSON'S SUMMARY OF RCW CLANS (PRESENT TERM IS GROUPS) ON THE I. D. FAIRCHILD STATE FOREST, 1990

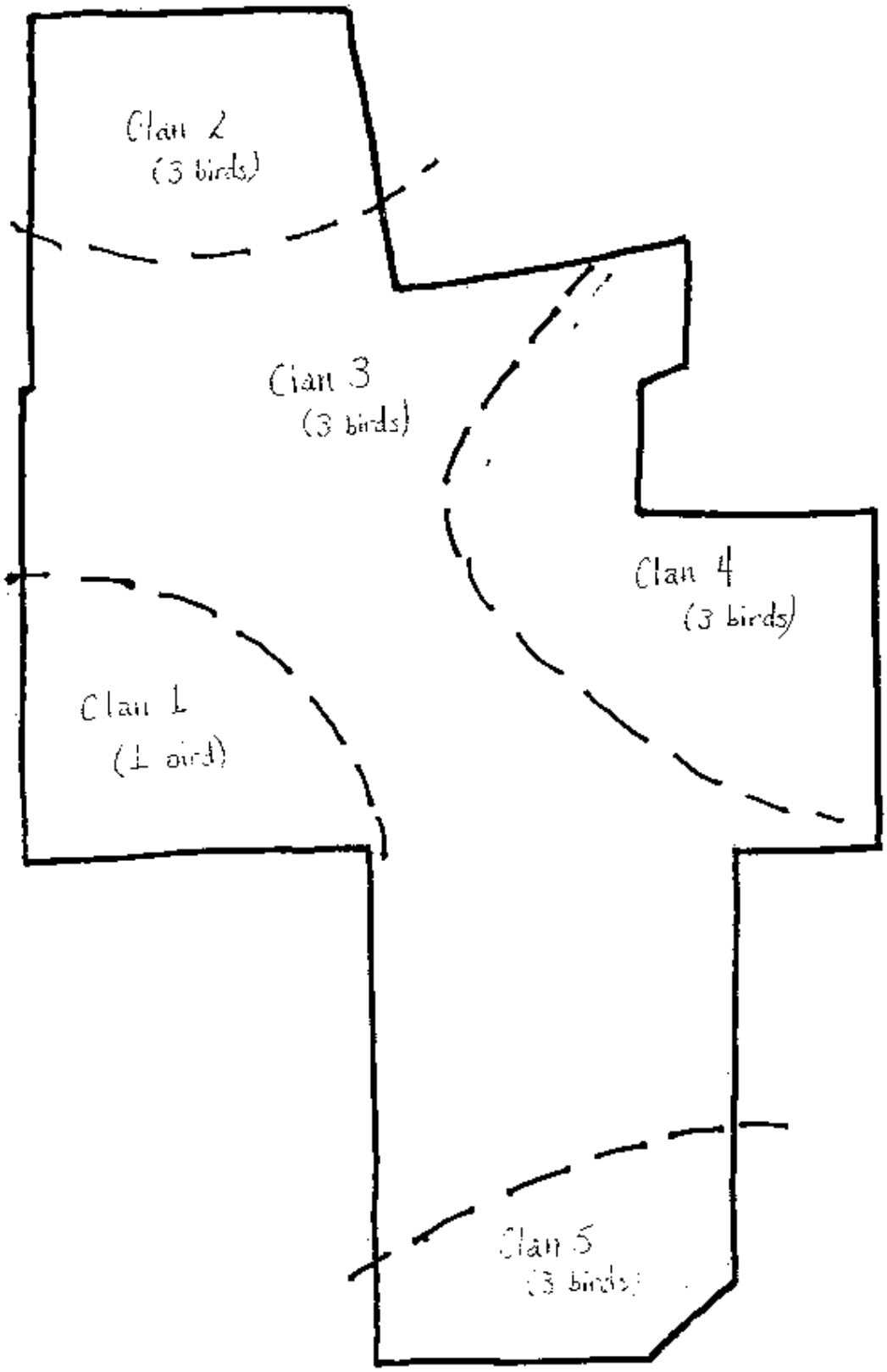


FIGURE 10: INITIAL STUDY AREA FOR MONTGOMERY COUNTY CORRIDOR INVENTORY PROJECT, MONTGOMERY COUNTY, TEXAS

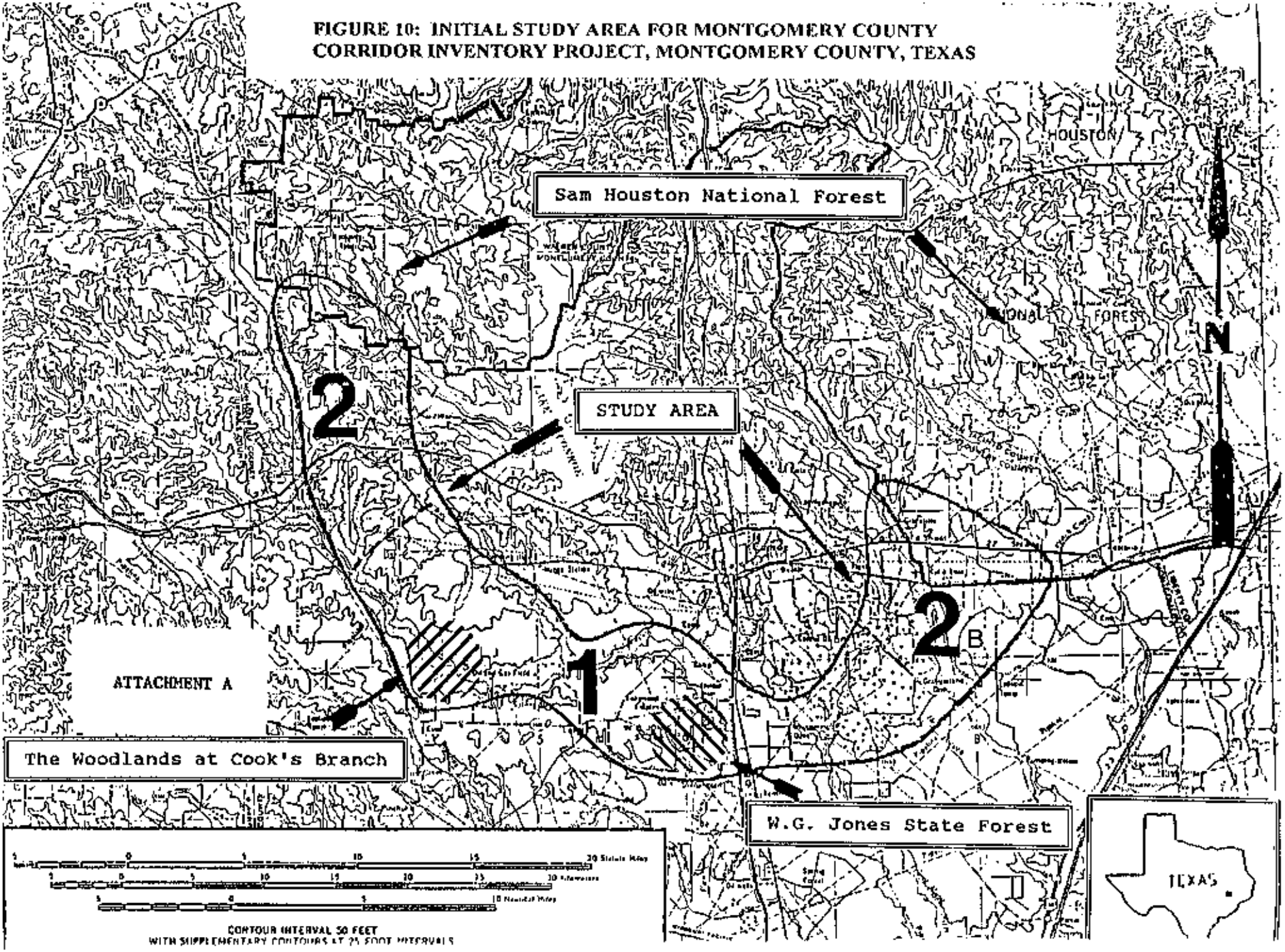


FIGURE 11: MONTGOMERY COUNTY CORRIDOR VEGETATIVE COVER

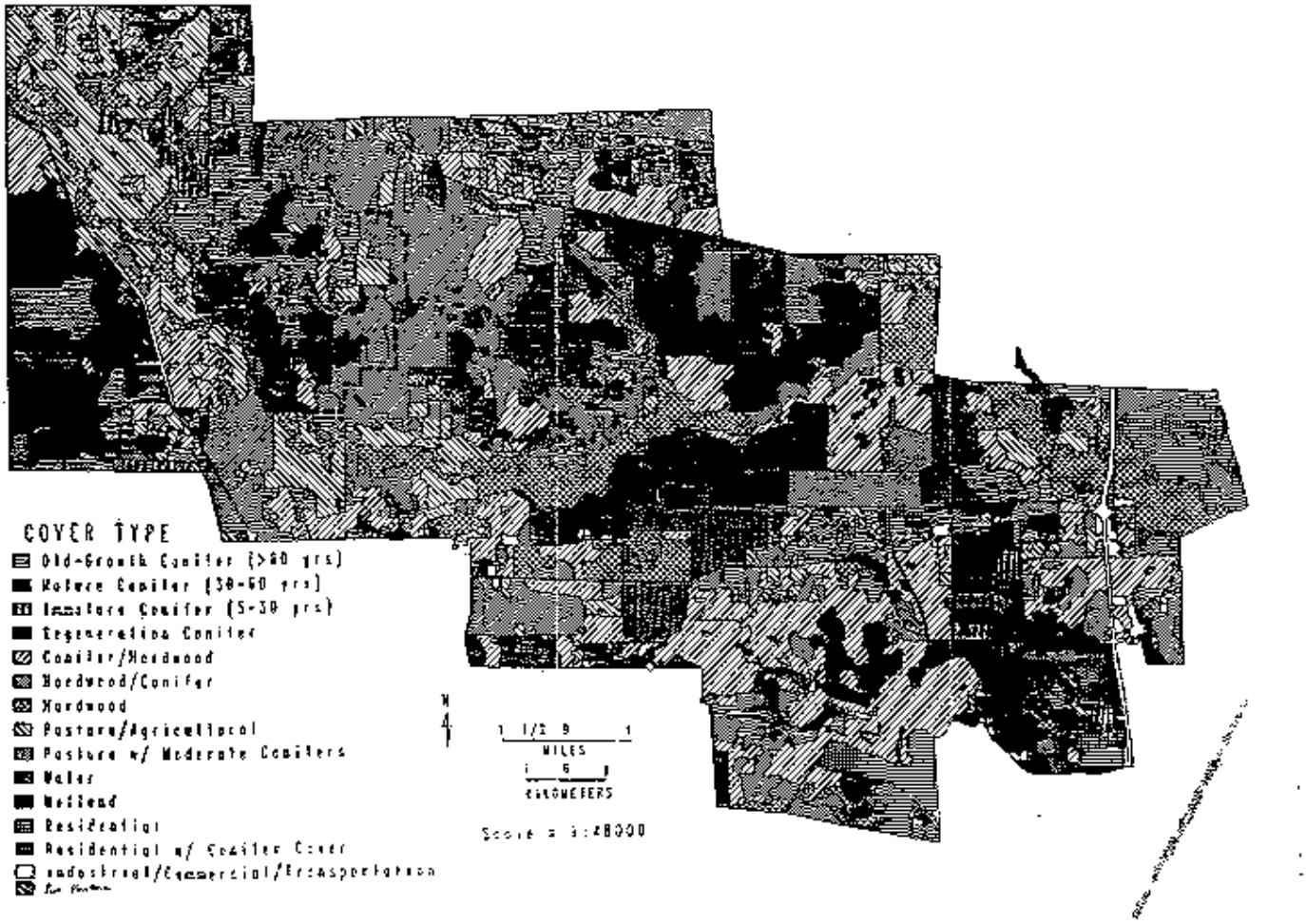


FIGURE 12: MONTGOMERY COUNTY CORRIDOR PROPERTY OWNERSHIP

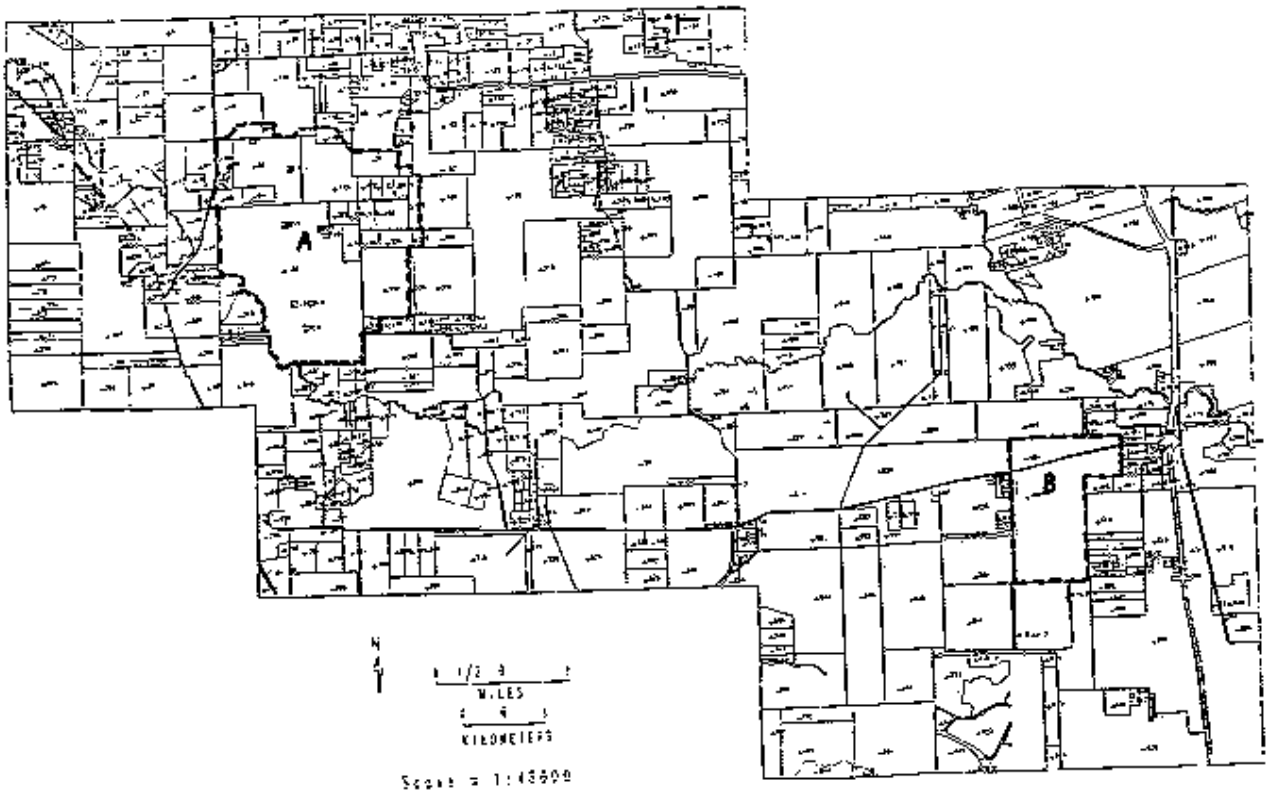


Table 1. RCW and stand characteristics on the Jones State Forest, Texas.

W. G. Jones State Forest
Red-Cockaded Woodpecker Management Plan

Stand No.	No. Colonies	'91	Stand Size-Acre	Forage Area Acre	BA/ Acre	Total* BA	# Pines** ≥10/Ac.	Total Pines ≥10" dbh
1	1	1(1)	93	93	96	8,928	70.0	6,510
2	1	2(2)	92	92	84	7,728	63.3	5,824
3	1	1(1)	70	70	86	6,048	48.4	3,388
4	0	0	66	66	90	5,940	70.8	4,673
5	1	1	92	92	76	6,992	55.6	5,115
6	0	0	70	70	100	7,000	73.9	5,173
7	0	1(1)	106	106	84	8,904	54.6	5,788
8	1	1	107	107	75	8,025	43.0	4,601
9	1	2(1)	113	70ST	15	1,050	10.0	700
10	0	0	98	98ST	15	1,470	10.0	980
11	0	1(1)	113	113	90	10,170	62.4	7,051
12	1	1	105	105	81	8,505	61.4	6,447
13	2	3(2)	112	112	50	5,600	35.7	3,998
14	3	0	91	91	56	5,096	35.2	3,203
15	0	0	97	97ST	15	1,455	10.0	970
16	1	0	108	108	91	9,828	65.0	7,020
	13	14	1,533	1,490		102,739		71,441

* 1979 Inventory
** 1979 Inventory projected 10 years
() Numbers in parentheses indicate number of nests confirmed

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Table taken from: Texas State Forests Red-cockaded Woodpeckers Habitat Management Plan . 1989. Texas Forest Service.

With additions from information collected by Rayford Sandel, TFS.

Table 2. RCW and stand characteristics on the Fairchild State Forest, Texas

Fairchild State Forest
Red-Cockaded Woodpecker Management Plan

Stand No.	Stand Summary: No. Colonies	Total Acres	Forage Area Acres	BA/Ac.	Total BA	# Pines/Ac. +10 in. dbh	Total Pines +10 in. dbh	Stand Age
1	1	118	67B, 51ST	72B	5,378	42B	3,274	58
2	0	99	99	70	6,890	44	4,366	58
3	0	86	86	77	6,596	65	5,530	Mixed
4	2	218	218	66	14,453	45	9,766	78
5	0	113	113ST	15	1,695	10	1,130	83
6	1	164	164	78	12,743	43	7,003	83
7	0	132	28B, 104ST	72B	3,576	42B	2,216	98
8	1	115	115	84	9,694	54	6,233	98
9	0	100	100	64	6,370	34	3,350	96
10	1	110	39B, 71ST	72B	3,882	54B	2,824	96
11	1	125	82B	72B	5,904	42	3,444	98
12	1	110	110	66	7,260	40	4,389	100
13	1	105	51B, 53ST	73B	4,518	42B	2,700	78
14	1	100	100	74	7,400	40	4,010	78
15	1	101	101	73	7,373	42	4,282	78
20	0	87	87	118	10,265	62	6,034	72
21	1	86	86	101	8,610	37	3,121	78
22	0	127	127	103	13,080	50	6,350	78
	12	2,096	2,052		135,687		80,022	

Stands 16-19 are isolated tracts without RCW colonies

In 1991 colony numbers 2, 6, 7, 8, and 9 were active

Source: 1988 inventory

Table taken from: Texas State Forests Red-cockaded Woodpeckers Habitat Management Plan. 1989. Texas Forest Service
With additions from information collected by Rayford Sandel, TFS.
3/31/89