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# **Investigation of Red-cockaded Woodpeckers in Virginia: 2006 report**



**The Center for Conservation Biology  
College of William and Mary**

# Investigation of Red-cockaded Woodpeckers in Virginia: 2006 report

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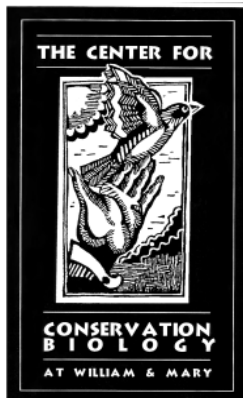
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**Cover Photo:** Pine savanna habitat at Piney Grove by *Bobby Clontz*.



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## Executive Summary

During the 2006 calendar year, 30 Red-cockaded Woodpeckers were identified within Piney Grove Preserve. This included 15 resident adults, 8 chicks produced during the breeding season, and 7 birds translocated to the site in previous years. Six birds were believed to be lost between the fall of 2005 and the breeding season of 2006. Twenty-two birds were present going into the breeding season and 26 birds were documented in the late fall. These numbers are identical to those recorded in 2005. Four birds were lost during the year including 1 bird banded as an adult in 1998, 3 birds banded as nestlings in the years 2001, 2002, and 2006. During the winter of 2006, birds were roosting in 8 different cluster areas including C-1, C-3, C-4, C-5, C-6, C-7, C-8, and C-10.

Five breeding pairs produced 8 nestlings that survived to fledging age during the 2006 breeding season. This represents an increase of 1 breeding pair over 2005 and 2 over 2004. Cluster 10 was the second recruitment cluster supporting a breeding pair. The breeding pair in cluster 1 was the same as it has been since 2003. This pair produced 2 eggs, 2 nestlings, and 2 fledglings. The breeding pair in cluster 3 was the same as it was in 2005. This pair fledged a single chick. The female in cluster 5 was the same as it has been since at least 2000 but the male was replaced. This pair produced 3 eggs and 3 nestlings but only 2 birds fledged. The male in cluster 7 was the same as it was in 2005 but the female was replaced. The breeding female was the only chick produced in cluster 7 in 2005. This pair produced 2 eggs, 2 nestlings, and 2 fledglings. The new breeding pair in cluster 10 included a male that was translocated to Piney Grove in 2003 and a female that was translocated to Piney Grove in 2005. This pair produced 2 eggs and 2 nestlings but only 1 bird fledged. In total, 10 nestlings were known to be produced, 8 of which fledged including 4 males and 4 females.

In December of 2006, Piney Grove contained 111 cavities in live trees including 21 start cavities, 34 completed cavities, and 56 artificial inserts. Of the 90 available cavities, 43 had fresh sap flow from resin wells. Eleven new cavities were added in 2006 including 5 new completed natural cavities, 2 starts in new trees, 3 starts in known cavity trees, and 1 insert. Two cavity trees including 1 natural and 1 insert died in 2006.

Cavity competitors were detected within Red-cockaded Woodpecker cavities during 2006. Southern flying squirrels accounted for 33 of 69 instances. Others included White-breasted Nuthatch, Tufted Titmouse, black rat snake, gray tree frog, and wasps/bees. Approximately 30% of available cavities had evidence of some use by competitors. The highest competitor densities occurred in clusters not currently occupied by Red-cockaded Woodpeckers.

## **BACKGROUND**

### **Context**

The Red-cockaded Woodpecker (*Picoides borealis*) is a federally endangered species. Within the past 100 years Red-cockaded Woodpeckers have disappeared completely from the northern portion of their breeding range. Historically, this species was recorded north into New Jersey and Pennsylvania. As recently as the 1930's and 1940's resident birds were known from the open maritime forests of Maryland. Since the recent loss of habitat in Kentucky, Virginia has supported the only population north of the Carolinas. In Virginia, breeding has continued to the present time but the number of both sites and birds has declined dramatically over the past 40 years. As recently as 1977, 23 clans were known scattered across 5 counties. In 1980, all clusters determined to be active in 1977 were surveyed in preparation for an investigation of habitat use (Bradshaw 1990). Of the 23 original clusters, only 9 were still forested. In the 4 years from 1977 to 1980, more than half of the known state population had been lost. By 1990, only 5 of the original 23 clusters detected in 1977 were still active. By 2000, this number had declined to only 2 clusters. During the breeding season of 2002, Virginia supported only 2 breeding pairs and 2 clusters with solitary males.

The Red-cockaded Woodpecker remains in eminent danger of extinction within Virginia. However, in 1998 a multi-organizational partnership was formed under the primary mission of stabilizing the population and restoring it back to pre-1980 levels. During that year, The Nature Conservancy negotiated a deal with Hancock Timber to purchase 1,100 ha of land supporting the last 3 known Red-cockaded Woodpecker breeding groups. The site has since been expanded and now includes 1,270 ha of pine land. The tract, located in Sussex County is named the Piney Grove Preserve and lies in the heart of the species former Virginia range. The site has become the nucleus for restoration work in Virginia.

Restoration of the Red-cockaded Woodpecker population in Virginia will require a long-term commitment and the use of aggressive techniques that have proven successful further south. Dramatic habitat management, population monitoring and management, and translocation of birds into the population has been ongoing since 2000 and is beginning to show promising results.

### **Objectives**

The primary objective of this ongoing project is to monitor the population of Red-cockaded Woodpeckers within the Piney Grove Preserve. A secondary objective is to collect information relevant to the continued management of birds and their habitat in Virginia. Specific objectives include

- 1) To determine the number and identification of all birds resident within Piney Grove during the 2006 calendar year.
- 2) To monitor breeding activity in order to document productivity and allow for the unique banding of all individuals within the population.
- 3) To monitor and manage nest trees and cavity condition.

## **METHODS**

### **Description**

Piney Grove Preserve contains an old-growth loblolly and short-leaf pine community in Sussex County, Virginia. The site supports a complex of moderate-age pine stands interspersed with pockets of older trees ranging from 80 to 140 years. Historically, the site was managed for saw timber on a relatively long rotation by Gray Lumber Company. The site was purchased by Hancock Timber Resource Group in 1993. Under Hancock Timber's management, site quality was improved by removing the dense hardwood understory. The Nature Conservancy purchased the tract from Hancock Timber in 1998. The Nature Conservancy has developed an aggressive management program designed to restore the disturbance regime necessary to return the site to an open pine savannah.

A single clan of Red-cockaded Woodpeckers was discovered within this site in 1985. A second clan was discovered in 1994 and a third in 1995. These 3 clans still remain active. Since 1999, there have been 11 recruitment clusters established by The Nature Conservancy through the installation of artificial cavities. There are now 14 independent cluster sites with either natural or artificial cavities.

### **Banding**

Being able to identify individual birds is an essential element of the monitoring program. Banding individuals with unique combinations of color bands allows for their identification and, for this reason, has been one of the project goals.

Adults – Adult birds are captured using a specialized net mounted on a telescopic pole shortly after they roost at dusk. The birds are “roosted” and the net is raised in place and the bird is enticed out into the net. Net poles are only effective on cavities below 50 feet in height. In 1998, Don Schwab banded 10 Red-cockaded Woodpeckers within the Piney Grove complex. In 2000, 7 of these birds were still resident within Piney Grove. During 2000, Bryan Watts banded an additional 4 adult birds, leaving only 2 unbanded birds in the population (1 each in clusters 3 and 5). The 2 remaining unbanded adults within clusters 3 and 5 were lost during 2004 and 2005 respectively. Since this time, all birds within the population have been individually identified by unique, color-band combinations.

Nestlings - For logistical and safety reasons, banding of Red-cockaded Woodpecker nestlings is restricted to an age window of 5-10 days. Because of this restriction, close monitoring of breeding activity is essential to successful banding. During the early portion of the breeding season, both the breeding pair and the nest cavity from each cluster area were monitored closely to determine clutch initiation dates. Where cavity height permits, breeding status is determined via the use of a miniature video camera mounted on an extendable pole. The pole can accommodate cavity heights to 50 ft. For cavities exceeding that height, breeding

status was determined by visual monitoring of activity at the cavity. After dates of incubation were determined, an estimated hatching date was calculated. Nest cavities were monitored closely around the time of expected hatching to verify hatch dates. The window for banding was determined from estimated hatching dates.

All nestlings were banded during the recommended age window. Nest trees were climbed with ladders and nestlings were extracted from cavities using a noose apparatus. Nestlings were then lowered to the ground, banded, and returned to the cavity. Each nestling received a unique combination of color bands as described above. Nestlings were weighed at the time of banding using a Pesola spring scale. In the first 2 weeks after fledging, birds were identified and sex was determined by crown plumage.

### **General Observations**

As in previous years, 2 systematic surveys of all birds within Piney Grove were conducted to identify individuals and to determine distribution. Surveys were conducted in the early spring prior to the expected breeding window and in the late fall after the expected dispersal period. All clusters were visited before dawn to count the number of individuals emerging from roost cavities and/or joining emerging birds to determine clan size. Birds were followed while foraging so that color band combinations could be read with spotting scopes. Biologists systematically worked through all sites over a period of days until all individuals were identified. Once clutches were laid, observations were made at the nest cavity to identify the breeding male and female for each site.

### **Cavity Monitoring and Management**

Cavity status was evaluated by visiting each cavity tree and evaluating tree characteristics and the condition of each cavity supported. Condition classes were live or dead, standing, broken or fallen, beetles, lightning strike, and red heart disease. Cavity height and entrance orientation was determined. The condition of each cavity's entrance and plate were used to assess cavity status. Complete cavities and inserts were evaluated in April and again in September. Characteristics were evaluated and recorded as follows:

#### Cavity stage/ 06 Condition

- 1-Complete – Natural cavity
- 2-Complete (New) – Newly completed since last update
- 3-Advanced Start: 10+ centimeter depth
- 4-Start: 1-10 centimeter depth
- 5-Sub-start: Less than one centimeter depth
- 6-Insert – Artificial cavity



### Entrance enlargement

- 0-Gone
- 1-Normal size entrance
- 2-Enlarged less than twice the normal diameter
- 3-Enlarged two to four times the normal diameter
- 4-Enlarged more than four times the normal diameter
- R-Restrictor plate reducing entrance to normal size

### Activity

- 1-Active: Chipping on resin wells to some degree with fresh sap flow
- 2-Possibly active: Slight but inconclusive evidence of RCW activity
- 3-Inactive: No recent RCW activity
- 4-Relic: No RCW activity for 4 years

### Plate size

- 5-Unstarted: No plate
- 4-Started: 0-15 centimeter diameter plate
- 3-Completed: 15-30 centimeter diameter plate
- 2-Completed: 30-45 centimeter diameter plate
- 1-Completed: Greater than 45 centimeter diameter plate

### Chipping on resin wells

- 4-Old: No recent RCW activity
- 3-Recent: Few resin wells have little chipping with little to no sap flow
- 2-Fresh: Most of resin wells have chipping and bark scaled slightly
- 1-Fresh: All resin wells have chipping and bark scaled extensively

### Sap (applies to fresh and dry)

- 4-None
- 3-Less than one meter of sap flow above and below the cavity
- 2-One to two meters of sap flow above and below the cavity
- 1-Greater than two meters of sap flow above and below cavity around circumference of tree at cavity height

Completed cavities were visited on a two-month cycle to locate and remove cavity competitors. Relic cavities were omitted from this cycle and were only visited during the fall of 2006. All active and inactive cavities below 50 feet were inspected using a peeper scope. Once competitors were located, trees were climbed and

materials were removed. Trees were not climbed to remove snakes, amphibians, or wasps. Nesting birds that were tending eggs or nestlings were not removed.

## **Historic Sites**

All historic sites in Virginia that are still standing and known to be used by Red-cockaded Woodpeckers for breeding in the past 15 years were visited to determine status. All cavity trees still standing within these sites were examined for activity.

## **RESULTS**

### **Population Monitoring**

During the calendar year of 2006, 30 Red-cockaded Woodpeckers were identified within Piney Grove preserve (Table 1). This included 15 birds that were from the site and resident in previous years, 8 chicks produced during the breeding season, 1 bird that was translocated from Gates County, NC in the spring of 2002, 1 bird that was translocated from Carolina Sandhills, NWR in the fall of 2002, 3 birds that were translocated from Carolina Sandhills in the fall of 2003, and 2 birds that were translocated from Carolina Sandhills during the fall of 2005. Six birds were believed to be lost between the fall of 2005 and the breeding season of 2006 including 1 unbanded bird that had been present at least since 2000, 1 bird banded as a nestling in 2003, 1 bird banded as a nestling in 2005, 2 birds translocated to Piney Grove in the fall of 2005, and 1 bird of unknown origin.

Twenty-two birds were believed to be present within the Piney Grove preserve going into the breeding season of 2006 (Table 1). This compares to 22, 21, 19, and 16 birds going into the breeding seasons of 2005, 2004, 2003, and 2002 respectively. Birds present included 1 bird banded as an adult in 1998, 1 bird banded as an adult in 2001, 1 bird banded as a nestling in 2001, 2 birds banded as nestlings in 2002, 1 bird banded as a nestling in 2003, 3 birds banded as nestlings in 2004, and 5 birds banded as nestlings in 2005. Translocated birds included 1 bird moved from Gates County, NC in 2002 and 6 birds moved from Carolina Sandhills (1 in 2002, 3 in 2003, and 2 in 2005).

**Table 1.** Occurrence of individual Red-cockaded Woodpeckers at Piney Grove Preserve (1998-2006).

FWS	Left Leg	Right Leg	Sex	1	2	2	2	2	2	2	2006	2006
				9	0	0	0	0	0	0		
				8	0	1	2	3	4	5	Spr	Fall
<b>Piney Grove</b>												
1581-66204	RE/DB/RE	PU1/AL	F	X								
1581-66208	RE/DB/RE	PK1/AL	U	X								
1581-66210	WH/LB/WH	DB1/AL	U	X								
1581-66201	WH/LB/WH	RE/AL	M	X	X							
1581-66209	DG/YE/DG	PU/AL	F	X	X							
1581-66206	DG/YE/DG	DB/AL	M	X	X							
1581-66203	RE/DB/RE	YE/AL	F	X	X	X	X	X				
1581-66205	RE/DB/RE	DG/AL	M	X	X	X	X	X				
1581-66202	WH/LB/WH	LG/AL	M	X	X	X	X	X	X	X		
1581-66207	WH/LB/WH	WH/AL	F	X	X	X	X	X	X	X	X	
1581-66213	WH/LB/WH	DB2/AL	F		X							
1581-66216	RE/DB	RE1/AL	U		X							
1581-66221	WH/LB/WH	PK1/AL	U		X							
1581-66211	DG/YE/DG	RE1/AL	F		X							
1581-66223	DG/YE/DG	YE/AL	F		X							
1581-66222	WH/LB/WH	AL/RE	U		X	X						
1581-66219	DG/YE/DG	WH/AL	M		X	X	X					
1581-66215	RE/DB	LG1/AL	U		X	A	X	X	X			
C-3 Unbanded	Unbanded	Unbanded	U		X	X	X	X	X			
1581-66214	RE/DB	WH/AL	M		X	X	X	X	X	X	X	X
1581-66212	WH/LB/WH	YE/AL	M		X	X	X	X	X	X		
1581-66220	WH/LB/WH	PU/AL	U		X	?	?	?	X	X		
C-5 Unbanded	Unbanded	Unbanded	M		X	X	X	X	X	X		
1581-66225	RE/DB/RE	RE2/AL	M			X						
1581-66226	RE/DB/RE	LG2/AL	F			X						
1581-66227	RE/DB/RE	PK2/AL	M			X	X					
1581-66229	WH/LB/WH	DG/AL	F			X	X					
1581-66228	RE/DB/RE	PU2/AL	M			X	X	X	X			
1581-66224	DG/YE/DG	RE2/AL	M			X	X	X	X	X	X	
1581-66231	WH/LB/WH	PK2/AL	M			X	X	X	X	X	X	X
1581-66236	RE/DB/RE	AL/DB	M				X					
1581-66232	WH/LB/WH	AL/DB	M				X	X				
1581-66233	WH/LB/WH	AL/LB	F				X	X				
1581-66234	RE/DB/RE	AL/YE	F				X	X				
1581-66230	WH/LB/WH	AL/YE	F				X	X	X	X	X	X
1581-66235	RE/DB/RE	AL/RE	F				X	X	A	X	X	
1581-66239	WH/LB/WH	AL/DG	U					X				

**Table 1.** –continued–

FWS	Left Leg	Right Leg	Sex	1	2	2	2	2	2	2	2006	2006
				9	0	0	0	0	0	2006		
				8	0	1	2	3	4	5	Spr	Fall
<b>Piney Grove</b>												
1581-66240	WH/LB/WH	AL/LG	M					X				
1581-66243	RE/DB/RE	AL/PK	F					X				
1581-66246	DG/YE/DG	AL/PU	U					X				
1581-66238	WH/LB/WH	AL/PU	F					X	X			
1581-66244	RE/DB/RE	AL/DG	M					X	X			
1581-66242	RE/DB/RE	AL/LB	F					X	X			
1581-66237	WH/LB/WH	AL/RE	M					X	?	X		
1581-66245	DG/YE/DG	AL/LB	M					X	X	X	X	X
1581-66249	DG/YE/DG	AL/DB	U						X			
1581-66247	DG/YE/DG	AL/WH	U						X			
1581-66248	DG/YE/DG	AL/PU	M						X			
1581-66241	DG/YE/DG	AL/LG	F						X			
1581-66250	LB/WH/LB	AL/PK	M						X	X		
1581-66252	LB/WH/LB	AL/LB	F						X	X		
1581-66254	DB/RE/DB	AL/RE	M						X	X	A	X
1581-66251	LB/WH/LB	AL/DB	M						X	X	X	X
1581-66253	DB/RE/DB	AL/WH	F						X	X	X	X
1581-66259	DG/YE/DG	AL/DG	F							X		
1581-66256	LB/WH/LB	AL/OR	F							X		
1581-66262	DB/RE/DB	AL/YE	F							X		
1581-66257	LB/WH/LB	AL/RE	M							X	X	X
1581-66258	LB/WH/LB	AL/YE	F							X	X	X
1581-66260	DG/YE/DG	AL/OR	F							X		
1581-66261	DB/RE/DB	AL/DB	M							X	X	X
1581-66263	DB/RE/DB	AL/PU	F							X	X	X
1581-66264	WH/RE/WH	AL/DG	F							X	X	X
1581-66265	LB/WH/LB	AL/WH	F								X	X
1581-66266	LB/WH/LB	RE/AL	F								X	X
1581-66267	WH/RE/WH	AL/RE	F								X	X
1581-66268	WH/RE/WH	AL/YE	M								X	X
1581-66269	DG/YE/DG	YE/AL	M								X	X
1581-66270	DG/YE/DG	WH/AL	M								X	X
1581-66271	DB/RE/DB	YE/AL	F								X	X
1581-66272	OR/OR/OR	RE/AL	M								X	
<b>Translocated</b>												
1751-83047	AL/LG	DB/DB/YE	M			X						
1681-89697	AL/LB	ST/ST/OR	F			X						

**Table 1.** –continued–

FWS	Left Leg	Right Leg	Sex	1 9 8	2 0 0	2 0 1	2 0 2	2 0 3	2 0 4	2 0 5	2006	2006
<b>Translocated</b>												
1681-89743	AL/DG	WH/WH/PU	F			X	X					
1751-42837	YE/DB/YE	WH/AL	M				X					
1751-42838	YE/DB/YE	LG/AL	M				X					
801-40249	BK/YE/DB	RE/AL	F				X	X	X	X	X	X
1751-83163	AL/OR	DG/DG/OR	F				X					
1751-83133	AL/WH	ST/ST/OR	F				X					
1751-83208	AL/OR	WH/WH/MV	M				X					
1681-89800	AL/LG	PU/PU/LG	M				X					
1751-82968	AL/WH	OR/OR/DB	F				X					
1751-83201	AL/OR	WH/WH/LB	F				X					
1751-83213	AL/OR	OR/OR/LG	M				X					
1751-83142	AL/OR	DB/DB/WH	M				X	X	X	X	X	X
1751-83234	AL/YE	WH/WH/WH	F				X					
951-26443	AL/YE	DG/DG/LG	F				X					
951-26448	AL/YE	DG/DG/MV	M				X	A	X	X	X	X
1751-83183	AL/OR	YE/YE/WH	M				X	X	X	X	X	X
951-26305	AL/YE	YE/YE/WH	M				X	X	X	X	X	X
1581-66262	WH/WH/WH	AL/WH	M							X		
941-92246	AL / ST	OR/OR/YE	M							X		
1951-05035	AL / PU	WH/WH/MV	M							X		
1951-05086	AL/MV	MV/MV/WH	F							X	X	X
941-92233	AL / ST	WH/WH/LG	F							X	X	X
941-92268	AL / ST	PU/PU/WH	F							X		
<b>Unknown</b>												
	MV/LG	LG/AL	U							X		

Twenty-six birds were identified within Piney Grove during the late fall of 2006 (Table 1). These birds included 19 birds that were produced on site and 7 birds that were moved to Piney Grove over the years. Four birds were known to be lost during the year including 1 bird banded as an adult in 1998, 1 bird banded as a nestling in 2001, 1 bird banded as a nestling in 2002, and 1 bird banded as a nestling in 2006. No translocated birds were known to have been lost during the year.

In the winter assessment, birds were roosting in 8 different cluster areas including C-1, C-3, C-4, C-5, C-6, C-7, C-8, and C-10 (Table 2). Considerable interaction was observed between these locations. As in the past, the single bird roosting in C-4 was part of the C-3 clan. Some intermixing and interactions were observed between the C-3 and C-5 clans along the boundary between these

locations. C-3 individuals were also observed mixing in with C-7 individuals. Birds emerging in C-1 were regularly being joined by 1 or more birds often from southeasterly direction. C-8 was dynamic with birds from C-1, C-3, and C-5 observed there at different times.

**Table 2.** Roost clusters for Red-cockaded Woodpeckers detected within Piney Grove Preserve during the 2006 winter assessment.

Roost Cluster	FWS	Left Leg	Right Leg	Sex	Age
C-1	1581-66230	WH/LB/WH	AL/YE	F	5
C-1	1581-66245	DG/YE/DG	AL/LB	M	4
C-1	1581-66265	LB/WH/LB	AL/WH	F	1
C-1	1581-66270	DG/YE/DG	WH/AL	M	1
C-3	1581-66253	DB/RE/DB	AL/WH	F	3
C-3	1581-66261	DB/RE/DB	AL/DB	M	2
C-3	801-40249	BK/YE/DB	RE/AL	F	≥6
C-3	1581-66271	DB/RE/DB	YE/AL	F	1
C-3	1581-66254	DB/RE/DB	AL/RE	M	3
C-3	1581-66214	RE/DB	WH/AL	M	7
C-5	1581-66257	LB/WH/LB	AL/RE	M	2
C-5	1581-66258	LB/WH/LB	AL/YE	F	2
C-5	1581-66231	WH/LB/WH	PK2/AL	M	6
C-5	1951-05086	AL/MV	MV/MV/WH	F	2
C-5	1581-66269	DG/YE/DG	YE/AL	M	1
C-5	1581-66266	LB/WH/LB	RE/AL	F	1
C-6	1751-83183	AL/OR	YE/YE/WH	M	4
C-6	1581-66263	DB/RE/DB	AL/PU	F	2
C-7	951-26305	AL/YE	YE/YE/WH	M	4
C-7	1581-66264	WH/RE/WH	AL/DG	F	2
C-7	1581-66268	WH/RE/WH	AL/YE	M	1
C-7	1581-66267	WH/RE/WH	AL/RE	F	1
C-8	1751-83142	AL/OR	DB/DB/WH	M	5
C-8	1581-66251	LB/WH/LB	AL/DB	M	3
C-10	951-26448	AL/YE	DG/DG/MV	M	4
C-10	941-92233	AL / ST	WH/WH/LG	F	2



## Breeding Observations

Active clusters were monitored for evidence of breeding activity. Five breeding attempts were documented during the 2006 season, producing 8 chicks to fledging age. Cluster 10 was a new breeding site following cluster 7 as the second recruitment cluster used successfully for breeding.

Cluster 1 – The breeding pair within cluster 1 was the same as it has been since 2003. The female (WH/LB/WH, AL/YE) was fledged in 2002 from cluster 5 and the male (DG/YE/DG, RE/AL) was banded as an after-hatching-year bird in cluster 1 on 4/28/01. The nest cavity was tree #48. On 20 April the cavity had chips in the floor but was empty. One egg was documented on 26 April. Two 9-day old chicks were banded on 20 May (Table 3). Both chicks fledged and were determined to be males by plumage on 6 June.

Cluster 3 – The breeding pair within cluster 3 was the same as it was in 2005. The breeding female (BK/YE/DB, RE/AL) was moved to Piney Grove in 2002 from Gates County, NC. The breeding male (RE/DB, WH/AL) was banded as a nestling in cluster 3 in 2000. The nest cavity in tree #3 that was used in 2005 was taken over by White-breasted Nuthatches during the early spring. The pair moved to a cavity in tree #8. This cavity was too high to be examined with the peeper scope. Incubation behavior was first observed on 16 May. A bird approached the cavity with food on 24 May. A single 11-d old chick was banded on 1 June (Table 3). This chick fledged successfully and was determined to be a female by plumage on 20 June.

Cluster 5 – The breeding female (WH/LB/WH, WH/AL) within cluster 5 was the same as it has been since 2000. This bird was banded in 1998 as an adult in cluster 5. The breeding male (WH/LB/WH, LG/AL) from 2005 was replaced with WH/LB/WH, PK2/AL. This bird was banded as a nestling in cluster 5 in 2001. The nest cavity was the same as in 2005 in tree #25. On 20 April a single egg was detected in the cavity with the peeper scope. On 26 April, 3 eggs were present in the cavity. All eggs hatched but only 2 chicks were present at banding. The 2 chicks were estimated to be 7-d old at banding on 13 May (Table 3). Both chicks fledged and were determined to be females by plumage on 5 June.

Cluster 7 – The breeding male (AL/YE, YE/YE/WH) was the same as in 2005. This bird was translocated to cluster 7 from Carolina Sandhills, NWR in 2003 and has been present within this cluster since that time. The breeding female (WH/RE/WH, AL/DG) was banded as a nestling in cluster 7 in 2005. The nest cavity was new and in tree #114. On 26 April, 2 eggs were present in the cavity. The birds were observed bringing food to the cavity on 8 May. Two 10-d old chicks were banded on 18 May (Table 3). Both chicks fledged and were determined to be 1 male and 1 female by plumage on 13 June.

Cluster 10 – The breeding male (AL/YE, DG/DG/MV) was translocated to Piney Grove from Carolina Sandhills, NWR in the fall of 2003. The breeding female (AL/ST, WH/WH/LG) was translocated to Piney Grove from Carolina Sandhills, NWR in the fall of 2005. The nest cavity was in the artificial insert in tree #64. Two eggs were observed in the cavity for the first time on 22 May. Two, just hatched chicks were observed in the cavity on 1 June (Table 3). A single chick remained on 8 June and was banded as a 7-d old. This chick fledged and was determined to be a male by plumage on 29 June.

**Table 3.** Red-cockaded Woodpecker nestlings banded in 2006 on Piney Grove Preserve.

Cluster	Date	FWS	Lft	Rt	Age	Wgt (g)	Sex
1	5/20/06	1581-66269	DG/YE/DG	YE/AL	9 d	30.0	M
1	5/20/06	1581-66270	DG/YE/DG	WH/AL	9 d	34.0	M
3	6/1/06	1581-66267	DB/RE/DB	YE/AL	11 d	38.5	F
5	5/13/06	1581-66265	LB/WH/LB	AL/WH	7 d	21.0	F
5	5/13/06	1581-66266	LB/WH/LB	RE/AL	7 d	26.5	F
7	5/18/06	1581-66267	WH/RE/WH	AL/RE	10 d	35.0	F
7	5/18/06	1581-66268	WH/RE/WH	AL/YE	10 d	38.5	M
10	6/8/06	1581-66272	OR/OR/OR	RE/AL	7 d	23.0	M

### Translocations

No translocations were made during 2006. A decision was made not to introduce new birds into Piney Grove based on good reproduction and the perception that many birds were exploring recruitment clusters and apparently foraging and settling in new areas.

### Cavity Trees

In December 2006, Piney Grove contained 111 cavities in live trees including 21 start cavities, 34 completed cavities, and 56 artificial inserts (Appendix I). Of the 90 available natural cavities or inserts, 43 had fresh or recent chipping and sap flow from resin wells in 2006 (Appendix II). Eleven new cavities were added in 2006: five new completed natural cavity trees; two new start cavity trees; three new starts in known cavity trees; and one new insert. Two cavity trees, one natural and one artificial insert, died in 2006 (Table 4).

**Table 4.** Red-cockaded Woodpecker cavity changes in each cluster area on Piney Grove Preserve during 2006.

Cluster area	Tree tag number	New Found or Died	Cavity condition	2006 Activity status
C-7	115	New	Artificial Insert	Active
C-1	57	Found	Natural Complete	Active
C-7	105	Found	Natural Complete	Active
C-7	106	Found	Natural Complete	Active
C-8	174	Found	Natural Complete	Active
C-10	67	Found	Natural Complete	Active
C-3	3b	Found	Start	Active
C-6	136b	Found	Start	Active
C-14	88**	Found	Start	Active
C-3	79b	Found	Start	Inactive
C-5	30	Found	Start (Advanced)	Active
C-7	112	Died	Artificial Insert	Inactive
C-5	21	Died	Natural Complete	Active

\*\* Tag 88 has already been used and will need to be re-tagged

### Cavity Competitors

In 2006, 69 occurrences of other occupants were detected in cavities (Table 5). Multiple occupants occurring simultaneously in a cavity were counted as separate occurrences. Southern flying squirrels and nest material accounted for 33 of the 69 occurrences (48%). Flying squirrels or nest material on were detected on 33 occasions in 27 of 90 available cavity trees. About one third (30%) of available Red-cockaded cavities contained occupants in 2006 (Appendix III). Of the 33 occurrences of flying squirrels or nest material, 11 (33%) occurred in cluster C-13 with only 7 cavity trees. Clusters C-12 and C-9 had 4 each of the 33 occurrences (12%). Seven Southern flying squirrels were removed from cavities.

**Table 5.** Red-cockaded Woodpecker cavity competitor occurrences on Piney Grove Preserve in 2006.

Cavity Occupant	Number of cavities	Number of occurrences
Southern Flying Squirrels removed	7	7
Flying squirrel and nest material	27	33
Tufted Titmouse	2	2
White-breasted nuthatch	5	5
Rat Snake	3	5
Gray Tree frog	7	9
Bumblebee species	3	3
Polistes wasp species	2	3
Unknown mud wasp species	6	9

Several species were detected using Red-cockaded cavities (Table 5). Other bird species were detected using cavities for nesting during a critical time period. Removal of the nest material after fledging made these cavities available throughout the remainder of the year. Bumblebee nests were encountered when removing

abandoned bird nests. Black rat snakes were found in cavities at C-12 and C-8 in inactive cavities, but a snakeskin was found in one cavity at C-9 (Appendix III).

The top 5 Cluster areas having the highest average occurrences of flying squirrels or nest material in cavities were either inactive or being used by woodpeckers from another cluster area. It is not clear whether the squirrels are using the cavities because of the lack of woodpecker activity or whether the woodpeckers are not using the cavities because of competition from flying squirrels. It is interesting to note that cluster C-11 is inactive, but had no recorded flying squirrel activity in 2006.

## **Historic Sites**

### Route 460 Site (Sussex County)

Site Condition – This site remains intact but is severely degraded from midstory encroachment and limited size. Habitat on both sides of this tract has been harvested in the last 20 years leaving this island of mature timber too insignificant to consider for management purposes.

Cavity tree status – None detected.

Bird status – No evidence of activity present.

### Route 35 Site (Southampton County)

Site Condition – The site was purchased by Ashton Lewis Lumber Company in late 2001 and harvested in fall 2002. Remaining timber on this tract is relegated to two small stands (less than 20 ha each) primarily in the 40 -60 year age class. Next nearest stand of mature timber is a small 15 ha block approx. 3 km away.

Cavity tree status – All were harvested or knocked down in the harvest.

Bird status – No recent evidence of birds.

### Route 612 Site (Southampton County)

Site Condition – With the exception of 135 acres that surrounds the cluster area, this site was harvested in the summer of 2003 by Virginia-Carolina Properties. Harvest was carried out under agreement with the Virginia Department of Game & Inland Fisheries and the U.S. Fish and Wildlife Service. Under a Habitat Conservation Plan developed in cooperation with the U.S. Fish and Wildlife Service, the Virginia Department of Game & Inland

Fisheries, The Nature Conservancy, and the Center for Conservation Biology, the lone, male Red-cockaded Woodpecker was moved to the Piney Grove Preserve and the remaining 135 acres were harvested in the late spring of 2005.

#### Rt. 40 Site (Sussex County)

Site Condition – The core site between Rt 40 and old Rt 40 is still intact, although hardwood encroachment and a dense pine subcanopy have all but removed access to any potential cavity trees. Ashton Lewis Lumber Company purchased this site from Gray Family Trust in 2002. They have since harvested all of the mature timber around this site, leaving only the historic triangle of old-growth timber still standing. This remaining tract is less than 25 ha and is too degraded to be of any use to red-cockaded woodpeckers. Ashton Lewis has received authority to harvest the remaining acreage as soon as the site dries out enough to get equipment in.

Cavity tree status – All historic cavity trees are dead or have been enlarged to the point of excluding red-cockaded as users.

Bird status – Last detection was a vocalizing bird to the southeast of the stand in spring, 1996.

#### **ACKNOWLEDGMENTS**

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**Appendix I. Status of Red-cockaded Woodpecker cavities on Piney Grove in 2006.**

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
1	35	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Recent
1	36	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
1	37	Loblolly	Live	Natural	Start	Normal	Unstarted	Recent
1	38	Shortleaf	Live	Natural	Complete	Normal	15-30 cm	Fresh
1	39	Loblolly	Live	Natural	Complete	Normal	30-45 cm	Fresh
1	40	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
1	41	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
1	42	Loblolly	Live	Natural	Start	Gone	Gone	None
1	43	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	44	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	45	Loblolly	Live	Natural	Complete	Normal	15-30 cm	Recent
1	46	Loblolly	Live	Natural	Complete	<2X	>15 cm	Old
1	47	Loblolly	Live	Natural	Start (Ad)	Restrictor	Unstarted	Recent
1	48	Loblolly	Live	Natural	Complete	Normal	30-45 cm	Fresh
1	49	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	50	Shortleaf	Dead	Artificial	Insert	Gone	Gone	Gone
1	51	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
1	52	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
1	53	Loblolly	Live	Artificial	Insert	<2X	>15 cm	Fresh
1	54	Loblolly	Live	Natural	Sub-start	Normal	Unstarted	None
1	55	Loblolly	Live	Natural	Complete	<2X	Unstarted	Fresh
1	57	Loblolly	Live	Natural	Complete (New)	Normal	Unstarted	Fresh
1	102	Loblolly	Live	Natural	Complete	<2X	>15 cm	Old
1	117	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
2	60	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
2	61	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
2	62	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
2	63	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
3	1	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
3	2	Loblolly	Live	Artificial	Insert	Restrictor	>15 cm	Fresh
3	3a	Loblolly	Live	Natural	Complete	Restrictor	15-30 cm	Fresh
3	3b	Loblolly	Live	Natural	Start	Normal	Unstarted	None
3	4	Loblolly	Live	Natural	Complete	Restrictor	15-30 cm	Fresh
3	5	Loblolly	Live	Natural	Start	Normal	Unstarted	None
3	6	Loblolly	Live	Natural	Complete	<2X	Unstarted	Fresh
3	7	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
3	8	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
3	9a	Loblolly	Live	Natural	Start	<2X	Unstarted	None
3	9b	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
3	9c	Loblolly	Live	Natural	Start	Normal	Unstarted	None
3	71	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
3	72	Loblolly	Live	Natural	Complete	>4X	>15 cm	Old
3	74	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
3	75	Loblolly	Live	Natural	Complete	>4X	>15 cm	Old
3	76	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
3	77	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
3	79a	Loblolly	Live	Natural	Complete	<2X	30-45 cm	Old
3	79b	Loblolly	Live	Natural	Start	Normal	Unstarted	Old



**Appendix I. –continued-**

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
3	79c	Loblolly	Live	Natural	Start	Restrictor	Unstarted	Old
3	80	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
3	177	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
3	178	Loblolly	Live	Natural	Start	<2X	Unstarted	Fresh
3	186	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
4	81	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
4	82	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
4	83	Loblolly	Dead	Artificial	Insert	Normal	15-30 cm	Old
4	84	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
5	20	Loblolly	Live	Natural	Complete	Restrictor	>15 cm	Recent
5	21	Loblolly	Dead	Natural	Complete	<2X	>15 cm	Recent
5	22	Loblolly	Live	Natural	Complete	Normal	>15 cm	Recent
5	23	Loblolly	Live	Natural	Complete	Restrictor	30-45 cm	Fresh
5	24	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
5	25	Loblolly	Live	Natural	Complete	Normal	15-30 cm	Fresh
5	26	Loblolly	Live	Natural	Complete (New)	Normal	Unstarted	Fresh
5	27	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
5	28	Loblolly	Live	Natural	Complete	Normal	>15 cm	Fresh
5	29	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
5	30	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
5	92	Loblolly	Live	Natural	Start	Normal	Unstarted	None
5	93	Loblolly	Live	Natural	Complete	Normal	30-45 cm	Recent
5	94	Loblolly	Live	Natural	Complete	Restrictor	>15 cm	Old
5	95	Loblolly	Live	Natural	Complete	Restrictor	15-30 cm	Old
5	96	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
5	97	Loblolly	Dead	Natural	Complete	Gone	Gone	Gone
5	98	Loblolly	Dead	Natural	Complete	<2X	30-45 cm	Old
5	99	Loblolly	Dead	Natural	Complete	>2X	30-45 cm	Old
5	127	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
5	138	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
5	191	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
6	10	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
6	11	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
6	12	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
6	13	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
6	116	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
6	135	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Fresh
6	136b	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
6	136a	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
6	137	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
6	139	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
7	105	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
7	106	Loblolly	Live	Natural	Complete (New)	Normal	Unstarted	Fresh
7	110	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
7	111	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
7	112	Loblolly	Dead	Artificial	Insert	Normal	Unstarted	Old
7	113	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
7	114	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone

**Appendix I. –continued–**

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
7	115	Loblolly	Live	Natural	Complete (New)	Normal	Unstarted	Fresh
7	195	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
8	170	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	171	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	172	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	173	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	174	Loblolly	Live	Natural	Complete	Normal	Unstarted	Fresh
9	85	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
9	86	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
9	87	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
9	88	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Fresh
10	64	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
10	65	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
10	66	Loblolly	Live	Artificial	Insert	Normal	Unstarted	None
10	67	Loblolly	Live	Natural	Complete	>2X	Unstarted	Recent
10	150	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
10	151	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
10	152	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
10	153	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
11	140	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	141	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	142	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	143	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
12	130	Loblolly	Dead	Artificial	Insert	Gone	Gone	Gone
12	131	Loblolly	Live	Artificial	Insert	<2X	Unstarted	Old
12	132	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
12	133	Loblolly	Live	Artificial	Insert	<2X	Unstarted	Old
12	189	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	118	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	119	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	120	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	121	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	122	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	123	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	124	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	88	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
14	89	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	90	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	91	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
14	100	Loblolly	Live	Natural	Start	Normal	Unstarted	Recent
14	101	Loblolly	Live	Natural	Complete	Normal	Unstarted	Fresh

**Appendix II. Characteristics of Red-cockaded Woodpecker cavities on Piney Grove during 2006.**

CLUSTER	Tree	Species	Condition	Direction	Height	Cavity Stage	Enlargement	Activity	Depth	Plate	Chipping	Dry Sap	Fresh Sap	Comments	Needs face repair	Needs major repair
1	35	Loblolly	Live	247	44	3	1	1	6+	5	3	3	3			
1	36	Loblolly	Live	207	32	6	1	1		4	3	3	3		X	
1	37	Loblolly	Live	242	52	4	1	1	3	5	3	3	3			
1	38	Shortleaf	Live	152	32.5	1	1	1		3	2	2	2			
1	39	Loblolly	Live	150	32	1	1	1		2	2	2	2			
1	40	Loblolly	Dead			1								Broke/standing		
1	41	Loblolly	Dead			1								Standing - Broke		
1	42	Loblolly	Live	?	?	4								About 10 holes in tree healing or healed - RHFB		
1	43	Loblolly	Live	277	35	1	4	4		3	4	3	4			
1	44	Loblolly	Live	295	35	1	4	4		3	4	3	4			
1	45	Loblolly	Live	83	25	1	1	1		3	3	2	3			
1	46	Loblolly	Live	226	63	1	2	4		4	4	3	4			
1	47	Loblolly	Live	251	57	3	R	1	4	5	3	3	3			
1	48	Loblolly	Live	249	34	1	1	1		2	2	2	2			
1	49	Loblolly	Live	260	55	1	4	4		3	4	3	4			
1	50	Shortleaf	Dead			6								Fallen		
1	51	Loblolly	Dead	282	39	6								Standing - Broke		
1	52	Loblolly	Live	300	35	6	1	3		5	4	4	4			
1	53	Loblolly	Live	292	46.5	1	2	1		4	2	3	2			
1	54	Loblolly	Live	247	29	5	1	1	1	5	2	3	3			
1	55	Loblolly	Live	347	50	1	2	1		5	2	3	2	11/7/06 cavity is complete		
1	57	Loblolly	Live	259	49	2	1	1		5	2	3	2	11/7/06 No paint		
1	102	Loblolly	Live	264	55	1	2	4		4	4	2	4	Tree leaning at 80 degree onto another tree		
1	117	Loblolly	Live	221	32	6	1	1		4	3	3	3		X	
2	60	Loblolly	Live	252	34	6	1	4		5	4	3	4		X	
2	61	Loblolly	Dead			6								Not Found	X	
2	62	Loblolly	Live	290	35	6	1	4		5	4	3	4		X	
2	63	Loblolly	Live	283	33	6	1	4		5	4	3	4		X	
3	1	Loblolly	Live	234	31	6	1	1		5	3	2	3			
3	2	Loblolly	Live	230	32	6	R	1		4	2	2	2			
3	4	Loblolly	Live	255	44	1	R	1		3	2	2	2			
3	5	Loblolly	Live	170	40	4	1	3	3	5	4	3	4			
3	6	Loblolly	Live	262	58	1	2	1		5	2	2	3	9/29/06 tree has become inactive		
3	7	Loblolly	Live	287	36	3	1	1	5+	5	2	3	2	9/29/06 needs paint (has one band on south side only)		
3	8	Loblolly	Live	258	56	1	2	1		4	1	2	2			
3	71	Loblolly	Dead	224	45	1								Standing - Broke at cavity		
3	72	Loblolly	Live	217	45	1	4	4		4	4	3	4			
3	74	Loblolly	Dead			1								Standing		
3	75	Loblolly	Live	255	50	1	4	4		4	4	2	4			
3	76	Loblolly	Live	306	31.5	6	1	1		4	3	3	3			
3	77	Loblolly	Dead			1								Standing		
3	80	Loblolly	Live	302	30	4	1	1	4	5	2	3	3			
3	177	Loblolly	Live	251	30	6	1	3		5	4	3	4		X	
3	178	Loblolly	Live	233	30	4	2	1	4	5	2	3	3			
3	3a	Loblolly	Live	250	27	1	R	1		3	1	2	2			
3	3b	Loblolly	Live	28	23	4	1	1	1	5	2	3	3			
3	79a	Loblolly	Live	238	50	1	2	4		2	4	2	4			
3	79b	Loblolly	Live	72	50	4	1	3	4	5	4	4	4			

Appendix II. –continued-

CLUSTER	Tree	Species	Condition	Direction	Height	Cavity Stage	Enlargement	Activity	Depth	Plate	Chipping	Dry Sap	Fresh Sap	Comments	Needs face repair	Needs major repair
3	79c	Loblolly	Live	272	33	4	R	3	4	5	4	3	4	Need to verify if complete		
3	9a	Loblolly	Live	303	58	4	2	4		5	4	4	4			
3	9b	Loblolly	Live	343	50	3	1	1	5+	5	1	3	3			
3	9c	Loblolly	Live	224	49	4	1	3	3	5	4	4	4	other holes at 248 deg. 41' 230 deg. 42' and others healed		
4	81	Loblolly	Dead			6								Fallen - windthrow		
4	82	Loblolly	Live	240	31.5	6	1	1		4	3	2	3			
4	83	Loblolly	Dead	270	32	6	1	4		3	4	3	4	Standing		
4	84	Loblolly	Live	250	33	6	1	4		5	4	3	4			
4	186	Loblolly	Live	230	31.5	6	1	4		5	4	3	4			
5	20	Loblolly	Live	230	51	1	R	1		4	3	2	3			
5	21	Loblolly	Dead	283	41	1	2	1		4	3	2	3	11/4/06 Dead/broke at cavity		
5	22	Loblolly	Live	296	52	1	1	1		4	3	2	3			
5	23	Loblolly	Live	325	49.5	1	R	1		2	2	2	2			
5	24	Loblolly	Live	365	55	1	2	1		4	2	1	2	Many Pileated woodpecker holes below cavity, possibly hollow, Red heart fruiting body		
5	25	Loblolly	Live	273	37.5	1	1	1		3	2	2	2			
5	26	Loblolly	Live	200	50	2	1	1		5	1	3	3	8/14/06 cavity recently complete		
5	27	Loblolly	Live	247	24	1	2	1		4	1	2	2			
5	28	Loblolly	Live	280	42	1	1	1		4	1	2	2			
5	29	Loblolly	Dead			1								Standing - top broke off		
5	30	Loblolly	Live	280	33	3	1	1	5+	5	1	3	3	11/4/06 New tree tagged #30		
5	92	Loblolly	Live	290	30	4	1	4	2	5	4	3	4			
5	93	Loblolly	Live	310	55	1	1	1		2	3	2	3			
5	94	Loblolly	Live	304	50	1	R	3		4	4	3	4			
5	95	Loblolly	Live	14	42	1	R	4		3	4	3	4			
5	96	Loblolly	Dead			1								Standing - Broke at cavity		
5	97	Loblolly	Dead			1								Standing - Broke at cavity		
5	98	Loblolly	Dead	206	45	1	2	4		2	4	2	4	Standing		
5	99	Loblolly	Dead	300	45	1	3	4		2	4	2	4	Standing		
5	127	Loblolly	Live	270	32.5	6	1	4		5	4	3	4		X	
5	138	Loblolly	Live	320	32	6	1	4		5	4	3	4	11/4/06 Lightning strike going through cavity, Beetles in base of tree with "sawdust"	X	
5	191	Loblolly	Live	322	32	6	1	4		5	4	3	4		X	
6	10	Loblolly	Live	206	32	6	1	1		4	2	3	2	Insert opens into hollow center of tree	X	
6	11	Loblolly	Dead			6								Fallen - windthrow		
6	12	Loblolly	Dead			6								Standing - broke at cavity		
6	13	Loblolly	Dead			6								Not Found		
6	116	Loblolly	Live	170	31.5	6	1	3		4	4	3	4		X	
6	135	Loblolly	Live	195	34.5	6	1	1		5	2	3	2	9/29/06 tree very active, 12/02/06 Water in cavity		X
6	137	Loblolly	Live	207	36	6	1	3		5	4	4	4			
6	139	Loblolly	Live	200	31.5	6	1	3		5	4	3	4			
6	136a	Loblolly	Live	166	48.5	4	1	1	1	5	2	3	3			
6	136b	Loblolly	Live	184	47	4	1	1	4	5	2	3	3			
7	105	Loblolly	Live	260	32.5	6	1	1		5	3	4	3	9/29/06 White paint		
7	106	Loblolly	Live	280	36	2	1	1		5	2	2	2	9/29/06 White paint, Red Heart Fruiting Body		
7	110	Loblolly	Live	265	23	6	1	1		4	3	2	3	9/26/06 Recent repairs made to cavity, Recent white paint		
7	111	Loblolly	Live	286	22	6	1	1		4	2	2	2			
7	112	Loblolly	Dead	253	32	6	1	3		5	4	3	4	4/2/06 tree is Dead/Standing - still brown needles on tree		
7	113	Loblolly	Dead			6								Standing - Broke at cavity		

Appendix II. –continued-

CLUSTER	Tree	Species	Condition	Direction	Height	Cavity Stage	Enlargement	Activity	Depth	Plate	Chipping	Dry Sap	Fresh Sap	Comments	Needs face repair	Needs major repair
7	114	Loblolly	Dead			6								Fallen - windthrow		
7	115	Loblolly	Live	274	45	2	1	1		5	1	2	2	9/20/06 White paint		
7	195	Loblolly	Live	223	29	6	1	1		4	3	3	3			
8	170	Loblolly	Live	314	33	6	1	3		5	4	3	4			
8	171	Loblolly	Live	287	33	6	1	3		5	4	3	4	04/04/06 Pileated damage above cavity, 10/31/06 water in cavity	X	X
8	172	Loblolly	Live	300	33	6	1	3		5	4	3	4	04/04/06 Pileated damage above cavity		
8	173	Loblolly	Live	255	33	6	1	3		5	4	3	4			
8	174	Loblolly	Live	352	38.5	1	1	1		5	2	2	2	10/31/06 White paint, Southern pine beetle pitch tubes		
9	85	Loblolly	Live	255	37	6	1	3		5	4	3	4		X	
9	86	Loblolly	Live	262	39	6	1	1		5	3	3	3			
9	87	Loblolly	Live	226	37	6	1	3		5	4	4	4			
9	88	Loblolly	Live	230	39	6	1	1		5	2	3	3			
10	64	Loblolly	Live	241	34.5	6	1	1		4	1	3	3			
10	65	Loblolly	Live	296	36	6	1	1		4	2	3	2		X	
10	66	Loblolly	Live	266	33	6	1	3		5	4	3	4	Pileated damage		
10	67	Loblolly	Live	305	46	1	3	1		5	3	3	2	10/31/06 White paint		
10	150	Loblolly	Live	250	32	6	1	1		5	3	3	3	Pileated damage, 10/31/06 Insert replaced		
10	151	Loblolly	Dead			6								Standing - Broke at cavity		
10	152	Loblolly	Dead			6								Standing - Broke at cavity		
10	153	Loblolly	Dead			6								Standing - Broke at cavity		
11	140	Loblolly	Live	195	31	6	1	3		5	4	3	4			
11	141	Loblolly	Live	202	31	6	1	3		5	4	3	4			
11	142	Loblolly	Live	264	31	6	1	3		5	4	3	4			
11	143	Loblolly	Live	220	31	6	1	3		5	4	3	4			
12	130	Loblolly	Dead			6								Fallen - windthrow		
12	131	Loblolly	Live	320	23	6	2	3		5	4	3	4			
12	132	Loblolly	Live	305	33	6	1	3		5	4	3	4			X
12	133	Loblolly	Live	280	33	6	2	4		5	4	3	4			X
12	189	Loblolly	Live	253	31	6	1	3		5	4	3	4	10/31/06 Cavity very moist - cleared drain hole		
13	118	Loblolly	Live	212	37	6	1	3		5	4	4	4		X	
13	119	Loblolly	Live	240	36	6	1	3		5	4	4	4			
13	120	Loblolly	Live	250	46	6	1	3		5	4	4	4		X	
13	121	Loblolly	Live	210	32	6	1	3		5	4	4	4			
13	122	Loblolly	Live	260	22	6	1	3		5	4	4	4			
13	123	Loblolly	Live	239	31.5	6	1	3		5	4	4	4			
13	124	Loblolly	Live		32.5	6	1	3		5	4	4	4		X	
14	88	Loblolly	Live	294	40	4	1	1	3	5	2	3	3	12/7/06 White paint, need to recheck tag #, appears double tagged		
14	89	Loblolly	Live	220	32	6	1	3		5	4	4	4			
14	90	Loblolly	Live	227	33	6	1	3		5	4	4	4			
14	91	Loblolly	Live	246	36	6	1	1		5	3	4	3			
14	100	Loblolly	Live	256	44	4	1	1	2	5	3	4	4			
14	101	Loblolly	Live	265	43	1	1	1		5	2	2	2			

**Appendix III. Occurrence and management of competitors in Red-cockaded Woodpecker cavities in Piney Grove during 2006.**

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant
1	35						
1	36	06/04/06	Dead Sisi remains	07/26/06	Removed feathers		
1	37						
1	38						
1	39						
1	40						
1	41						
1	42						
1	43						
1	44						
1	45	06/04/06	Dead Glvo	07/26/06	Removed carcass	11/14/06	Nest material removed
1	46						
1	47						
1	48	04/26/06	Pibo nest				
1	49						
1	50						
1	51						
1	52						
1	53						
1	54						
1	55	11/07/06	Nest material (not removed)				
1	57						
1	102						
1	117	11/04/06	Nest material removed				
2	60						
2	61						
2	62						
2	63						
3	1						
3	2	08/14/06	Hych				
3	4						
3	5						
3	6	09/29/06	Posp	12/12/06	Posp		
3	7						
3	8	06/04/06	Pibo nest				
3	71						
3	72						
3	74						
3	75	04/26/06	Nest material				
3	76	09/26/06	Hych	12/12/06	Nest material removed		
3	77						
3	80						
3	177	04/09/06	Unsp	08/14/06	Unsp	12/12/06	Nest material removed
3	178						
3	3a	04/09/06	Sica nest				
3	3b						
3	79a						
3	79b						
3	79c						



Appendix III. –continued-

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant	Date	Occupant
3	9a								
3	9b								
3	9c								
4	81								
4	82	04/26/06	Glvo						
4	83								
4	84	04/26/06	Unsp	11/04/06	Unsp				
4	186	04/26/06	Hych	06/10/06	Pine straw removed	08/14/06	Hych	11/04/06	Hych
5	20								
5	21								
5	22								
5	23								
5	24								
5	25	04/20/06	Pibo nest						
5	26								
5	27								
5	28								
5	29								
5	30								
5	92								
5	93								
5	94								
5	95	06/04/06	Moss/leaves						
5	96								
5	97								
5	98								
5	99								
5	127	11/04/06	Hych						
5	138								
5	191	11/04/06	Unsp						
6	10								
6	11								
6	12								
6	13								
6	116	04/09/06	Sica nest	07/31/06	Bosp nest removed	07/31/06	Hych		
6	135	12/12/06	Water in cavity						
6	137	04/09/06	Glvo removed	07/31/06	Debri & insects removed				
6	139								
6	136a								
6	136b								
7	105								
7	106								
7	110	07/26/06	Nest removed/blue egg piece	09/29/06	Pibo				
7	111								
7	112								
7	113								
7	114								
7	115	04/26/06	Pibo nest						
7	195	04/09/06	Sica nest	06/17/06	Removed nest material	06/17/06	Removed Bosp		
8	170	06/10/06	Eisp	08/14/06	Eisp	09/29/06	Eisp		

**Appendix III. –continued-**

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant	Date	Occupant
8	171	06/10/06	Unkown Nest with 2eggs	09/06/06	Unkown Nest with 2eggs	10/31/06	Removed nest material		
8	172								
8	173								
8	174								
9	85	04/09/06	Twigs/grass removed	06/17/06	Snake skin removed				
9	86								
9	87	04/09/06	Grass removed	06/17/06	Bosp nest removed	07/31/06	Glvo removed		
9	88	04/09/06	Twigs/grass removed						
10	64	06/10/06	Pibo nest						
10	65								
10	66	06/10/06	Pabi Nest-5 eggs	10/31/06	Debri removed				
10	67								
10	150			10/31/06	Glvo removed				
10	151								
10	152								
10	153								
11	140	09/29/06	Elsp	10/31/06	Fungus and roaches				
11	141	04/09/06	Unsp	10/31/06	Roaches				
11	142								
11	143	04/02/06	Sica	04/09/06	Sica 6 eggs				
12	130								
12	131	06/04/06	Posp	09/29/06	Nest material (not removed)	12/12/06	Nest material removed		
12	132	06/04/06	Unsp						
12	133	06/04/06	Pine straw removed	09/29/06	Nest material (not removed)	12/12/06	Nest material removed		
12	189	09/29/06	Elsp	12/12/06	Nest material removed				
13	118	04/26/06	Sica Nest	11/07/06	Nest material removed				
13	119	06/10/06	Nest material removed	11/07/06	Nest material removed				
13	120	04/26/06	Nest material removed	06/10/06	1 white egg and egg shell	11/07/06	Nest material removed		
13	121	04/26/06	Nest material removed	11/07/06	Nest material removed				
13	122	11/07/06	Nest material removed						
13	123	04/26/06	Nest material removed	06/10/06	Glvo removed	11/07/06	Nest material removed	11/07/06	Hych
13	124	06/10/06	Nest material removed						
14	88								
14	89	08/14/06	Nest material removed						
14	90	04/15/06	Nest material removed	06/04/06	roaches				
14	91	08/14/06	Debri/roaches/Unsp tubes	10/31/06	Debri/roaches/Unsp tubes				
14	100								
14	101	04/15/06	Glvo removed	06/04/06	Pabi nest				

**Occupant key to Appendix III.**

Code	Occupant description	Code	Occupant description
Bosp	Bumble Bee species	Pibo	Red-cockaded Woodpecker
Glvo	Southern Flying Squirrel	Posp	Polistes wasp species
Hych	Gray Treefrog	Sica	White-breasted nuthatch
Elsp	Rat Snake species	Sisi	Eastern Bluebird
Pabi	Tufted Titmouse	Unsp	Unknown mud wasp species

