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Investigation of red-cockaded woodpeckers in Virginia: 2001 report

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INVESTIGATION OF RED-COCKADED WOODPECKERS IN VIRGINIA: YEAR 2001 REPORT



**CENTER FOR CONSERVATION BIOLOGY
COLLEGE OF WILLIAM AND MARY**

Investigation of Red-cockaded Woodpeckers in Virginia: 2001 report

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EXECUTIVE SUMMARY

A total of 20 different Red-cockaded Woodpeckers were identified during the 2001 breeding season. These birds included 11 resident adults, 6 nestlings, and 3 hatching-year birds translocated from Carolina Sandhills, NWR. Five of these birds disappeared over the course of the year including 1 resident adult, 2 nestlings, and 2 translocated females. The population included 11 individuals in April and 15 individuals in November. This compares to 13 and 14 individuals respectively for the same time periods in 2000. The gender of birds remaining in November included 9 males, 4 females, and 2 unknown.

Only 2 of the 3 active woodpecker clusters produced young in 2001. Cluster 1 contained only 2 males by April eliminating the opportunity for a breeding attempt. Three of 4 nestlings produced in cluster 3 were known to have fledged. Only 2 of these were remaining in November. Both nestlings produced in cluster 5 fledged and were present in November. Young reaching fledging age included 3 males and 2 females. Hatching dates were 4 and 9 May for cluster 3 and 5 respectively.

In 2001, Piney Grove Preserve supported 57 trees that contained Red-cockaded start cavities, completed cavities, or cavity inserts. Sixteen new cavities were completed in 2001 including 4 cavities that were started in 2000, 5 cavities that were initiated in 2001, and 7 artificial inserts. Of 34 natural cavities still standing in 2001, 20 showed evidence of recent maintenance. Only 19 of 52 available cavities were determined to be used by roosting birds. Of the 20 cavities determined to be used in 2000 less than half were still in use in 2001. Damage to natural cavities was more widespread in 2001 compared to 2000. Of 34 natural cavities available, 25 had evidence of damage by competitors. Damage on more than half of these was severe with the cavity entrance being enlarged more than twice normal size. Of considerable concern is that 4 of the 10 new starts and cavities showed signs of damage by the fall. Both of the nest cavities that were active in 2001 showed competitor damage by the fall months.

BACKGROUND

Context - The Red-cockaded Woodpecker (*Picoides borealis*) is a federally endangered species. This species excavates cavities within live, mature (80+ years) pine trees and requires pine stands with open park-like understories. A single family group may require 100 ha of pine forest or more depending on site quality. 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 that time, the range has contracted to southeastern Virginia as northern breeding sites have been lost. 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 the late 1970's, 23 clans were known scattered across 5 counties. Currently, 2 productive clans exist in a single county.

The Red-cockaded Woodpecker is in eminent danger of extinction within Virginia. A recent survey of the entire southeastern portion of Virginia has failed to locate any additional active breeding sites. Approximately 15 sites including approximately 3,500 ha of old growth pine remain that seem to be adequate to meet the breeding requirements of the species if restored. Within the past 2 years, The Nature Conservancy has purchased just over 600 ha of old growth pineland that supports the core of the remaining population. This land has been designated as the Piney Grove Preserve. The primary mission of this new reserve will be the restoration of pine savannah habitat. If successful, this project may be expanded to other sites.

Restoration of the Red-cockaded Woodpecker population in Virginia will require the aggressive use of techniques that have been successful further south. Intensive management of extant clans along with extensive habitat restoration is needed to stabilize the population and bring it back to pre-1980 levels. Ultimately, this will require the translocation of birds either to increase the small gene pool or to establish clans on new sites. Management activities will be most effective if coupled with an intensive monitoring program.

Objectives – The primary objective of this project was to monitor the population within the Piney Grove Preserve. A secondary objective was to collect information relevant to the continued management of birds and their habitat. Specific objectives include

- 1) Determine the number and identification of all birds within each group at the throughout the breeding season.
- 2) To monitor the breeding activity of active pairs for the purpose of coordinating banding activities and determining productivity.
- 3) To monitor the status of cavity trees.

METHODS

Piney Grove

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 understorey. 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. From 1999 through 2001, three recruitment clusters were established by The Nature Conservancy by installing artificial cavities. There are now six different cluster sites with either natural or artificial cavities (See maps in Figures 1 through 4).

Figure 1. Map of cluster 6. Circles indicate location of natural cavities or artificial inserts. Numbers are unique cavity codes.

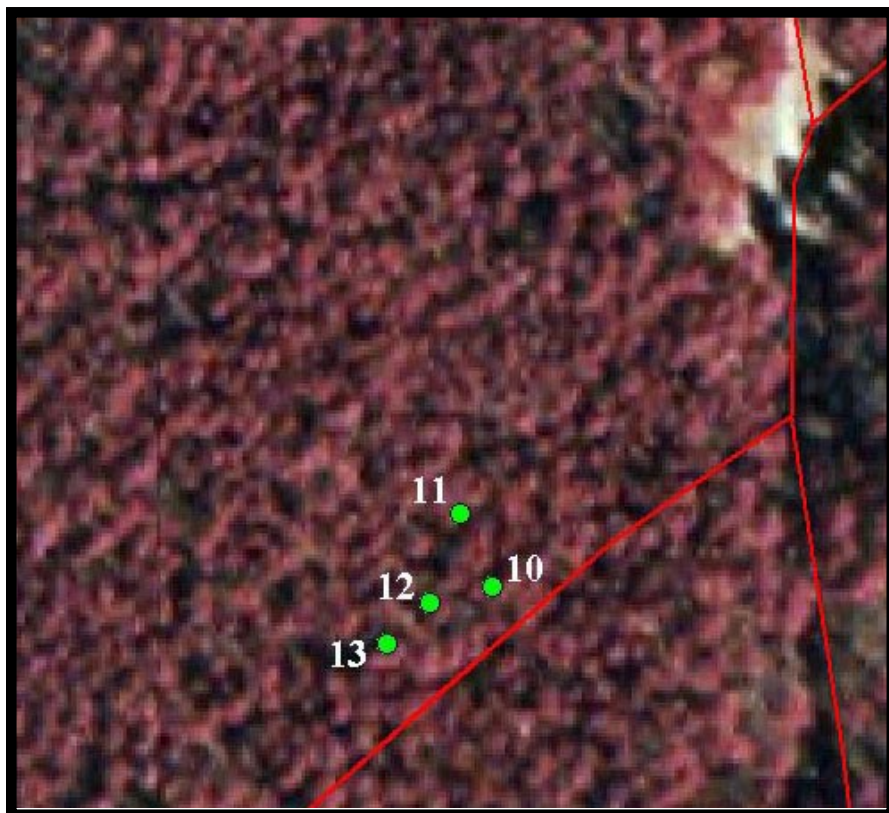


Figure 2. Map of clusters 1 and 2. Circles indicate location of natural cavities or artificial inserts. Numbers are unique cavity codes.

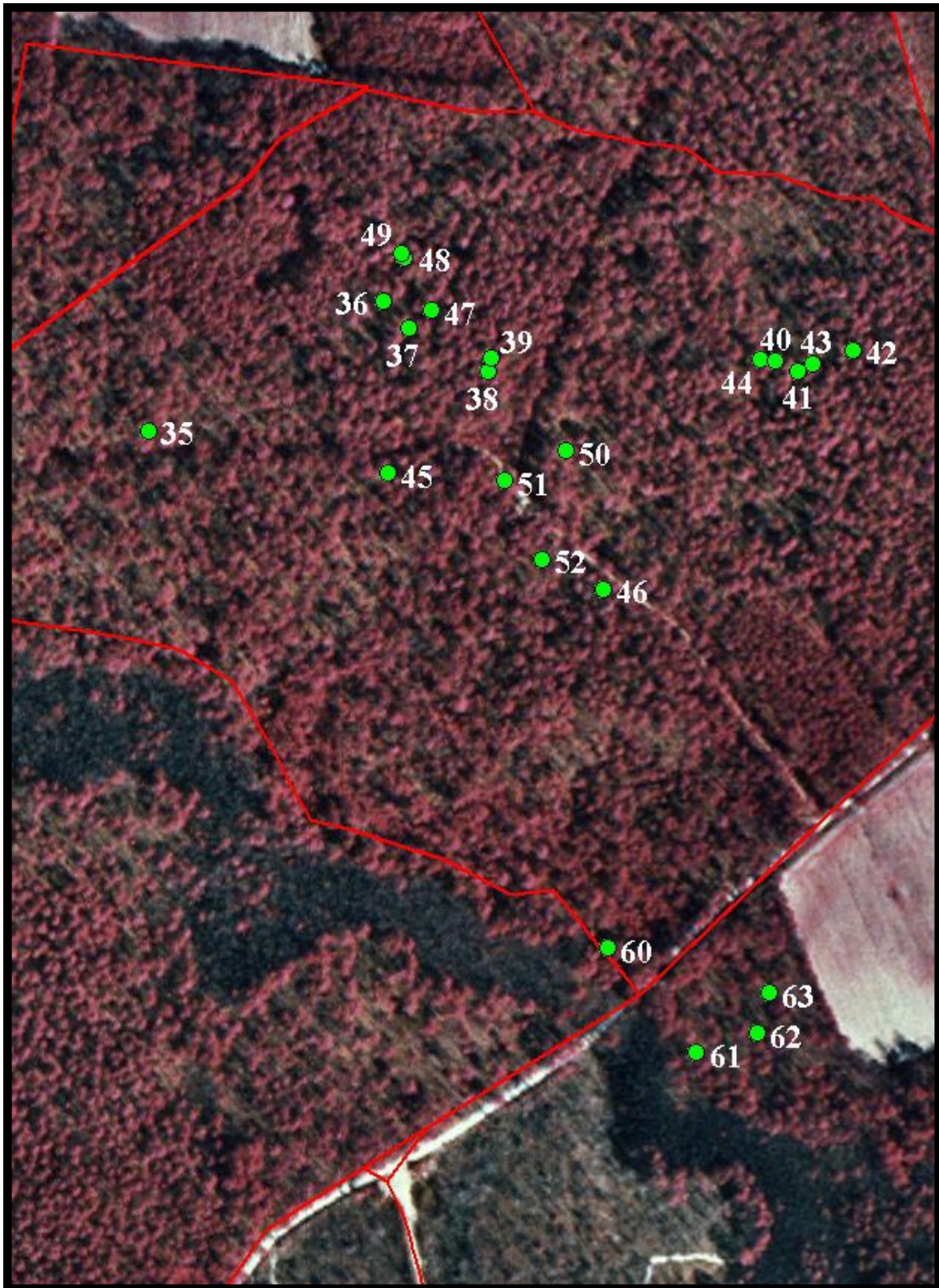


Figure 3. Map of clusters 3 and 4. Circles indicate location of natural cavities or artificial inserts. Numbers are unique cavity codes.

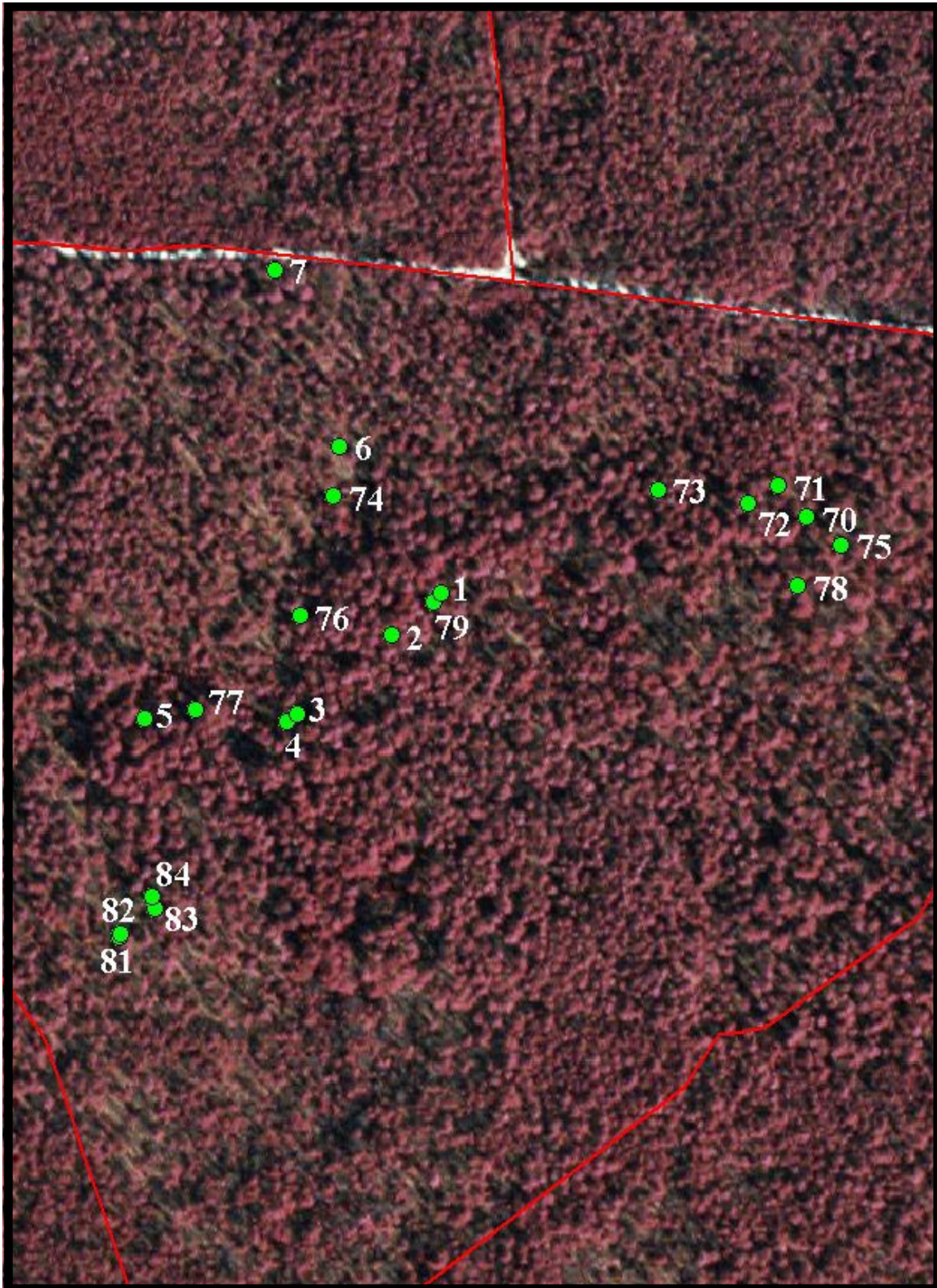
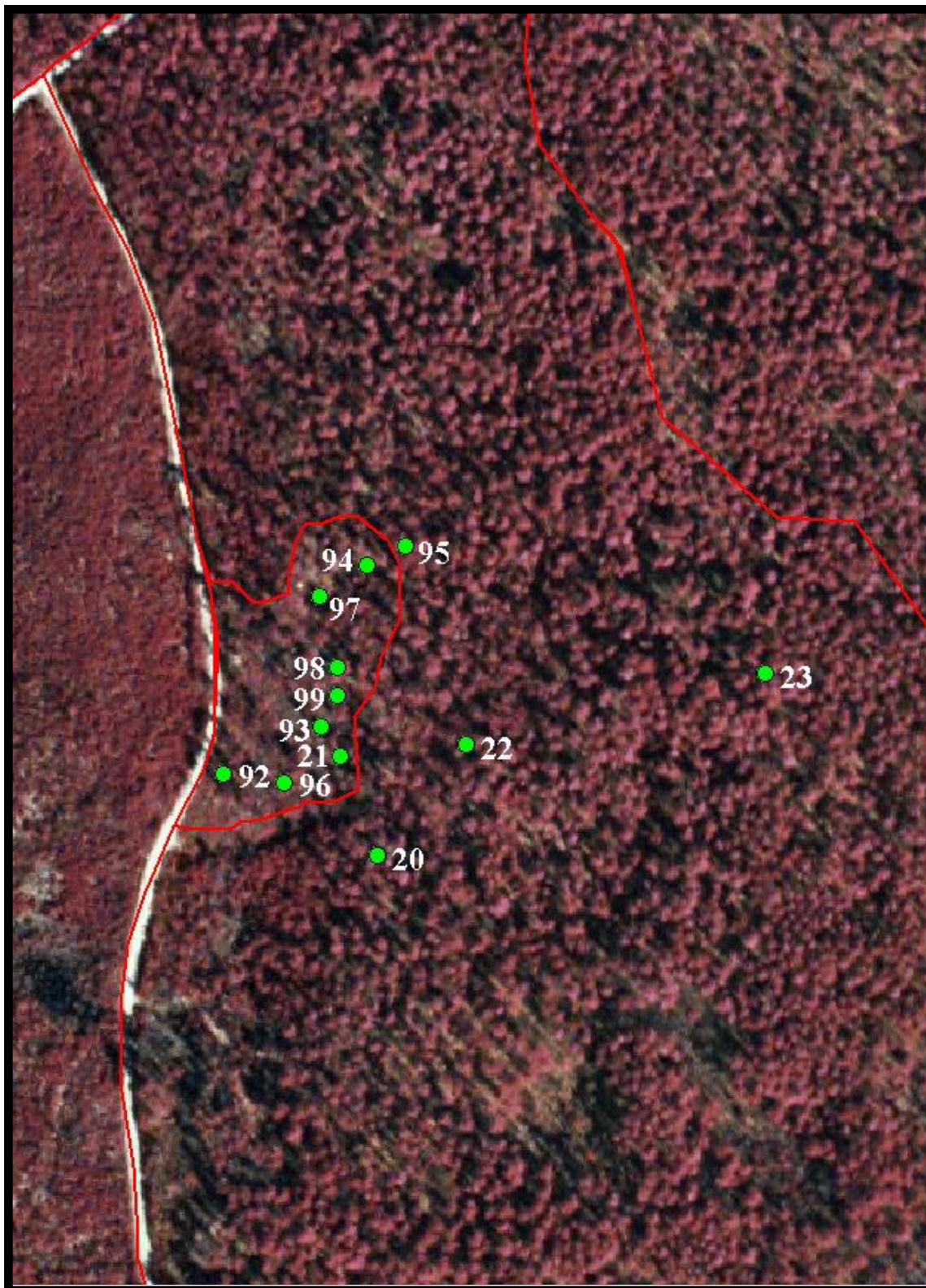


Figure 4. Map of cluster 5. Circles indicate location of natural cavities or artificial inserts. Numbers are unique cavity codes.



Banding

Adults - In 1998, Don Schwab banded 10 Red-cockaded Woodpeckers within the Piney Grove complex. Observations made during 2000 and 2001 indicate that several of these birds are still present within the population (see results section below). Although completion of the color-marking program is a priority with clear management benefits, the capture and banding of wild birds is not risk free. For this reason, caution was used in the execution of the capture program. Every effort was made to target specific individuals that were known to be unbanded. This approach insured that the handling of banded birds was kept to a minimum. Because individuals frequently exchange cavities for roosting, this approach required extensive monitoring. Birds were identified and located in specific cavities as they returned to the cluster areas to roost. Known birds were then targeted for capture shortly after roosting in the evening or before emerging the following morning.



Adult woodpecker captured in the evening just after roosting and fitted with a unique combination of color bands.

Adult birds were captured using a fine-mesh net mounted on a telescopic pole. The net was attached to a wire frame that was formed to estimate the curvature of a tree trunk. The telescopic pole was used to raise the net in position while the target bird was roosting in the cavity. The net was placed over the cavity entrance and flush against the tree trunk. The cavity tree was then tapped to encourage the woodpecker to emerge into the net. Once in the net, the bird was lowered for removal. The telescopic pole is 50 feet long. Because several roost cavities are well over 50 feet high (see results section below), birds roosting within these cavities could not be trapped.

Captured birds were banded, measured, sexed, and released. Each bird was fitted with a unique combination of color bands. A series of three color bands were used on the left leg to signify the clan affiliation. A single color band in combination with the aluminum Fish and Wildlife band was used on the right leg to identify the individual within each clan. Individual birds were measured using standard protocols. Unflattened wing chord was measured using a wing ruler. Length from the “shoulder” to the tip of the longest primary was measured to the nearest 1 mm. Exposed culmen was measured from the tip of the bill to the edge of feathers at the base of the bill with dial calipers to the nearest 0.1 mm. Weight was measured to the nearest 0.1 g using a Pesola spring scale. Birds were sexed according to the presence and extent of a red cockade in the crown.

Nestlings - For logistical and safety reasons, banding of Red-cockaded Woodpecker nestlings is restricted to an age window of 5-9 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. The nest cavity within cluster one was monitored regularly by inserting a video camera into the cavity entrance and inspecting the cavity for the presence of eggs. Due to the height of the nest cavities within clusters three and five, video monitoring was not possible. Within both of these clusters, breeding status was determined by observation of breeding birds. 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.



Nest cavities were monitored for condition and the presence of eggs using a video monitor. A video camera mounted on a telescopic pole was raised and inserted into cavity entrance to view contents. Contents could be viewed on a video monitor mounted at the base of the pole.



Rex Badgett climbs tree 79 in cluster 3 to extract nestlings. Nestlings are then lowered to the ground to be banded.



Brian van Eerden retrieves nestlings in bag from drop line in cluster 3. Birds were banded and then placed back in nest cavity.

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 also weighed using a Pesola spring scale.

Applying Fish and Wildlife band to nestling (right).



Taking nestling weight with pesola spring scale (left).

Nestlings from cluster 3 after application of bands (right).



General Observations

During the course of banding operations, numerous observations of birds within the three cluster areas were made and recorded. Most of these observations were made around the time that birds went to roost in the evening or emerged in the morning. These observations were used to construct patterns of occurrence for individual birds, estimates of population size, patterns in cavity use, patterns in the presence and distribution of cavity competitors, etc. It should be noted that these observations do not fully represent systematic monitoring.

Following the end of the normal breeding season, all known, natural cavity trees within Piney Grove were examined to determine condition and to measure physical parameters for new cavities. The cavity plate and resin wells were examined for evidence of recent work by Red-cockaded Woodpeckers. The cavity entrance was examined for evidence of enlargement. Cavities that had an enlarged entrance were graded according to degree of enlargement relative to normal size. Several measurements were made of new cavity trees including age, diameter at breast height, height to first live limb, height of cavity, height of tree crown, and crown depth. Age was determined using an increment borer. Diameter was measured using a standard DBH tape. All height measurements were estimate using a clinometer at a distance of 100 feet (30.5 m).

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 Red-cockaded Woodpecker cavity trees still standing within these sites were examined for activity.

RESULTS

Piney Grove

Population Monitoring

Eleven birds were present with the Piney Grove Preserve going into the breeding season of 2001 (Table 1). This included 2 birds in cluster 1, 4 birds in cluster 3, and 5 birds in cluster 5. This compares to 13 birds that were present going into the breeding season of 2000. Four birds were lost from the population between the fall of 2000 and the spring of 2001. Most notably, the breeding pair from cluster 1 was lost. Surprisingly, a bird was present in cluster 1 from unknown origin. This bird was unbanded and was not present within any of the clusters in the fall of 2000. This bird was captured, banded, and determined to be a male.

Over the course of the 2001 season, 20 different woodpeckers were identified within the Piney Grove Preserve (Table 1). These birds included 11 resident adults, 6 nestlings, and 3 birds translocated from Carolina Sandhills, NWR. By the fall of 2001, 15 birds remained including 10 resident adults, 4 young of the year, and 1 of the birds translocated from Carolina Sandhills, NWR. Sex ratio of the population was 9 males, 4 females, and 2 unknown.

Breeding Observations

Only two of the three active clusters within the Piney Grove Preserve were productive during the 2001 breeding season. Detailed breeding observations are presented below for each clan.

Cluster 1 – In April when intensive observations of birds within this cluster began, both the breeding male (DB/FWS) and the breeding female (RE/FWS) from the previous year were absent. Only 2 birds were present within the site. One of these birds was the male produced during the following breeding season and the other was a male of unknown origin. Since no female was available within the cluster, no breeding occurred.

Cluster 3 – DG/FWS and YE/FWS were determined to be the mated pair for this clan. The nest cavity was determined to be 79-1. Incubation was confirmed on 26 April when birds exchanged incubation duties. First observation of birds feeding young was on 4 May. Four chicks were extracted and banded on 9 May. These birds appeared to be approximately 7 d old. Only 3 of the 4 nestlings were believed to have fledged. On 5 June a fledge check was conducted revealing only 3 of the nestlings. Two of these birds were males and the third was a female. By mid fall only 1 male and 1 female of the brood remained in the cluster.

Table 1. Table of temporal occurrence for birds in Piney Grove from spring 2000 – fall 2001.

Location	Individual Bird	Sex	Spring	Summer	Fall	Spring	Summer	Fall
Cluster 1	PU/FWS	F	X					
	RE1/FWS	F	X	X				
	DB/FWS	M	X	X	X			
	YE/FWS	F	X	X	X			
	WH/FWS	M		X	X	X	X	X
	RE2/FWS	M				X	X	X
	FWS/LB	F					X ¹	
Cluster 3	PU1/FWS	F						
	PK1/FWS	U						
	YE/FWS	F	X	X	X	X	X	X
	DG/FWS	M	X	X	X	X	X	X
	Unbanded	U	X	X	X	X	X	X
	LG1/FWS	U		X				
	RE1/FWS	U		X				
	WH/FWS	M		X	X	X	X	X
	RE2/FWS	M					X	
	PU2/FWS	U					X	
	LG2/FWS	F					X	X
	PK2/FWS	M					X	X
Cluster 5	DB1/FWS	U						
	RE/FWS	M	X					
	DB2/FWS	F	X	X	X			
	LG/FWS	M	X	X	X	X	X	X
	WH/FWS	F	X	X	X	X	X	X
	YE/FWS	M	X	X	X	X	X	X
	Unbanded	U	X	X	X	X	X	X
	FWS/RE	U		X	X	X	X	
	PU/FWS	U		X				
	PK1/FWS	U		X	X			
	PK2FWS	M					X	X
DG/FWS	F					X	X	
Cluster 6	FWS/DG	F					X ¹	
	FWS/LG	M					X ¹	X

¹Translocated from Carolina Sandhills, NWR on 9/26/01

Cluster 5 – LG/FWS and WH/FWS were determined to be the mated pair for this clan. The nest cavity was determined to be 97-2. Apparent incubation exchanges were observed between 26 April and 4 May. First observation of birds feeding young was on 9 May. Two chicks were extracted and banded on 16 May. Birds appeared to be approximately 7 d of age. A fledge check was conducted on 11 June. Both nestlings fledged and were sexed as 1 female and 1 male. Both of these birds were present within the cluster in late November.

Translocations

Three hatching-year Red-cockaded Woodpeckers were translocated from Carolina Sandhills, NWR to Piney Grove Preserve. Birds included 2 females and 1 male. Birds were trapped after roosting within Carolina Sandhills on 25 September and transported to Piney Grove on 26 September. In the evening of 26 September, birds were placed in cavities and screened in. A male and female were placed in cavities in recruitment cluster 6 to form a new pair. The second female was placed in a cavity in cluster 1 to replace lost breeding female. Screens were removed at dawn on 27 September. All 3 birds emerged from cavities successfully and interacted with other woodpeckers. Clusters 1 and 6 were monitored on 5 October for translocated birds. Both females were never observed again. The single male was still present in cluster 6 in early December.

Cavity Trees

Piney Grove Preserve currently has 57 trees that contain Red-cockaded start cavities (8), completed cavities (31), or cavity inserts (18) (Table 2a-c). Three of these trees support 2 completed cavities or starts. Ten new starts were detected in 2001. Five of these starts were converted to completed cavities during the year. An additional 4 starts that were detected in 2000 were converted to completed cavities in 2001. Seven artificial inserts were installed in 2001.

Tree Measurements – Seven new cavity trees were measured in 2001 (Table 3). As with those described during 2000, most active cavity trees ranged in age between 90 and 125 years. Many of these trees had shallow crowns but were in good health. Cavities were typically placed below the first live limb. Many of the cavities were placed quite high with several exceeding 14 m.

Cavity Maintenance – Of the 34 natural cavities still standing in 2001, 20 (58.8%) showed evidence of recent maintenance activity (Table 2a-c). Eight (44.4%) of 18 artificial inserts showed evidence of recent work on resin wells. Of the 19 cavities that showed maintenance activity in 2000, 12 (63.2%) showed continued maintenance in 2001. This shift reflects the apparent abandonment of several cavities that seems to coincide with the use of newly constructed natural cavities and artificial inserts.

Table 2a. Summary of Red-cockaded Woodpecker cavity status, use, maintenance, and enlargement status within clusters 1 and 2 of Piney Grove Preserve. Year 2000 and 2001 are both shown for comparison.

Cavity ID	Status ¹	Use 2000	Use 2001	Maint. Activity 2000	Maint. Activity 2001	Enlargement Status 2000	Enlargement Status 2001
<u>Cluster 1</u>							
35-01	NS	-----	N	-----	Y	-----	N
36-01	A	-----	N	-----	N	-----	N
37-01	NS	-----	N	-----	Y	-----	Y(slight)
38-01	NS	-----	N	-----	Y	-----	N
39-01	NS	-----	N	-----	Y	-----	Y(slight)
40-01	C	N	N	N	N	Y(>4X)	Y(>4X)
41-01	C	Y	N	Y	Y	Y(slight)	Y(>4X)
43-01	C	N	N	N	Y	Y(<2X)	Y(>2X)
44-01	C	N	N	N	N	Y(>2X)	Y(>4X)
45-01	C	Y	Y	Y	Y	N	N
46-01	C	Y	N	Y	N	Y(<2X)	Y(>2X)
47-01	C	N	N	Y	Y	N	Y(slight)
48-01	C	Y	Y	Y	Y	N	Y(slight)
49-01	C	N	N	Y	N	Y(slight)	Y(>2X)
50-01	A	Y	N	Y	N	N	N
51-01	A	Y	N	Y	N	N	N
52-01	A	N	Y	N	Y	N	N
<u>Cluster 2</u>							
60-01	A	N	N	N	N	N	N
61-01	A	N	N	Y	N	N	N
62-01	A	N	N	N	N	N	N
63-01	A	Y	N	Y	N	N	N

¹Cavity codes are as follows: A – artificial cavity, C – completed cavity, NS – new start, AS – abandoned start.

Table 2b. Summary of Red-cockaded Woodpecker cavity status, use, maintenance, and enlargement status within clusters 3 and 4 of Piney Grove Preserve. Year 2000 and 2001 are both shown for comparison.

Cavity ID	Status¹	Use 2000	Use 2001	Maint. Activity 2000	Maint. Activity 2001	Enlargement Status 2000	Enlargement Status 2001
<u>Cluster 3</u>							
01-01	A	-----	N	-----	Y	-----	N
02-01	A	-----	Y	-----	Y	-----	N
03-01	C	-----	Y	-----	Y	-----	N
04-01	C	-----	N	-----	Y	-----	N
05-01	AS	-----	-----	N	N	N	N
06-01	C	-----	Y	-----	Y	-----	N
07-01	AS	-----	-----	N	Y	N	Y(slight)
70-01	C	N	N	N	N	Y(>2X)	Y(>2X)
71-01	C	N	N	N	N	Y(slight)	Y(>2X)
72-01	C	N	N	N	N	Y(>2X)	Y(>2X)
73-01	C	N	N	N	N	Y(>2X)	Y(>2X)
74-01	C	Y	Y	Y	Y	N	Y
75-01	C	Y	N	Y	Y	N	Y(slight)
76-01	C	N	N	Y	N	N	Y(slight)
77-01	C	N	N	N	N	Y(>4X)	Y(>4X)
79-01	C	Y	Y	Y	Y	N	Y(slight)
79-02	NS	-----	-----	-----	Y	-----	N
<u>Cluster 4</u>							
81-01	A	N	N	N	Y	N	N
82-01	A	Y	Y	Y	Y	N	N
83-01	A	N	Y	Y	Y	N	N
84-01	A	Y	N	Y	N	N	N

¹Cavity codes are as follows: A – artificial cavity, C – completed cavity, NS – new start, AS – abandoned start.

Table 2c. Summary of Red-cockaded Woodpecker cavity status, use, maintenance, and enlargement status within clusters 5 and 6 of Piney Grove Preserve. Year 2000 and 2001 are both shown for comparison.

Cavity ID	Status ¹	Use 2000	Use 2001	Maint. Activity 2000	Maint. Activity 2001	Enlargement Status 2000	Enlargement Status 2001
<u>Cluster 5</u>							
20-01	C	-----	Y	-----	Y	-----	N
21-01	C	-----	N	-----	Y	-----	Y(slight)
22-01	C	-----	Y	-----	Y	-----	N
23-01	C	-----	Y	-----	Y	-----	Y(<2X)
92-01	AS	-----	-----	N	N	N	Y(slight)
93-01	C	Y	Y	Y	Y	N	N
94-01	C	N	Y	Y	Y	N	Y(<2X)
95-01	C	Y	N	Y	N	Y(slight)	Y(<2X)
96-01	C	Y	N	Y	N	Y(slight)	Y(>4X)
96-02	C	Y	N	Y	N	Y(slight)	Y(slight)
97-01	C	Y	N	Y	N	N	Y(>2X)
97-02	C	Y	Y	Y	Y	N	Y(<2X)
98-01	C	Y	Y	Y	Y	N	Y(slight)
99-01	C	Y	Y	Y	Y	N	N
<u>Cluster 6</u>							
10-01	A	-----	N	-----	N	-----	N
11-01	A	-----	Y	-----	Y	-----	N
12-01	A	-----	N	-----	N	-----	N
13-01	A	-----	N	-----	Y	-----	Y

¹Cavity codes are as follows: A – artificial cavity, C – completed cavity, NS – new start, AS – abandoned start.

Table 3. Summary of Cavity tree measurements. Measurements were taken on all known cavity trees on Piney Grove and within remaining historic sites.

Tree ID	Age	DBH cm(inches)	Cavity Height m(feet)	1 st Limb Height m(feet)	Crown Height m(feet)	Crown Depth m(feet)
Piney Grove						
<u>Cluster 1</u>						
40-01 ¹	102	53.8(21.0)	10.4(34)	13.7(45)	30.5(100)	16.8(55)
41-01 ¹	90+	46.2(18.0)	14.3(47)	17.7(58)	27.4(90)	9.8(32)
43-01 ¹	96	48.7(19.0)	8.2(27)	14.3(47)	28.7(94)	14.3(47)
44-01 ¹	100	52.6(20.5)	8.5(28)	17.1(56)	29.6(97)	15.5(41)
45-01 ¹	91+	35.9(14.0)	5.8(19)	11.9(39)	19.2(63)	7.3(24)
46-01 ¹	97	50.0(19.5)	17.1(56)	18.0(59)	29.9(98)	11.9(39)
47-01 ¹	75	46.2(18.0)	11.6(38)	10.7(35)	33.2(109)	22.6(74)
48-01 ¹	88	50.0(19.5)	8.8(29)	9.3(30.5)	30.5(100)	21.2(69.5)
49-01 ¹	89	52.6(20.5)	13.7(45)	20.7(68)	33.8(111)	13.1(43)
<u>Cluster 3</u>						
03-01 ²	112	34.9(13.6)	7.5(27)	12.5(41)	25.0(82)	12.5(41)
04-01 ²	140	50.5(19.7)	13.4(44)	12.2(40)	31.7(104)	19.5(64)
06-01 ²	114	53.8(21.0)	10.7(35)	11.6(38)	23.7(78)	12.2(40)
70-01 ¹	-----	50.0(19.5)	16.2(53)	-----	27.7(91)	-----
71-01 ¹	91	55.1(21.5)	13.1(43)	13.7(45)	35.4(116)	21.6(71)
72-01 ¹	93	50.0(19.5)	11.3(37)	12.2(40)	33.8(111)	21.6(71)
73-01 ¹	-----	43.6(17.0)	9.8(32)	-----	26.5(87)	-----
74-01 ¹	109	47.4(18.5)	5.2(17)	11.6(38)	21.3(70)	9.8(32)
75-01 ¹	81	67.9(26.5)	15.8(52)	20.4(67)	32.9(108)	12.5(41)
76-01 ¹	127	51.3(20.0)	7.9(26)	9.1(30)	21.3(70)	12.2(40)
77-01 ¹	120	50.0(19.5)	15.8(52)	21.3(70)	30.5(100)	9.1(30)
79-01 ¹	-----	55.1(21.5)	18.3(60)	15.5(51)	28.7(94)	13.1(43)

¹Tree parameters taken in 2000.

²Tree parameters taken in 2001.

Table 3. – continued - Summary of Cavity tree measurements. Measurements were taken on all known cavity trees on Piney Grove and within remaining historic sites.

Tree ID	Age	DBH cm(inches)	Cavity Height m(feet)	1 st Limb Height m(feet)	Crown Height m(feet)	Crown Depth m(feet)
Piney Grove						
<u>Cluster 5</u>						
20-01 ²	95	34.9(13.6)	15.2(50)	18.3(60)	27.4(90)	9.1(30)
21-01 ²	103	38.7(15.1)	11.6(38)	17.7(58)	27.7(91)	10.1(33)
22-01 ²	98	56.2(21.9)	14.3(47)	18.3(60)	29.6(97)	11.3(37)
23-01 ²	97	41.3(16.1)	14.6(48)	20.7(68)	32.0(105)	11.3(37)
92-01 ¹	-----	44.9(17.5)	7.9(26)	-----	-----	-----
93-01 ¹	112	41.0(16.0)	14.3(47)	16.5(54)	26.8(88)	10.4(34)
94-01 ¹	101	48.7(19.0)	13.1(43)	18.6(61)	27.4(90)	8.8(29)
95-01 ¹	101	53.8(21.0)	9.8(32)	15.5(51)	24.7(81)	9.1(30)
96-01 ¹	91	61.5(24.0)	14.9(49)	16.5(54)	33.8(111)	17.4(57)
96-02 ¹	91	61.5(24.0)	14.6(48)	16.5(54)	33.8(111)	17.4(57)
97-01 ¹	99	53.8(21.0)	14.9(49)	21.3(70)	31.1(102)	9.8(32)
97-02 ¹	99	53.8(21.0)	14.9(49)	21.3(70)	31.1(102)	9.8(32)
98-01 ¹	98	47.4(18.5)	13.1(43)	14.6(48)	21.9(72)	7.3(24)
99-01 ¹	89	42.3(16.5)	11.0(36)	10.1(33)	27.4(90)	8.2(27)
Grizzard Trct						
GT1-01 ¹	96	50.0(19.5)	8.2(27)	14.9(49)	29.9(98)	14.9(49)
GT2-01 ¹	93	39.7(15.5)	10.4(34)	-----	-----	-----
Route 35						
R351-01 ¹	119	59.0(23.0)	17.7(58)	16.2(53)	31.4(103)	15.2(50)
R352-01 ¹	116	48.7(19.0)	10.7(35)	17.1(56)	29.9(98)	12.8(42)
Stoney Creek						
SC1-01 ¹	126	59.0(23.0)	15.5(51)	19.8(65)	30.5(100)	10.7(35)
SC2-01 ¹	118	55.1(21.5)	11.6(38)	12.2(40)	27.4(90)	15.2(50)

¹Tree parameters taken in 2000.

²Tree parameters taken in 2001.

Cavity Use – Only 19 (36.5%) of 52 available cavities were determined to be used by roosting birds in 2001 (Table 2a-c). This includes 14 (41.2%) of 34 natural cavities and 5 (27.8%) of 18 artificial cavities. Of the 20 cavities determined to be used in 2000, less than half (9) were still in use in 2001. For both clusters 3 and 5, the same cavity was used for nesting in 2000 and 2001.

Cavity Damage – Damage to natural cavities was more widespread in 2001 compared to 2000 (Table 2a-c). Of 34 natural cavities available, 25 (73.5%) had evidence of damage by competitors. Damage on more than half of these was severe with the cavity entrance being enlarged more than twice normal size. Approximately half of the cavities that showed damage in 2000 showed signs of ongoing damage. Of considerable concern is that 4 of the 10 new starts and cavities showed signs of damage by the fall. Both of the nest cavities that were active in 2001 showed competitor damage by the fall months.

Banding

Since the spring of 1998, 28 different birds have been banded within the Piney Grove complex (Table 4). This includes 10 birds in 1998, 11 birds in 2000, and 7 birds in 2001. Birds banded in 2001 include 1 adult and 6 nestlings. The single adult bird was captured in cluster 1. This bird was of unknown origin. Four nestlings were banded in cluster 3 and 2 in cluster 5. Of the 6 birds banded in 2001 where sex could be determined, 4 were males and 2 were females.

Two adult birds remain unbanded within Piney Grove. These include one bird each in clusters 3 and 5. These birds have been monitored closely and have utilized cavities that are beyond the height reachable with the telescopic net. Given the low number of birds within Piney Grove no attempt has been made to take extreme measures to capture these individuals. Monitoring is ongoing to determine when or if these birds relocate to situations that would allow for safe capture.

Cluster Interactions

The two males from cluster 1 have shown consistent interaction with the lone male of cluster 6 since this bird was released. All 3 birds have been seen together on numerous occasions both within cluster 6 and within cluster 1.

Considerable interaction between clusters 3 and 5 has been documented during 2001. In the fall of 2000, birds from cluster 5 were documented to roost within the inserts in recruitment cluster 4. By the spring of 2001, this site had been taken over by birds of cluster 3. One to two birds from cluster 3 were observed roosting in cluster 4 inserts throughout the season. This has typically included the breeding female from this cluster.

Table 4. Summary of individual Red-cockaded Woodpeckers banded within clusters 1 and 3 (1998-2001).

Date	Cluster	FWS	Left	Right	Age	Sex	Wing	Culm	Wght
01/11/98	1	1581-66206	DG/YE/DG	DB/FWS	AHY	M	-----	-----	-----
08/15/98	1	1581-66209	DG/YE/DG	PU/FWS	AHY	F	-----	-----	-----
04/05/00	1	1581/66211	DG/YE/DG	RE/FWS	AHY	F	122	17.9	47.5
05/29/00	1	1581-66219	DG/YE/DG	WH/FWS	~7-8d	U	-----	-----	24.0
04/28/01					SY	M	117	16.8	47.0
10/02/00	1	1581-66223	DG/YE/DG	YE/FWS	AHY	F	120	16.6	-----
04/28/01	1	1581-66224	DG/YE/DG	RE/FWS	AHY	M	118	16.9	48.0
09/26/01	1	1681-89697	FWS/LB	ST/ST/OR	HY	F ³	-----	-----	-----
02/10/98	3	1581-66203	RE/DB/RE	YE/FWS	AHY	F	117	17.0	47.8
02/11/98	3	1581-66204	RE/DB/RE	PU/FWS	AHY	F	-----	-----	-----
02/11/98	3	1581-66205	RE/DB/RE	DG/FWS	AHY	M	-----	-----	-----
08/10/98	3	1581-66208	RE/DB/RE	PK/FWS	HY	U	-----	-----	-----
05/12/00	3	1581-66214	RE/DB	WH/FWS	~7d	U	-----	-----	11.0
01/29/02					SY	M	119	16.8	48.5
05/12/00	3	1581-66215	RE/DB	LG/FWS	~7d	U	-----	-----	12.0
05/12/00	3	1581-66216	RE/DB	RE/FWS	~7d	U	-----	-----	12.0
05/09/01	3	1581-66225	RE/DB/RE	RE/FWS	~7d	M ²	-----	-----	25.0
05/09/01	3	1581-66226	RE/DB/RE	LG/FWS	~7d	F ²	-----	-----	27.0
05/09/01	3	1581-66227	RE/DB/RE	PK/FWS	~7d	M ²	-----	-----	29.0
05/09/01	3	1581-66228	RE/DB/RE	PU/FWS	~7d	U	-----	-----	22.0

¹initially banded as opposite sex but behavioral observations confirm sex.

²Gender determined during fledge checks.

³Bird translocated from Carolina Sandhills, NWR.

Table 4. –continued- Summary of individual Red-cockaded Woodpeckers banded within clusters 5 and 6 (1998-2001).

Date	Cluster	FWS	Left	Right	Age	Sex	Wing	Culm	Wght
02/09/98	5	1581-66201	WH/LB/WH	RE/FWS	AHY	M ¹	-----	-----	-----
02/10/98	5	1581-66202	WH/LB/WH	LG/FWS	AHY	M	121	18.0	-----
02/12/98	5	1581-66207	WH/LB/WH	WH/FWS	U	F ¹	-----	-----	-----
08/16/98	5	1581-66210	WH/LB/WH	DB1/FWS	HY	U	-----	-----	-----
04/20/00	5	1581-66212	WH/LB/WH	YE/FWS	AHY	M	118	17.5	46.0
04/30/00	5	1581-66213	WH/LB/WH	DB2/FWS	AHY	F	122	17.0	44.0
06/16/00	5	1581-66220	WH/LB/WH	PU/FWS	~7d	U	-----	-----	30.0
06/16/00	5	1581-66221	WH/LB/WH	PK/FWS	~7d	U	-----	-----	32.0
06/16/00	5	1581-66222	WH/LB/WH	FWS/RE	~7d	U	-----	-----	26.0
05/16/01	5	1581-66229	WH/LB/WH	DG/FWS	~7d	F ²	-----	-----	24.0
05/16/01	5	1581-66231	WH/LB/WH	PK/FWS	~7d	M ²	-----	-----	22.0
09/26/01	6	1681-89743	FWS/DG	WH/WH/PU	HY	F ³	-----	-----	-----
09/26/01	6	1751-83047	FWS/LG	DB/DB/YE	HY	M ³	-----	-----	-----

¹initially banded as opposite sex but behavioral observations confirm sex.

²Gender determined during fledge checks.

³Bird translocated from Carolina Sandhills, NWR.

On 1 December a territorial dispute between the two clusters was observed as follows. While following cluster 5 birds observed cluster 3 and cluster 5 birds in a territorial stand-off along the path near the T-intersection. The C5-LG bird was jousting with the C3-DG bird and what I assume was the C3 unbanded bird for some twenty minutes. They chased each other around the trunks of several trees, often stopping to use the wing-out display or to physically stab at each other with their bills. There was much antagonistic vocalizing by all members of both groups present, but no other antagonistic encounters were noticed. The C5-PK bird and the C3-PK bird were seen foraging together within a foot or two of each other, vocalizing frequently but displaying no other observable antagonistic actions. Both C5 and C3 White and Yellow birds and the C3-LG bird was observed as well. The boundary dispute diminished as the C5 birds began moving north along the footpath towards Rt. 604 and the C3-birds dropped back towards the Cluster 4 site. This encounter occurred from 0845 to about 0910.

HISTORIC SITES

Route 460 Site (Sussex County)

Site condition – This site remains forested with the exception of the several acres that were removed in 1988 in association with the harvesting violation by Gray Lumber Company. In the intervening 12 years the site has succumbed to severe degradation brought on by hardwood encroachment. Although hardwoods are still predominantly confined to the subcanopy, the stand is unsuitable for occupation by Red-cockaded Woodpeckers. An additional detraction to this site is its size. The stand of mature timber is limited to the corridor between Route 460 and the railroad tracks. The harvesting of the large mature pine stand to the north of Route 460 in 1989 removed the last remaining option for suitable foraging habitat in the area. As a result, this site should not be considered viable for re-occupation even if remaining habitat could be improved.

Cavity tree status – None detected

Bird status – No evidence of activity present.

Stony Creek Rt. 40 Site (Sussex County)

Site condition – The core site is still present although hardwoods are a dominant sub-canopy species in the stand. This represents the oldest known Red-cockaded Woodpecker site. Both random and cavity trees have yielded ages exceeding 130 years. While hardwood removal would easily bring this site into suitability for use by Red-cockaded, the site would likely not have the longevity that other sites exhibit. Most of the mature timber is well into senescence and there is not a prominent age class of younger pines, with the exception of a vigorous sapling stand that dominates

the understory over much of the site. An adjacent stand across Rt. 40 harbors a better mix of old and moderate pines although the stand comprises less than 50 acres. Collectively these two stands harbor less than 100 acres of suitable habitat, based on a thorough hardwood removal operation. Evidence of recent activity by pine beetles was observed in at least one tree adjacent to the most recently used cavity trees.

Cavity tree status – Two detected. Although both trees were alive and vigorous, the cavity in each had been enlarged substantially, precluding use by Red-cockaded. There was no evidence of activity by Red-cockaded anywhere on the tree. Resin wells and resin were dried and crusted over.

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

Route 35 Site (Southampton County)

Site condition – This site harbors a significant pine habitat that exists now in only a remnant stand of less than 120 hectares. Site conditions are excellent for Red-cockaded. A hardwood removal operation in 1996 and 97 greatly improved the habitat leaving a park-like open stand of old-growth pines interspersed with younger trees. In the intervening 3 years, the hardwood habitat has rebounded making pedestrian access difficult. Sprouting hardwood stumps and saplings dominate the understory, but have not yet begun to erode the midstory. If routine management could be undertaken in this stand, it could provide a model habitat for woodpeckers, and be potentially close enough for exchange with the Piney Grove Preserve.

Cavity tree status – Two detected. Both trees contained a useable cavity, although there was no evidence of recent activity. The primary tree was known to have been occupied by a single bird in January 2000, although resin evidence on the tree suggests that the resin wells had not been maintained since before that fall. The second cavity was useable, although resin wells were gray and crusted, suggesting abandonment long before the other cavity. It also showed signs of recent work by competitor species to enlarge the cavity.

Bird status – A single bird known to have been present at the site throughout 1999 subsequently abandoned the site or was lost to other causes. Cavity tree evidence, in conjunction with field observations, suggests an absence beginning sometime between January and summer 2000.

Note: This site has recently been sold to Ashton Lewis Lumber Company in North Carolina, and has received approval from DGIF and USFWS for harvesting beginning in mid to late 2002. The first block designated for harvest is block 5 to the immediate west of the former cluster site.

Route 612 Site (Southampton County)

Site condition – This site represents one of the final stands in an over 600 hectare block, the remainder having been harvested within the last 10 years. It constitutes a natural pine stand, with no evidence of historical management for sawtimber. Hardwoods are a codominant in the canopy and comprise almost the entire subcanopy and midstory component. Pine constitutes a low proportion of the stand basal area. Red-cockaded Woodpeckers occupied the only portion of the stand that was dominated by old growth pines. The current stand boundaries comprise little more than 60 hectares and exists as an island within miles of plantation pine.

Cavity tree status – Three detected. The primary cavity tree had broken off at the level of the original cavity in 1999. A new cavity was excavated and still showed resin flow in 2000. By fall of 2001, resin flow had long ceased, but a second new cavity had been excavated between the first and the break and was in active use. A second cavity tree showed no recent signs of cavity maintenance. The cavity was enlarged although still appeared suitable for Red-cockaded use. The third tree harbored a start cavity that showed no evidence of having been completed, with no recent signs of Red-cockaded Woodpecker activity, although there had been some earlier work on resin wells.

Bird status – A single bird was detected in the vicinity of the cavity trees in September of 2001, and is believe to be still roosting in the broken off cavity tree.

ACKNOWLEDGMENTS

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APPENDIX I: Observations made of birds within clusters 1 and 2 during 2001.

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 4/20/01

TIME: 06:20 – 8:40

OBSERVERS: B. Watts, D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		—	—	—	—	—
41	1		—	—	—	—	—
42	1		—	—	—	—	—
43	1		—	—	—	—	—
44	1		—	—	—	—	—
45	1	N	—	—	—	—	—
46	1	WBNH	—	—	—	—	—
47	1	N	—	—	—	—	—
48	1	RCWO	06:36	—	N	—	—
49	1	N	—	—	—	—	—
50	1	N	—	—	—	—	—
51	1	N	—	—	—	—	—
52	1	RCWO	06:42	—	Y	WH/FWS	YE/DG/YE
60	1		—	—	—	—	—
61	1		—	—	—	—	—
62	1		—	—	—	—	—
63	1		—	—	—	—	—

COMMENTS: Arrived on sight approximately 06:20. Catherine set up to observe trees 46 and 52, Bryan on 45, 50, 51, and 52. Dana on 48, 49, 47. Unbanded bird emerged from 48 at 6:36 and sat quietly in adjacent tree until 6:40. Bird then flew to central area around tree 51 then foraged in area around 46. WH/FWS bird finally emerged from 52 around 6:42 flew up and began foraging with unbanded. Only 2 birds in cluster area. Very good looks at WH/FWS which appears to be a female. WBNH feeding young repeatedly throughout morning in 46. Went through entire clan site and examined cavity conditions. See other observation sheet.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

RED-COCKADED WOODPECKER CAVITY ACTIVITY FORM (CLUSTERS 1&2)

DATE: 4/22/01

TIME: 7:00 – 9:00

OBSERVERS: B. Watts, D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1		---	---	---	---	---
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1		---	---	---	---	---
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---

COMMENTS: Visited site to scope accessible cavities for activity status (see additional data sheet). When approaching tree 48, both RCWs were present and working on cavity tree. WH/FWS worked around on resin wells and perched up on limb to preen. Both birds flew off to the north as we approached.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 4/29/01

TIME: 18:40 – 20:00

OBSERVERS: B. Watts, D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1	RCWO	---	19:05	Y	DG/YE/DG	WH/FWS
46	1	WBNU	---	---	---	---	---
47	1		---	---	---	---	---
48	1	RCWO	---	19:27	Y	DG/YE/DG	RE/FWS
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---

COMMENTS: Visited site to attempt capture of both birds for gender determination. Pair of WBNU observed feeding young in cavity 46-1. Both RCWOs were observed in area around tree 46 and identified as unbanded and WH/FWS. Birds foraged in general area from 46 to 51. WH/FWS roosted in 45-1 at approximately 19:05. Unbanded bird foraged in area and worked over toward tree 48. Bird eventually roosted in 48-1 around 19:27. Captured unbanded bird at around 19:40. Bird was a male and banded RE/FWS. Captured WH/FWS at approximately 19:46. WH/FWS was a male. Fully developed cockade was visible on both birds.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 09/23/01

TIME: 06:45 – 08:30

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1	RCWO	07:15	---	A	---	---
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1	RCWO	07:05	---	Y	DG/YE/DG	RE/FWS
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---

COMMENTS: Arrived at site at 6:45 and took a position about 30 meters south of tree #48. A bird emerged from #48 at 7:05 and perched quietly in an adjacent tree for about 8 minutes. He then started foraging down toward tree #45 at which time a second bird emerged from that tree at 7:15. The two birds began foraging to the south, then turned at the creek and flew out to the west. I was able to identify only the Red/FWS bird, which I was pretty sure came out of tree #48. The second bird was banded, although I couldn't ID the individual color. I departed the site at 8:30.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 9/26/01

TIME: appr. 19:30

OBSERVERS: D. Schwab, B. van Eerden, B. Watts, others.

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1		---	---	---	---	---
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1		---	---	---	---	---
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---
36	1	RCWO			Y	FWS/LB	ST/ST/OR

COMMENTS: Arrived on site to place female from Carolina Sandhills, NWR in cluster. Bird was placed in new insert near tree #48 and screened in after dark.

COLOR ABBREVIATION KEY

DG - Dark Green	PU - Purple
LG - Light Green	WH - White
DB - Dark Blue	PK - Pink
LB - Light Blue	YE - Yellow
RE - Red	FWS - Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 9/27/01

TIME: 6:15 – 7:30

OBSERVERS: B. Watts, B. van Eerden, M. Lipford

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1	RCWO	07:05	---	Y	DG/YE/DG	WH/FWS
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1	RCWO	07:04	---	Y	DG/YE/DG	RE/FWS
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---
36	1	RCWO	07:08	---	Y	FWS/LB	ST/ST/OR

COMMENTS: Arrived on site to release female from Carolina Sandhills. Everyone got into position to wait for resident birds to emerge and to remove screen for female release. RE/FWS emerged from cavity 48-1 at 07:04 calling and began to work on resin wells. After approximately 1 min. bird was heard calling from direction of tree 45. Screen was pulled down from cavity 36-1 shortly after RE/FWS emerged. Female eventually emerged calling once and flew toward tree 48. RE/FWS showed aggressive behavior toward female initially but shortly interacted on trunk of 48. Birds later flew off toward center of cluster and met up with WH/FWS.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 10/5/01

TIME: 06:45-08:30

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1	RCWO	07:12	---	Y	DG/YE/DG	WH/FWS
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1	RCWO	07:10	---	Y	DG/YE/DG	RE/FWS
49	1		---	---	---	---	---
50	1		---	---	---	---	---
51	1		---	---	---	---	---
52	1		---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---
36	1						

COMMENTS: We arrived to check on status of translocated female. RE/FWS emerged at 7:10 calling and worked around the cavity for approximately 2 minutes. Bird then flew to central parking area and roosted in crown of pine. WH/FWS emerged after RE/FWS appeared in central area. Birds met up and then flew to the west over to creek area. We followed birds for considerable period identifying both several times. Birds eventually flew south along creek to 604 and then east past entry road into cluster 1. Both birds were identified again at that point. For entire time that birds were under observation, there was no indication of a third bird. Translocated female was never observed.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTERS 1&2)**

DATE: 12/2/01

TIME: 6:55-8:30

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
40	1		---	---	---	---	---
41	1		---	---	---	---	---
42	1		---	---	---	---	---
43	1		---	---	---	---	---
44	1		---	---	---	---	---
45	1	RCWO	7:48	---	A	---	---
46	1		---	---	---	---	---
47	1		---	---	---	---	---
48	1	RCWO	7:47	---	A	---	---
49	1		---	---	---	---	---
50	1	N	---	---	---	---	---
51	1	N	---	---	---	---	---
52	1	N	---	---	---	---	---
60	1		---	---	---	---	---
61	1		---	---	---	---	---
62	1		---	---	---	---	---
63	1		---	---	---	---	---

COMMENTS: Bird in 48-1 peered out of cavity entrance at 7:26 and sat quietly for 20 min. Bird finally emerged at 7:47. Bird emerged from 45-1 at 7:48. Both birds met up and foraged over toward creek to the west. Later 3 birds were heard that moved over and foraged around tree #50. These birds were identified as WH/FWS and RE/FWS from cluster 1 and FWS/LG from cluster 6. All 3 birds were last observed foraging to the north of the cluster area.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

APPENDIX II: Observations of birds within clusters 3 and 4 during 2001.

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/22/01

TIME: 06:16 – 06:40

OBSERVERS: B. Watts, D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1	N	---	---	---	---	---
71	1	N	---	---	---	---	---
72	1	N	---	---	---	---	---
73	1	N	---	---	---	---	---
74	1	N	---	---	---	---	---
75	1	L	---	---	---	---	---
76	1	N	---	---	---	---	---
77	1	?	---	---	---	---	---
78	1	N	---	---	---	---	---
79	1	RCWO	6:31	---	?	---	---
81	1	?	---	---	---	---	---
82	1	?	---	---	---	---	---
83	1	?	---	---	---	---	---
84	1	?	---	---	---	---	---

COMMENTS: RCWO emerged from 79 at 6:31, then moved out approx. 30 m to SW and waited in pine canopy. At 6:32 second bird believed to have come from 75 was heard moving toward cavity. It then met up with what was assumed to be first bird. Birds were identified as WH/FWS and unbanded. It is not known which or if either bird emerged from 79. A third bird was heard at 6:40 from the SW toward the inserts. As this bird was approaching, an unidentified bird flew to the cavity and peered in. Moments later, the cluster 3 YE/FWS flew to the cavity and entered. The remaining 2 birds foraged around in the general area to the northeast.

Later as observers were walking over to 74 to examine condition, YE/FWS and an unidentified bird were observed working on resin wells on 74. When approached they foraged off to the south. Unclear if other birds were attending nest cavity at that time.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/23/01

TIME: 6:21 – 6:40

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1	N	---	---	---	---	---
82	1	RCWO	6:31	---	Y	RE/DB/RE	YE/FWS
83	1	N	---	---	---	---	---
84	1	N	---	---	---	---	---

COMMENTS: Arrived at site at 0621. Cluster 3 Yellow bird emerged from Insert #82 at 0631. It remained in the immediate vicinity of the cavity for approx. 3 minutes, then moved off to the northeast corner of the inserts. While confirming the ID of this bird, another bird joined it at the site at 0636. It too bore the Cluster 3 colors but no individual ID could be determined before the birds flew out of sight and out of hearing toward the Cluster 3 colony site at 0637. This bird is not believed to have been roosting in cluster 4.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/24/01

TIME: 06:10-08:15

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1	N	---	---	---	---	---
82	1	RCWO	06:30	---	Y	RE/DB/RE	YE/FWS
83	1	N	---	---	---	---	---
84	1	N	---	---	---	---	---

COMMENTS: YE/FWS emerged from cavity 82-1 at 6:30 and vocalized several times within the cavity cluster. At 6:31 the bird departed the area flying out of sight to the northeast toward cluster 3. No other birds were observed to emerge from the inserts. At 08:15 WH/FWS from cluster 3 was observed on tree #82 and #83 doing a small amount of maintenance work around the cavities but primarily foraging. This bird moved off to the northeast toward cluster 3.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/26/01

TIME: 06:12 – 08:30

OBSERVERS: D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		—	—	—	—	—
71	1		—	—	—	—	—
72	1		—	—	—	—	—
73	1		—	—	—	—	—
74	1		—	—	—	—	—
75	1		—	—	—	—	—
76	1		—	—	—	—	—
77	1		—	—	—	—	—
78	1		—	—	—	—	—
79	1	RCWO	06:26	—	Y	RE/DB/RE	DG/FWS
81	1		—	—	—	—	—
82	1		—	—	—	—	—
83	1		—	—	—	—	—
84	1		—	—	—	—	—

COMMENTS: Arrived on site at 0612. The DG/FWS bird emerged from the nest cavity at 0626 and flew approx. 20 m. out to the south and waited. At 0627 YE/FWS arrived from the southwest and entered the cavity. At 0630 WH/FWS arrived from the southwest and flew to the lip of the cavity and exchanged vocalizations with YE/FWS inside. It then departed the site after 1 minute. The Green and White birds left the area at 0631 and moved off to the northeast. The Yellow bird remained in the cavity.

By 0750, there had been no change in status, so the observer moved over to Cluster 5 to assist with monitoring that activity. Both observers returned at 0720. Upon approaching the site, two RCW's were observed on the nest tree. One bird was vocalizing from the entrance to the cavity. It entered the cavity at 0723. At 0726, the White bird flew up to the nest cavity, vocalized, and entered as the other bird emerged. At 0740, the White bird was replaced by the Yellow bird. At 0809 a RBWO attempted to enter the nest cavity but was rebuffed by the attendant RCW. The RBWO then began calling from a nearby perch which appeared to attract the DkGreen RCW, which arrived at the cavity at 0812. Both the DkGreen RCW and the Yellow bird (from within the entrance to the cavity) began exchanging vocalizations with the RBWO. At 0814, the RBWO departed the area, the Yellow bird emerged and departed the area, and the DkGreen bird entered the cavity. Neither the White or Yellow bird were observed again before we departed at 0830, and the unbanded bird was not observed during this visit.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/27/01

TIME: 06:10 – 08:25

OBSERVERS: D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1	RCWO	06:21	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: First bird arrived from direction of inserts and displaced incubating bird at 0621. Incubating bird flew out to east and returned with a third bird at 0626. Their arrival brought bird out of cavity and a new bird went in. No prey items could be discerned. From 0610 to 0815 a total of 8 bird exchanges took place at the nest cavity. An additional 6 visits to the cavity tree were observed by birds that did not enter. One bird was observed to spend just over 9 minutes working on resin wells and general cavity maintenance. Most of the time spent in the cavity was by the Yellow Bird and unbanded bird although all 4 birds were seen to enter the cavity. The White bird was most often associated with visiting the cavity but not entering. At 0809 a RBWO flew to the cavity entrance but drew the attention of the Dark Green bird who arrived in an agitated state to drive the RBWO away. After his departure, the Dark Green bird took over incubation duties while the Yellow bird departed to the east. We departed the site at 0825 having observed no evidence of prey items being taken to the cavity.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/29/01

TIME: 18:00 – 18:30

OBSERVERS: B. Watts, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1	RCWO	---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: Visited site to determine status of eggs/young. Three birds were observed attending nest cavity and foraging in immediate vicinity. Birds observed were YE/FWS, DG/FWS, unbanded. WH/FWS was not observed. Upon arrival, DG/FWS was working on resin wells on nest tree. Bird worked up above nest entrance and then came down to entrance. YE/FWS emerged and flew off. DG/FWS entered cavity and remained for 3 min. Unbanded bird arrived and worked on nest tree. This bird also went to entrance and initiated exchange. Six exchanges were observed between 18:00 and 18:30. We departed with unbanded in the nest cavity. Exchanges appear to be tradeoffs in incubation duties. No prey items were observed to be taken into nest cavity.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 4/30/01

TIME: 06:35 – 07:10

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: 0635 Arrived at site. Three birds were visible foraging in immediate vicinity of cavity: YE/FWS, WH/FWS, and unbanded. At 0645 the Yellow bird flew up to cavity and began to work on resin wells. A WBNU flew up to cavity and was immediately chased off by the Yellow and the White bird. At 0651, DG/FWS flew out of the cavity and was replaced by the Yellow bird. White bird flew up to the cavity three different times to peer in several times before flying off. By 0708 all three remaining birds had moved out of hearing to the east, suggesting there are still no young to feed. I departed the site at 0710.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 5/2/02

TIME: 06:13 – 08:05

OBSERVERS: D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		—	—	—	—	—
71	1		—	—	—	—	—
72	1		—	—	—	—	—
73	1		—	—	—	—	—
74	1		—	—	—	—	—
75	1		—	—	—	—	—
76	1		—	—	—	—	—
77	1		—	—	—	—	—
78	1		—	—	—	—	—
79	1	RCWO	06:18	—	A	—	—
81	1		—	—	—	—	—
82	1		—	—	—	—	—
83	1		—	—	—	—	—
84	1		—	—	—	—	—

COMMENTS: Arrived on site at 06:13 with no birds out yet. At 6:18 bird approaches from southwest calling. Cavity bird exits and approaching bird enters cavity. At 6:28 a third bird flies to tree and begins working on resin wells. At 6:31 another bird flies to nest cavity, works on resin wells, then displaces bird inside. Bird exchanges occur at 6:40, 6:44, and 6:48. At 7:04 bird emerges from cavity and departs. WH/FWS perches on cavity and systematically dips head into cavity numerous times over 3 min. period but does not enter. At 7:08 a second bird enters cavity. WH/FWS approaches cavity 2 more times, goes through repetitive bobbing behavior into cavity but never enters and finally flies off. Exchanges occur at 7:13, 7:23, and 7:41. 7:56 bird emerges and departs. 7:57 WH/FWS lands on cavity entrance goes through bobbing behavior but does not enter. YE/FWS enters at 8:03. No evidence of prey delivery. Birds identified were WH/FWS, YE/FWS, DG/FWS, and unbanded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 5/04/01

TIME: 6:10 – 6:50

OBSERVERS: B. Watts, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1	RCWO	6:13	---	?	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: Visited site at dawn to determine stage of eggs/young. Bird heard flying toward nest tree from cluster 4 at 6:12. Bird emerged from nest cavity at 6:13 and was quickly replaced by bird from cluster 4 (assumed to be YE/FWS). Identity of roosting bird not determined. Within 5 min. all 4 birds were calling and active within vicinity of nest cavity. Three birds foraged within area near and west to cavity. Single bird was always present within cavity. Observed 12 nest entries in 40 min period. Exchanges involved bird flying to nest entrance, bird emerging and flying off and approaching bird going directly into cavity. Insect prey was visible within bill on several entries. Typical feeding behavior and exchanges observed until leaving site. All 4 adults were identified and were involved in feeding activity. Eggs appear to have hatched within previous 24 hours. Clusters 3 and 4 were burned on 5/03/01.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

RED-COCKADED WOODPECKER CAVITY ACTIVITY FORM (CLUSTER 3 & 4)

DATE: 05/09/01

TIME: 10:00 – 11:30

OBSERVERS: B. Watts, B. van Eerden, R. Badgett, C. Markham, others

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1	RCWO	---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: Came to site to band nestlings. Rex climbed tree and extracted 4 nestlings. Birds appeared to be approximately 7 d of age. Birds were banded and weighed. Band combinations are as follows: 1581-66226 (RE/DB/RE LG/FWS), 1581-66225 (RE/DB/RE RE/FWS), 1581-66227 (RE/DB/RE PK/FWS), 1581-66228 (RE/DB/RE PU/FWS). Birds were in fine condition and were placed back into nest cavity.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

RED-COCKADED WOODPECKER CAVITY ACTIVITY FORM (CLUSTER 3 & 4)

DATE: 6/5/01

TIME: 05:40 – 08:20

OBSERVERS: D. Bradshaw, B. van Eerden

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		—	—	—	—	—
71	1		—	—	—	—	—
72	1		—	—	—	—	—
73	1		—	—	—	—	—
74	1		—	—	—	—	—
75	1		—	—	—	—	—
76	1		—	—	—	—	—
77	1		—	—	—	—	—
78	1		—	—	—	—	—
79	1	RCWO	05:55	—	Y	RE/DB/RE	DG/FWS
81	1		—	—	—	—	—
82	1		—	—	—	—	—
83	1		—	—	—	—	—
84	1		—	—	—	—	—

COMMENTS: Arrived on site at 0540. DG/FWS emerged from nest cavity at 0555 and began drumming on snag in front of nest tree. Drummed for 4 minutes. Departed at 0600 and flew out of sight to northeast. Immediately behind him flew two additional birds to the northeast. These two birds had originated from the southwest in the direction of the Cluster 4 cavity inserts.

We moved down to the eastern cavities and listened. Nothing there so we moved out to 604 and began walking east. At about 300 meters from our vehicles we encountered birds vocalizing on the south side of the road. A fledgling male was immediately spotted being fed by the unbanded adult. The fledgling was colorbanded Red. Also identified in the area were the White adult and the Yellow adult. Minutes later a fledgling female was observed. This bird was identified to have a Lt Green color band. The White adult was observed passing food to it, although it was foraging quite a bit on its own, as was the Red male. The birds eventually moved across 604 to the north. After several more minutes of observations, an additional fledgling male was observed in a different area from the already identified Red male. This new bird was colorbanded Pink. The time was now 0750. This now totaled 3 fledglings and 4 adults that had been accounted for, although the Dk Green bird had not been seen again since we picked up the group with the fledglings. Still we could not distinguish more than 6 different birds at any one time during our observations, so we concluded the search and returned to the Cluster 3 colony site. There we found the Dk Green bird working on resin wells. Upon hearing a second bird nearby, we approached and identified the Yellow Cluster 3 adult having returned to the colony. We departed the site at 0820.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 10/23/01

TIME: 8:40-9:20

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: Upon entry contacted birds foraging near nest tree. Followed birds up to cluster 4. Birds foraged and worked on resin wells for 10-15 min. Birds then foraged west and then down to creek and back toward nest tree. At least 5 birds present. Birds identified include DG/FWS, YE/FWS, WH/FWS, LG/FWS, and unbanded. Two new cavity trees located down in creek area than appear to be in use.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 11/18/01

TIME: 07:45 – 09:45

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: I moved through the wooded connector trail from Cluster 5 to the Cluster 4 inserts at 0745. No activity there, so I headed down into the marshy area to relocate the two new trees south of the Cluster 3 site. While there, the Cluster 3 birds moved in from the north at 0830. The Cluster 3 DG/FWS bird was observed working on resin wells on the nest cavity. The unbanded bird then moved down to my area and entered the southernmost of the two new cavities to continue excavation work. I observed him for 30 minutes bringing wood chips to the entrance and releasing them outside. He would disappear entirely below the cavity entrance and be gone for 3 to 4 minutes, then reappear for 15 to 20 times at a rate of about once every 15 seconds to remove wood chips. I slipped away while he was down for a while in an attempt to track down the remaining birds, but by that time they had moved off to the west and northwest. I departed the site at 0945.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 11/29/01

TIME: 07:00 – 07:45

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		—	—	—	—	—
71	1		—	—	—	—	—
72	1		—	—	—	—	—
73	1		—	—	—	—	—
74	1		—	—	—	—	—
75	1		—	—	—	—	—
76	1		—	—	—	—	—
77	1		—	—	—	—	—
78	1		—	—	—	—	—
79	1	RCWO	07:05	—	?	—	—
81	1		—	—	—	—	—
82	1	RCWO	07:07	—	A	—	—
83	1	RCWO	07:10	—	A	—	—
84	1		—	—	—	—	—
2	1	RCWO	07:05	—	?	—	—
6	1	RCWO	7:06	—	?	—	—
3	1	RCWO	07:10	—	Y	—	—
4	1						

COMMENTS: Birds emerged and met together in creek area around new cavities. Birds converged on site before bird emerged from new cavity. Birds from cluster 4 joined others in creek area. Birds were very social, foraging rapidly and interacting. 6 birds believed to be present. Birds identified include YE/FWS, WH/FWS, DG/FWS, PK/FWS, LG/FWS, and unbanded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 3 & 4)**

DATE: 12/1/01

TIME: 08:45 – 09:10

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
70	1		---	---	---	---	---
71	1		---	---	---	---	---
72	1		---	---	---	---	---
73	1		---	---	---	---	---
74	1		---	---	---	---	---
75	1		---	---	---	---	---
76	1		---	---	---	---	---
77	1		---	---	---	---	---
78	1		---	---	---	---	---
79	1		---	---	---	---	---
81	1		---	---	---	---	---
82	1		---	---	---	---	---
83	1		---	---	---	---	---
84	1		---	---	---	---	---

COMMENTS: While following Cluster 5 birds observed Cluster 3 and Cluster birds in a territorial stand-off along the path near the T-intersection. The C5-LG bird was jousting with the C3-DG bird and what I assume was the C3 unbanded bird for some twenty minutes. They chased each other around the trunks of several trees, often stopping to use the wing-out display or to physically stab at each other with their bills. There was much antagonistic vocalizing by all members of both groups present, but no other antagonistic encounters were noticed. The C5-PK bird and the C3-PK bird were seen foraging together within a foot or two of each other, vocalizing frequently but displaying no other observable antagonistic actions. Both C5 and C3 White and Yellow birds and the C3-LG bird was observed as well. The boundary dispute diminished as the C5 birds began moving north along the footpath towards Rt. 604 and the C3-birds dropped back towards the Cluster 4 site. This encounter occurred from 0845 to about 0910. I followed the C5 birds for another twenty minutes and was able to once again identify 5 of 6 birds, but only the same five as earlier. I departed the area at 0930.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

APPENDIX III: Observations of birds within cluster 5 during 2001.

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 4/23/01

TIME: 6:14 – 7:45

OBSERVERS: D. Bradshaw, B. Paxton, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2	RCWO	---	---	---	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: Birds emerged at 0614 as we were walking up, so no definitive data on bird IDs upon emergence. A total of 5 birds were ultimately observed within the first 5 minutes following emergence. Clan colors W/LB/W were clearly visible on 2 birds. Positive IDs were limited to Cluster 5 Red bird, Cluster 5 white bird, one unbanded bird, and one UID banded bird. From 0618 to 0714 12 visits to the cavity by at least 3 different birds were observed. The remaining birds foraged back and forth between the colony site and the Cluster 4 inserts. General behavior of cavity visitors was to peer into the cavity briefly, or to position themselves near the cavity entrance for brief periods before moving off. One bird was observed entering the cavity for up to one minute at approximately 0700. Following that, the entire clan moved off to the east/northeast toward Cluster 3. We departed the site at 0745 with no birds present on-site or known to be in the nest cavity. There were three incidents of copulation observed between 0614 and 0745. The first incident was at 0615, directly following emergence from the cavities. No IDs could be confirmed on either bird during any of the observations of copulation.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 04/26/01

TIME: 06:06 – 07:10

OBSERVERS: D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2	RCWO	06:08	---	A	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: Bird out of nest tree at 0608. Two birds returned to nest tree at 0614, but neither went in. Both departed, then 1 bird returned and entered nest cavity at 0617. This began a sequence of transfers and visits that went on for 45 minutes. Between 0617 and 0702 there were 10 exchanges of adults at the cavity. Time spent in the nest cavity averaged a little more than 1 minute per visit. Approx. half the exchanges took place simultaneously with one bird arriving and vocalizing at the cavity entrance, and the other bird vacating to make way for the arrival. The remaining transfers were interrupted by up to 8 minutes at which time the nest was unattended before an adult returned. Only the last two exchanges were observed with the use of optics suitable for detecting prey items and none were observed. It is not clear whether prey items were delivered during earlier exchanges. In addition to the cavity exchanges, there were 7 additional visits by RCW's to the cavity entrance that did not result in a bird entering the cavity. These usually occurred when the cavity was vacant, and the visitor would typically vocalize intermittently for up to 2 minutes from the lip of the cavity, then depart.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 04/27/01

TIME: 06:10 – 07:10

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1		—	—	—	—	—
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	—	—	—	—	—
98	1		—	—	—	—	—
99	1		—	—	—	—	—

COMMENTS: 0610 Arrived on site, all birds already out. Between 0610 and 0710 there were 12 exchanges at the nest cavity with one bird replacing another one in the cavity. There were 10 additional visits to the cavity by other birds that did not result in an entrance. These visits were characterized primarily by peering into the cavity, or sitting quietly at the cavity entrance. On at least two visits however, the visiting bird appeared to be feeding a bird inside the cavity, although no evidence of prey items being brought to the cavity was ever observed. There were deep dips into the cavity in conjunction with what appeared to be convulsive actions as though the bird were regurgitating food. These appear to have occurred while an adult bird was known to have been in the cavity. Birds seen entering the cavity included the YE/FWS; WH/FWS; LG/FWS; and an unbanded bird. Another unidentified Cluster 5 banded bird was observed but could not be identified to individual. Departed the site at 0710.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 04/30/01

TIME: 06:10 – 07:50

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2		---	---	---	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: 0610 Arrived on site. All birds already out, but quiet. The first bird arrived to enter the cavity at 0618. There were no additional visits to the cavity before 0630 so I departed the site at that time to check out Cluster 3. 0720 Returned to Cluster 5 to evaluate activity. At least 2 birds were approx. 50 meters out to the west in the young pine regeneration stand. They could be heard drumming and calling periodically. By 0735 there were 4 birds present in the colony site. LG/FWS spent several minutes working on resin wells on the nest tree. The unbanded bird spent several minutes working on the plate and resin wells on start tree #94. There were no bird exchanges at the cavity during the 30 minute timespan of this second observation period, and only two visits to the cavity by RCWs, neither bird bearing any evidence of prey. These birds clearly are not feeding young yet either. I departed the site for the second time at 0750. Birds identified at the site included LG/FWS, YE/FWS, an unbanded bird, and another bird with Cluster 5 clan colors. It was assumed that the WH/FWS bird was probably incubating at the time.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 05/01/01

TIME: 18:40 – 19:45

OBSERVERS: D. Bradshaw, C. Markham

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1	RCWO	—	19:23	A	—	—
94	1	RCWO	—	19:45	N	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	—	19:28	Y	WH/LB/WH	LG/FWS
98	1	RCWO	—	19:37	Y	WH/LB/WH	?
99	1	RCWO	—	19:45	A	—	—

COMMENTS: WH/FWS entered nest cavity at 18:48. This bird was displaced in nest cavity at 19:09 by YE/FWS. WH/FWS displaced YE/FWS at 19:11. LG/FWS displaced WH/FWS in nest cavity and roosted at 19:28. Bird was foraging around un-numbered start tree at 19:40 and eventually roosted in 99-1 at 19:45. Birds identified within site include WH/FWS, LG/FWS, YE/FWS, and unbanded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 05/02/01

TIME: 05:50 – 07:20

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1	RCWO	06:07	—	Y	—	—
94	1	RCWO	06:03	—	N	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	06:03	—	A	—	—
98	1	RCWO	06:03	—	A	—	—
99	1		—	—	—	—	—

COMMENTS: Arrived on site at 05:50 to determine nesting status. Unbanded bird emerged from 94-1 first followed by bird in nest cavity and bird in 98-1. A banded bird emerged from 93-1 at 06:07. A bird re-entered nest cavity at 06:15. Bird exchanges at nest cavity occurred at 06:24 and 06:36. Bird emerged from nest cavity at 07:02 and flew out of hearing range to the east. At 07:04 a bird flew in from east and entered nest cavity. Departed site after having no evidence of prey delivery and not birds within hearing for more than 15 min. No birds were individually identified other than unbanded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 05/04/01

TIME: 06:08 – 07:10

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1	RCWO	06:09	—	?	—	—
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	—	—	—	—	—
98	1		—	—	—	—	—
99	1		—	—	—	—	—

COMMENTS: Four birds were out and in the cluster area upon arrival. Bird emerged from tree 93 at 06:09. LG/FWS emerged from nest cavity and was replaced by other bird at 06:21. Bird exchanges at nest occurred at 06:30, 6:37, 6:40, and 7:10. Bird was observed working on resin wells on tree 93. At 07:10 most of the cluster 5 birds foraged out of main site over toward cluster 4 inserts.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 05/09/01

TIME: ~11:45 – 12:30

OBSERVERS: B. Watts, B. van Eerden, R. Badget, and others

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2	RCWO	---	---	---	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: Came over to site after banding chicks in cluster 3 to climb and determine status of nesting. Upon arrival birds were observed bringing food to nest cavity 3 times. Birds appear to have hatched in past 24 hours.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 05/16/01

TIME: ~10:00

OBSERVERS: D. Bradshaw, B. van Eerden, R. Badget and others

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2		---	---	---	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: Came to site to band chicks. Two chicks were extracted and banded. Chicks appeared to be about 7 d of age. Chicks were banded 1581-66229 (WH/LB/WH DG/FWS) and 1581-66231 (WH/LB/WH PK/FWS).

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 06/11/01

TIME:

OBSERVERS: B. van Eerden, K. Johnston

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2		---	---	---	---	---
98	1		---	---	---	---	---
99	1		---	---	---	---	---

COMMENTS: Site visit to conduct fledge check. Both young of the year were detected flying with rest of clan. PK/FWS was identified as a male. DG/FWS was identified as a female.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 10/23/01

TIME: 06:00 – 08:30

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1	RCWO	06:45	—	—	—	—
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	06:44	—	—	—	—
98	1	RCWO	06:46	—	—	—	—
99	1	RCWO	06:47	—	—	—	—
22	1	RCWO	06:45	—	—	—	—

COMMENTS: Birds emerged from cavities and converged within the SE corner of the cluster before moving off to the east and out of hearing range. Birds identified were WH/FWS and unbanded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 11/06/01

TIME: 06:15 - -7:20

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1	RCWO	06:53	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2	RCWO	06:54	---	---	---	---
98	1	RCWO	06:53	---	---	---	---
99	1		---	---	---	---	---
22	1	RCWO	06:55	---	---	---	---
23	1	RCWO	06:58	---	---	---	---

COMMENTS: Bird emerged from 98-1 first at 06:53 and flew over to tree 93. Bird in 93-1 emerged followed by bird in 97-2. Bird emerged from nest cavity and foraged around nest tree for a short period then flew over to join others. Bird flew into area from 23-1. Birds foraged around cluster eventually moving down to NW corner of cluster. All birds then flew out over regenerating stand toward Higgins Tract. WH/FWS and unbanded were only bird identified. At least 3 other birds were banded.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 11/11/01

TIME: 06:30 – 07:30

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1		—	—	—	—	—
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2		—	—	—	—	—
98	1		—	—	—	—	—
99	1		—	—	—	—	—
22	1	RCWO	06:42	—	?	—	—
23	1	RCWO	06:45	—	?	—	—

COMMENTS: Arrived at Cluster 5 at 0630 and took a position between the two new trees east of the colony site. A bird emerged from the tree closest to the colony site at 0642 and immediately flew out to the main cluster area as other birds emerged. A second bird emerged from the new tree furthest from the cluster area at 0645 and departed toward the main site. As I moved around to the north, the birds began to move north along the driveway toward 604. After a few minutes foraging along the driveway, they all departed west across the regeneration stand. I was only able to identify one unbanded bird and the fact at least three other birds were banded, but could not get IDs. The birds were difficult to work, spending much time in the canopy, in addition to a stiff breeze that was starting to kick in.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 11/17/01

TIME: 15:45 – 16:55

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		---	---	---	---	---
93	1		---	---	---	---	---
94	1		---	---	---	---	---
95	1		---	---	---	---	---
96	1		---	---	---	---	---
96	2		---	---	---	---	---
97	1		---	---	---	---	---
97	2		---	---	---	---	---
98	1	RCWO	---	16:27	---	---	---
99	1		---	---	---	---	---

COMMENTS: Arrived at Cluster 5 at 1545. (Clear skies, calm, sunset: 1656) Took a position in the brushy habitat of the open colony site approximately 20 meters west of Tree #93 (the southernmost active tree). The birds arrived from the north at 1600. At least 4 birds were observable working in the tree crowns just outside the colony site at the north end. At 1627 one bird flew directly into the cavity at Tree #98. Two additional birds moved down to Tree #93 and began working on resin wells at 1630. One of these birds was the Cluster 5 breeding male (LG/FWS). The other bird showed Cluster 5 colors but I could not make out the individual ID. Both birds then moved off to the southeast toward the Cluster 4 inserts at 1640. They were the only two birds within hearing at this point. Within another couple of minutes only one bird could be heard, somewhat distant now from the colony site. By 1647 all was quiet. I waited until 1655, then upon hearing no more birds, I departed the site.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 5)**

DATE: 11/18/01

TIME: 06:35 – 07:02

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1		—	—	—	—	—
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2		—	—	—	—	—
98	1	RCWO	06:57	—	?	—	—
99	1		—	—	—	—	—
20	1	RCWO	06:57	—	?	—	—

COMMENTS: Took a position at the southeastern perimeter of the colony area, approximately 25 meters southeast of Tree #93. I was within sight of Trees 20, 98,99, & 93. At 0653 I observed a bird with his head protruding from 20 for approximately 1 minute. Then at 0657, a bird emerged from Tree#98 simultaneously with a bird from further north (couldn't tell whether from nest tree(97) or from 94, and couldn't determine who emerged first). Seconds later a bird emerged from Tree #93 and was immediately joined in the middle of the colony area by a bird emerging from 20. Seconds later, a fifth bird emerged from some point just outside the southeastern corner of the site. It was identified as the Cluster 5 YE/FWS bird. All 5 birds were now foraging in the crowns of trees along the side of the colony site adjacent to the regeneration stand. Then, at 0702, a sixth bird emerged from some point outside the colony site to the northeast. This bird was identified as the Cluster 5 PK/FWS bird for a total of 6 birds. I moved down around the northeast side of the colony site to get a better view, just as the birds began to move back to the south. They left the colony area and spread out through the woods to the south, using the supercanopy trees that extend up above the saplings that dominate that stand along the logging road. I moved out to the logging road and down about 200 meters to get back in front again. Once inside the woods, the birds approached me and I identified the Cluster 5 White/FWS bird. After a few minutes of quiet foraging, the birds began vocalizing and departed the area entirely, flying out of sight and out of hearing to the southeast.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

RED-COCKADED WOODPECKER CAVITY ACTIVITY FORM (CLUSTER 5)

DATE: 12/01/01

TIME: 06:50 – 09:30

OBSERVERS: D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
92	1		—	—	—	—	—
93	1	RCWO	07:07	—	Y	WH/LB/WH	YE/FWS
94	1		—	—	—	—	—
95	1		—	—	—	—	—
96	1		—	—	—	—	—
96	2		—	—	—	—	—
97	1		—	—	—	—	—
97	2	RCWO	07:07	—	Y	WH/LB/WH	WH/FWS
98	1	RCWO	07:07	—	—	—	—
99	1		—	—	—	—	—
20	1	RCWO	07:07		Y	WH/LB/WH	LG/FWS

COMMENTS: Birds from trees #93 and #97 emerged simultaneously at 0707, immediately followed by the birds from tree #98 and #20, and a fifth bird from an unseen location. At 0710 the Cluster 5 PK/FWS bird flew in from some distance away to the east. Other identified birds and locations were the C5-YE/FWS bird from tree #93 and the C5-LG/FWS bird from #20. It appeared that it was the C5-WH/FWS bird that came from the former nest cavity. The unbanded bird was later spotted but its origin was unseen. The ID of a sixth bird could not be determined, although it was confirmed at least 3 different times that there were 6 RCW's present.

Proceeded to follow the birds for two and a half hours. They foraged east then south down into the low lying areas along the swamp. From there they made their way back west and north and re-entered the cluster site at 0830. Birds briefly went to their respective trees, but were there less than a minute when they suddenly began moving back into the woods to the east. Only the unbanded bird was left behind diligently working on the new start cavity #21. The entrance corridor appears complete now and he seemed to be beginning work on excavating the actual chamber below. He could not fit his entire body inside the cavity, but was extending his head and upper body down into the hole to extract wood chips.

I moved into the woods to catch up to the main group and determined that they were engaging the Cluster 3 birds in a territorial stand-off along the path near the T-intersection. The C5-LG bird was jousting with the C3-DG bird and what I assume was the C3 unbanded bird for some twenty minutes. They chased each other around the trunks of several trees, often stopping to use the wing-out display or to physically stab at each other with their bills. There was much antagonistic vocalizing by all members of both groups present, but no other antagonistic encounters were noticed. The C5-PK bird and the C3-PK bird were seen foraging together within a foot or two of each other, vocalizing frequently but displaying no other observable antagonistic actions. Both C5 and C3 White and Yellow birds and the C3-LG bird was observed as well. The boundary dispute diminished as the C5 birds began moving north along the footpath towards Rt. 604 and the C3-birds dropped back towards the Cluster 4 site. This encounter occurred from 0845 to about 0910. I followed the C5 birds for another twenty minutes and was able to once again identify 5 of 6 birds, but only the same five as earlier. I departed the area at 0930.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

APPENDIX IV: Observations of birds within cluster 6 during 2001.

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 6)**

DATE: 09/26/01

TIME: ~19:30

OBSERVERS: D. Schwab, B. Watts, B. van Eerden, others

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
10	1		---	---	---	---	---
11	1	RCWO	---	---	Y	FWS/LG	DB/DB/YE
12	1		---	---	---	---	---
13	1	RCWO	---	---	Y	FWS/DG	WH/WH/PU

COMMENTS: Came to cluster to place translocated birds from Carolina Sandhills, NWR in cavity inserts. Don climbed trees, placed each bird in cavity and stapled screen in place. Both birds seemed fine.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 6)**

DATE: 09/27/01

TIME: ~06:30

OBSERVERS: D. Schwab, J. Dunscomb, others

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
10	1		---	---	---	---	---
11	1	RCWO	---	---	Y	FWS/LG	DB/DB/YE
12	1		---	---	---	---	---
13	1	RCWO	---	---	Y	FWS/DG	WH/WH/PU

COMMENTS: Came to cluster to release birds from Carolina Sandhills, NWR. Screens were pulled free of cavity entrance when birds appeared at entrance. Both birds flew from cavities and seemed in good condition.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 6)**

DATE: 10/05/01

TIME: 06:45 – 08:00

OBSERVERS: B. van Eerden, M. van Eerden

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
10	1		—	—	—	—	—
11	1	RCWO	—	—	?	—	—
12	1		—	—	—	—	—
13	1		—	—	—	—	—

COMMENTS: Came to cluster to check on status of translocated birds. One bird was heard vocalizing just after dawn. This bird was apparently the male and likely emerged from 11-1. Two birds were not observed.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum

**RED-COCKADED WOODPECKER CAVITY
ACTIVITY FORM
(CLUSTER 6)**

DATE: 10/23/01

TIME: 10:00 – 10:30

OBSERVERS: B. Watts, D. Bradshaw

TREE	CAV	USE	EMRG	RST	BANDED	LFT LEG	RT LEG
10	1		---	---	---	---	---
11	1		---	---	---	---	---
12	1		---	---	---	---	---
13	1		---	---	---	---	---

COMMENTS: Two birds were calling when we walked into cluster area. One bird was west of entry road and the other was east of road. As we approached eastern bird joined western bird near cluster area. Birds foraged together near cluster. First bird was identified as trans-located male from Carolina Sandhills, NWR (FWS/LG DB/DB/YE). Second bird was banded bird from cluster 1.

COLOR ABBREVIATION KEY

DG – Dark Green	PU - Purple
LG – Light Green	WH - White
DB – Dark Blue	PK - Pink
LB – Light Blue	YE - Yellow
RE – Red	FWS – Aluminum