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## Investigation of red-cockaded woodpeckers in Virginia: 2003 report

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**INVESTIGATION OF RED-COCKADED  
WOODPECKERS IN VIRGINIA:**

**YEAR 2003 REPORT**



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

# **Investigation of Red-cockaded Woodpeckers in Virginia: 2003 report**

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## Executive Summary

A total of 32 different Red-cockaded Woodpeckers were present at Piney Grove at some point during the 2003 calendar year. This includes 17 resident adults, 7 fledglings, 3 translocated birds remaining from 2002, and 5 translocated birds from 2003. This compares with 15 resident adults, 6 fledglings and 11 translocations for 2002. There were 2 documented mortalities in 2003: one local bird and one 2002 translocation. At least 2 other local birds and 3 of the 8 translocated birds present during the year were presumed to be lost as of November.

All three active woodpecker clusters produced young in the spring of 2003. The resident male in Cluster 1 secured a female from Cluster 5 and bred successfully, although with low productivity. The female laid 3 eggs, of which 2 hatched, and 1 young fledged. Cluster 3 lost its breeding pair in late spring, who were replaced by a Cluster 3 helper male and a translocated female from Gates Co. North Carolina. The pair produced 3 eggs and fledged 3 young. Cluster 5 retained the same breeding pair and produced 4 eggs, fledging 3 young. A total of 7 young fledged successfully in the form of 4 males and 3 females.

In 2003, Piney Grove supported 97 trees that contained Red-cockaded Woodpecker completed cavities, start cavities, or cavity inserts, compared to 84 for 2002. This includes 43 natural cavities, or starts, and 54 artificial inserts. Only one new natural cavity was discovered in 2003, while 12 new artificial cavities were installed. Of 43 natural cavities, only 19 showed evidence of Red-cockaded Woodpecker activity in 2003. Only 29 of 87 available cavities were determined to be used by roosting birds during the year.

Hurricane Isabel in September 2003 inflicted damage to foraging habitat and caused the loss of 9 cavities. Of these, 3 were natural cavities, one of which was the historic nest cavity for cluster 3 along with the lower roost cavity in the same tree. Six additional artificial cavities were lost. The 9 cavity losses were spread across 6 clusters so potential impacts to any woodpecker group from lost roost sites were relatively small. Intense damage in selected areas may have potential foraging implications due to significantly reduced stand basal area.

## BACKGROUND

Context - The Red-cockaded Woodpecker (*Picoides borealis*) is a federally endangered species. Within the past 100 years Red-cockaded Woodpeckers have disappeared completely from the northern portion of their breeding range. Historically, this species was recorded north into New Jersey and Pennsylvania. As recently as the 1930's and 1940's resident birds were known from the open maritime forests of Maryland. Most recently, the population in southeastern Kentucky was moved due to habitat loss making Virginia the only remaining northern population north of the Carolinas. In Virginia, breeding has continued to the present time but the number of both sites and birds has declined dramatically over the past 40 years. As recently as the late 1970's, 23 clans were known scattered across 5 counties. Currently, 6 groups exist in a single county, of which only 4 contain breeding pairs.

The Red-cockaded Woodpecker is still in eminent danger of extinction within Virginia. As of 1998 less than 12 sites including approximately 2,500 ha of old growth pine remained that appeared adequate to meet the breeding requirements of the species if restored. Shortly after that assessment, The Nature Conservancy purchased what is now over 600 ha of old growth pineland that supports the core of the remaining population. This land was designated as the Piney Grove Preserve. The primary mission of this new reserve is the restoration of pine savannah habitat.

Restoration of the Red-cockaded Woodpecker population in Virginia is requiring the aggressive use of techniques that have been successful further south. Intensive management of extant clans along with extensive habitat restoration is underway to stabilize the population and bring it back to pre-1980 levels. Continued translocations will be carried out to increase the small gene pool and 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 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

### Description

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

A single clan of Red-cockaded Woodpeckers was discovered within this site in 1985. A second clan was discovered in 1994 and a third in 1995. These 3 clans still remain active.



Since 1999, there have been nine recruitment clusters established by The Nature Conservancy through the installation of artificial cavities. There are now 11 independent cluster sites with either natural or artificial cavities (Figure 1).



### **Banding**

Adults - In 1998, Don Schwab banded 10 Red-cockaded Woodpeckers within the Piney Grove complex. Observations made during 2003 indicate that at least 3 of these individuals were still present within the population (see results section below). At the close of 2003 there were still 2 adult Red-cockaded Woodpeckers that were unbanded. 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 has been used in the execution of the capture

program. Every effort has been made to target specific individuals that were known to be unbanded. This approach ensured that the handling of banded birds was kept to a minimum. Because individuals frequently exchange cavities for roosting, this approach requires extensive monitoring. Birds are typically identified as they returned to the cluster areas to roost. Known birds are then targeted for capture shortly after roosting in the evening or before emerging the following morning.

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. Where cavity height permits, breeding status is determined via the use of a miniature video camera mounted on an extendable pole. The pole can accommodate cavity heights to 50 ft. For cavities exceeding that height, breeding status was determined by visual monitoring of activity at the cavity. After dates of incubation were determined, an estimated hatching date was calculated. Nest cavities were monitored closely around the time of expected hatching to verify hatch dates. The window for banding was determined from estimated hatching dates.

All nestlings were banded during the recommended age window. Nest trees were climbed with ladders and nestlings were extracted from cavities using a noose apparatus. Nestlings were then lowered to the ground, banded, and returned to the cavity. Each nestling received a unique combination of color bands as described above. Nestlings were also weighed using a Pesola spring scale. In a departure from previous years, the responsibility for banding nestlings transitioned from out-of-state contractors to a project partner in 2003. Bryan Watts received certification through hands-on experience banding young at Carolina Sandhills NWR in May of 2003. This made him eligible to take over the nestling banding duties at Piney Grove with the last of three RCW broods in June.

## **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. In addition, 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.

## **Historic Sites**

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



## RESULTS

### Population Monitoring

Nineteen birds were known to be present within the Piney Grove preserve going into the breeding season of 2003 (Table 1). This included 2 birds in Cluster 1, 9 birds in Cluster 3, and 8 birds in Cluster 5. This compares to 16 birds in 4 clusters during the same period in 2002. There was a loss of 5 birds from Piney Grove between the fall of 2002 and spring of 2003. This included 4 of 6 translocated woodpeckers that were still present in late fall 2002 and one resident bird from Cluster 1.

Over the course of the 2003 season, 32 different red-cockaded woodpeckers were identified within the Piney Grove Preserve (Table 1). These birds included 17 resident adults, 7 fledglings, 3 translocated birds from 2002, and 5 birds translocated in 2003. Due to the paucity of observations after the breeding season, no firm numbers can be generated for birds remaining into the fall. Three of 5 translocated birds from South Carolina in 2003 were known to be present up to one month after translocation, and 2 birds still remained from the 11 Red-cockaded Woodpeckers transferred in 2002. There were 2 documented mortalities in 2003.



*Bryan Watts prepares to climb a nest tree. Photo by Larry Lynch.*

### Breeding Observations

All of the three active clusters within the Piney Grove Preserve were productive in 2003. Two of the three groups harbored new breeding pairs. Detailed breeding observations and status for each clan are presented below.

Cluster 1 – Two bachelor males were present at this site into late April. Then a series of events involving movements between groups brought three different females into contact with the resident males over the course of a few days. A pair was eventually formed between a 2002 fledged female from Cluster 3 and the resident Piney Grove male in Cluster 1. Tree #48 remained the nest tree. Chicks were observed just beginning to hatch on 5 June. Only 2 of 3 eggs hatched and 2 young were extracted and banded on 12 June. Only 1 young eventually fledged - a male.

Cluster 3 – The expected breeding pair at this site dissolved with the loss of the breeding male in late April (see *Mortalities* section). That moved one of the helper males up to breeder, who then took a 2002 translocated female from Gates County as his mate. A new nest tree (#3) was activated with the loss of the historic nest cavity to nuthatches. The group was first observed feeding young on 20 May. Three chicks were extracted and banded on May 26 at approximately 9 days of age. All three young fledged successfully: 2 females and a male.

Cluster 5 – The LG male and WH female were mated for the third year. Records show that both of these individuals were at least 6 years old in 2003. The nest cavity continued to be #97-2. First observation of feeding young was on 5 May. Four nestlings were extracted and banded on 12 May at approximately 8 days of age. Only 3 of the young were accounted for after fledging – 2 males and a female. This nest tree was subsequently blown down in Hurricane Isabel.



Bander Ryan Speckman with (clockwise) Wanda SanJule, Mary Scalf, Tim Sanjule, and Dana Bradshaw. Photo by Larry Lynch.



8 day old chick now bearing Cluster 1 markings. Photo by Larry Lynch.

### Translocations

Only one translocation event was conducted in 2003. On 1 October, Bryan Watts, Mike Wilson and Tim SanJule travelled to Carolina Sandhills NWR and were assisted by refuge staff in trapping 5 Red-cockaded Woodpeckers: 3 males, and 2 females. The birds were returned to Piney Grove on the afternoon of 2 October and placed in the cavities after dusk. The release went without incident the next morning and all birds emerged in good shape. Assisting with the release were the above named, plus Brian van Eerden and Wanda SanJule.

Sex	Band No.	Left leg	Right leg	Release cluster	Release cavity	Release date
F	951-26443	AL/YE	DG/DG/LG	6	135	10/03/2003
M	951-26448	AL/YE	DG/DG/MV	6	116	10/03/2003
F	1751-83234	AL/YE	WH/WH/WH	11	141	10/03/2003
M	1751-83183	AL/OR	YE/YE/WH	11	140	10/03/2003
M	951-26305	AL/YE	YE/YE/WH	7	195	10/03/2003

As of 26 October 3 of the 5 translocated birds were still present at Piney Grove. This included the male from Cluster 11 and the female from Cluster 6 who were observed together near Cluster 6 on that date. The third bird was the Cluster 6 male who was observed roosting in Cluster 7 with a Cluster 3 female who had relocated to that cluster. Those two birds emerged from C7 cavities on 25 October and moved off to the west foraging together.

Two translocated birds from 2002 were still present in late 2003. One translocated female from Gates County, NC had assumed the breeding female role in Cluster 3. And a translocated male from Carolina Sandhills was still present in Cluster 1 throughout the year.

Table 1. Temporal occurrence of birds at Piney Grove from 2000 through summer 2003.

Location	ClusterID (left leg)	Bird ID (right leg)	Sex	2000	2001	Spr 2002	Sum 2002	Fall 2002	Spr 2003	Sum 2003	Fall 2003
C1	DG/YE/DG	PU/AL	F	X							
C1	DG/YE/DG	RE1/AL	F	X							
C1	DG/YE/DG	DB/AL	M	X							
C1	DG/YE/DG	YE/AL	F	X							
C1	DG/YE/DG	WH/AL	M	X	X	X		X			
C1	DG/YE/DG	RE2/AL	M		X	X	X	X	X	X	X
C1	AL/LB	ST/ST/OR	F		X <sup>1</sup>						
C1	AL/OR	DG/DG/OR	F								
C1	AL/OR	DB/DB/WH	M						X	X	?
C1	WH/LB/WH	AL/YE	F							X	X
C1	DG/YE/DG	AL/LB	M							X	X
C3	RE/DB/RE	PU1/AL	F								
C3	RE/DB/RE	PK1/AL	U								
C3	RE/DB/RE	YE/AL	F	X	X	X	X	X	X		
C3	RE/DB/RE	DG/AL	M	X	X	X	X	X	X		
C3	Unbanded	Unbanded	U	X	X	X	X	X	X	X	X
C3	RE/DB	LG1/AL	U	X		X	X	X	X	X	?
C3	RE/DB	RE1/AL	U	X							
C3	RE/DB	WH/AL	M	X	X	X	X	X	X	X	?
C3	RE/DB/RE	RE2/AL	M		X						
C3	RE/DB/RE	PU2/AL	M		X	X	X	X	X	X	X
C3	RE/DB/RE	LG2/AL	F		X						
C3	RE/DB/RE	PK2/AL	M		X	X	X				
C3	RE/DB/RE	AL/YE	F				X	X	X	X	
C3	RE/DB/RE	AL/RE	F				X	X	X		
C3	RE/DB/RE	AL/DB	M				X				
C3	AL/OR	DG/DG/OR	F					X			
C3	BK/YE/DB	RE/AL	F						X	X	X
C3	RE/DB/RE	AL/LB	F							X	?
C3	RE/DB/RE	AL/PI	F							X	?
C3	RE/DB/RE	AL/DG	M							X	X
C5	WH/LB/WH	DB1/AL	U								
C5	WH/LB/WH	RE/AL	M	X							
C5	WH/LB/WH	DB2/AL	F	X							
C5	WH/LB/WH	LG/AL	M	X	X	X	X	X	X	X	?
C5	WH/LB/WH	WH/AL	F	X	X	X	X	X	X	X	?
C5	WH/LB/WH	YE/AL	M	X	X	X	X	X	X	?	?
C5	Unbanded	Unbanded	U	X	X	X	X	X	X	X	?
C5	WH/LB/WH	AL/RE	U	X	X						
C5	WH/LB/WH	PU/AL	U	X							
C5	WH/LB/WH	PK1/AL	U	X							
C5	WH/LB/WH	PK2/AL	M		X	X	X	X	X	X	?
C5	WH/LB/WH	DG/AL	F		X	X					
C5	WH/LB/WH	AL/YE	F				X	X	X		
C5	WH/LB/WH	AL/LB	F				X	X	X		

**Table 1(cont). Temporal Occurrence of birds at Piney Grove from 2000 through summer 2003.**

Location	ClusterID (left leg)	Bird ID (right leg)	Sex	2000	2001	Spr 2002	Sum 2002	Fall 2002	Spr 2003	Sum 2003	Fall 2003
C5	WH/LB/WH	AL/DB	M				X	X	X	X	?
C5	WH/LB/WH	AL/RE	M							X	?
C5	WH/LB/WH	AL/PU	F							X	?
C5	WH/LB/WH	AL/LG	M							X	?
C5	WH/LB/WH	AL/DG	-								
C6	AL/DG	WH/WH/PU	F		X	X	X	X			
C6	AL/LG	DB/DB/YE	M		X						
C6	AL/WT	ST/ST/OR	F					X			
C6	AL/YE	DG/DG/LG	F								X
C6	AL/YE	DG/DG/MV	M								X
C7	BK/YE/DB	RE/AL	F			X	X	X			
C7	YE/DB/YE	WH/AL	M			X					
C7	YE/DB/YE	LG/AL	M			X					
C7	AL/YE	YE/YE/WH	M								X
C7	RE/DB/RE	YE/AL	F							X	
C7	RE/DB/RE	AL/YE	F								X
C8	AL/OR	WH/WH/MV	M					X			
C11	AL/LG	PU/PU/LG	M					X			
C11	AL/WH	OR/OR/DB	F					X			
C11	AL/YE	WH/WH/WH	F								X
C11	AL/OR	YE/YE/WH	M								X
C12	AL/OR	DB/DB/WH	M					X			
C12	AL/OR	WH/WH/LB	F					X			
C13	AL/OR	OR/OR/LG	M					X			

## Mortalities

- 1) Bird ID      Left leg – AL/OR,      Right Leg – WH/WH/MV  
 Band #        1751-83208  
 Origin        Carolina Sandhills NWR to Piney Grove Preserve Cluster 8, 10/2/2002.  
 Found        Cluster 13, Tree #121  
 Date         2 February, 2003

During a routine cavity check with the cavity peeper Bryan Watts and Brian van Eerden discovered a RCW carcass in Tree #121. The bird was resting on the cavity floor on its back. Its right leg was projecting up. Later, an extractor tool was used to gently remove the carcass from the cavity. The wings were kept folded close to the body as it was spiraled up toward the entrance. The handlers were confident that no bones were broken or dislodged during the recovery. The bird was found to have a broken neck and dried matted blood on the upper breast and lower neck area. It was identified as a SC transplant originally released at tree #173 in Cluster 8 on 2 October, 2002.

The bird was frozen and subsequently sent by Don Schwab to the Southeastern Cooperative Wildlife Disease Study (SCWDS) lab at the University of Georgia for necropsy. Gross examination revealed a fracture of the mid-cervical spine and a 4.0 mm x 3.0 mm circular hole in the right aspect of the base of the head that penetrates the skull. In a report dated 20 April, 2003 the SCWDS listed trauma and Carbamate (oxamyl) exposure as the final diagnosis, with the following comments: "The immediate cause of this birds death is head trauma. There was evidence of exposure to the carbamate insecticide oxamyl, a Class I restricted use pesticide. Levels of the compound were low, and it cannot be determined whether pesticide exposure played a role in the bird's traumatic injury. Brain acetylcholinesterase levels were only slightly depressed, suggesting that this animal was exposed to but not significantly affected by the carbamate compound. Another possibility is the enzyme activity may have increased after death as can occur with carbamates. ... While it is not possible to determine the origin of the trauma resulting in the death of this bird, the injuries are consistent with wounds inflicted by another woodpecker."

- 2) Bird ID      Left Leg – RE/DB/RE      Right Leg – DG/AL (ID unconfirmed)  
 Band #        1581-66205 (unconfirmed)  
 Origin        Piney Grove; suspected 6+ year old breeding male at Cluster 3.  
 Found        Beneath Tree #48 in Cluster 1

On 24 April, 2003 the remains of a Red-cockaded Woodpecker were located by Dana Bradshaw approximately 3 meters from the base of Tree #48 in Cluster 1. This observation coincided with an event 24 hours earlier in which this and 3 other C3 birds plus a C5 bird were observed in territorial interactions with the two bachelor males at C1. Aggressive territorial interactions were observed around the C1 cavity trees for over two hours before Bradshaw departed. Upon departing he noted an adult Cooper's hawk perched within a hundred meters of the RCW interactions. On the morning of the 24<sup>th</sup>, he revisited the site and located the remains. Present were more than 15 flight feathers, a full compliment of tail feathers, and copious amounts of breast and flank plumage, some matted with bits of flesh and traces of blood. There was no carcass present, or identifiable bone structures. The ground was searched thoroughly for evidence of leg bands or any other identifiable features. The ID of this bird could only be surmised based on the known presence of the bird at the site on the previous day and its subsequent absence. The bird had

been a breeding male at C3 for at least 3 years and that position was taken over by a helper male only days after this incident, further pointing to the loss of this individual. All other birds that had been observed were later accounted for. Cause of death was unknown. The two most likely scenarios are predation by Cooper's hawk, or injury by conspecifics that rendered it flightless and therefore predisposed to mortality by ground predators.

### Hurricane Isabel

On September 18, 2003 Hurricane Isabel struck coastal North Carolina and moved northwesterly into Virginia. Shortly after making landfall, the storm passed within 40 kilometers of Piney Grove still retaining hurricane force winds and dropping more than 6 inches of rain. The combination of wind and rain toppled hundreds of mature pines at Piney Grove. Although not yet quantified, the reduction in stand basal area appears significant in several places within the preserve. Most notable are areas between Clusters 3 and 5, around Cluster 6, and adjacent to Cluster 1. Incredibly, only 8 cavity trees were lost, containing 9 cavities. Table 2 below details cavity information:

**Table 2. Storm Damage Results**

Cluster	Tree#	Cavity Type	Pre-hurricane Status	Hurricane Effect
1	50	Artificial	Inactive	Toppled
3	74	Natural	Active	Snapped at cavity
3	81	Artificial	Inactive	Toppled
5	97-1	Natural	Active (nest cavity)	Snapped at lower cavity
5	97-2	Natural	Active	Snapped at cavity
6	11	Artificial	Inactive	Toppled
6	13	Artificial	Inactive	Toppled
7	114	Artificial	Inactive	Toppled
12	130	Artificial	Inactive	Toppled



*Rt. 604 between Clusters 3 & 5 one day after Isabel. Photo by Dana Bradshaw*





*Post-Isabel photos taken along fire lane between Clusters 3 & 5. Upper photo faces south, lower photo faces west.*  
Photos by Dana Bradshaw.





## Cavity Trees

During 2003 Piney Grove had 98 trees that contained Red-cockaded start cavities (9), completed cavities (36), or cavity inserts (54). Twelve of the 54 artificial inserts were installed in 2003, all of which went toward replacing damaged or lost cavities.

Tree Measurements – No new tree measurements were taken in 2003.

Cavity Maintenance – Of the 36 natural cavities present post-breeding season (pre-hurricane), 16 (43%) showed evidence of recent maintenance activity (Table 2a-c). Seven (16%) of 43 artificial inserts present before the hurricane showed evidence of recent work on resin wells. The eleven additional inserts installed since the hurricane were not monitored closely enough to ascertain activity since the hurricane.

Cavity Use – Only 23 (23%) of 98 available cavities were determined to be used by roosting birds in 2002 (Table ). This includes 16 (42%) of 36 natural cavities and 7 (17%) of 42 artificial cavities. For Clusters 1 & 5, the nest cavities remained the same as in previous years. Cluster 3 used a new nest cavity after the loss of the old cavity to nuthatches and the formation of a new breeding pair. The roost cavity of the new breeding male became the nest cavity.

Cavity Damage – Damage to natural cavities increased only moderately in 2003, but a greater number of problems were discovered with artificial inserts. Of 36 natural cavities available, only 4 (11%) showed evidence of new or ongoing damage by competitors, and most was minor. Only 2 cavity restrictors were installed.

Inspection of artificial cavities became routine in 2003 with the advent of flooding problems discovered the previous year. Eight (19%) of 42 inserts were discovered to have standing water or evidence of damage from water. Twenty-four (57%) required repair to correct damage to the entrance hole, water problems, and general wear. Most of these cavities are now at least 4 years old requiring monitoring throughout the season to ensure suitability for roost use.

Cavity competitors – Twenty-nine flying squirrels were removed from cavities at Piney Grove in 2003. Additional cavity competitors observed in 2002 included white-breasted nuthatches, eastern bluebirds, red-bellied woodpeckers, pileated woodpeckers, and mud dauber wasps. White breasted nuthatches nested successfully in cavity 79-1 in Cluster 3 and red-bellied woodpeckers continued to use cavity 49 in Cluster 1.



*Tim Sanjule assembles the ladders on the way up to conduct cavity maintenance & squirrel removal. Photo by Larry Lynch.*



*Flying squirrel peering out of RCW cavity. Photo by Dana Bradshaw*

Table 3. Cavity Status Summary

Clust. #	Tree #	Cavity Type	Status_02	Status_03
1	35	Natural	Active; adv. Start	Inactive advanced start
1	36	Artificial	Inactive	Inactive; removed 2 squirrels
1	37	Natural	Active; adv. Start	Inactive advanced start
1	38	Natural	Active start	Completed active cavity
1	39	Natural	Active cavity	Active
1	40	Natural	Abandoned; enlarged	Abandoned; greatly enlarged
1	41	Natural	Abandoned; enlarged	Abandoned; greatly enlarged
1	42	Natural	Abandoned start	Abandoned start
1	43	Natural	Abandoned; enlarged	Abandoned; greatly enlarged
1	44	Natural	Abandoned; enlarged	Abandoned; greatly enlarged
1	45	Natural	Inactive; WBNU	Inactive
1	46	Natural	Inactive; enlarged	Inactive; greatly enlarged
1	47	Natural	Advanced start	Inactive advanced start
1	48	Natural	Active; nest cavity	Active; nest cavity
1	49	Natural	Inactive; enlarged	Inactive; enlarged
1	50	Artificial	Inactive	Inactive; blown down by Hurricane Isabel
1	51	Artificial	Inactive	Inactive
1	52	Artificial	Inactive	Inactive
1	117	Artificial	Not present	Replacement for # 50
1	Un#d	Natural	Initial start	Completed active cavity
3	1	Artificial	Active	Active
3	2	Artificial	Active	Active
3	3	Natural	Active cavity	Active: nest cavity
3	4	Natural	Active cavity	Active cavity
3	5	Natural	Inactive start	Inactive start
3	6	Natural	Inactive new cavity	Active cavity
3	7	Natural	Inactive start	Active start
3	70	Natural	Abandoned; enlarged	Abandoned; dead
3	71	Natural	Inactive cavity	Inactive cavity
3	72	Natural	Abandoned; enlarged	Abandoned; enlarged
3	73	Natural	Abandoned; enlarged	Abandoned; dead
3	74	Natural	Active cavity	Active; snapped at cavity by Isabel
3	75	Natural	Inactive cavity	Inactive cavity
3	76	Natural	Inactive; WBNU	Inactive; replaced with artificial cav. (177)
3	77	Natural	Abandoned; enlarged	Abandoned; enlarged
3	78	Natural	Inactive advanced start	Inactive advanced start
3	79-1	Natural	Active; nest cavity	Inactive; WBNU nest
3	79-2	Natural	Inactive start	Inactive advanced start
3	81	Artificial	Inactive	Inactive; blown down by Isabel
3	82	Artificial	Active	Active
3	83	Artificial	Active	Active
3	84	Artificial	Inactive	Inactive
3	177	Artificial	Not present	Replacement for # 76
3	186	Artificial	Not present	Replacement for # 81

Table 3(cont). Cavity Status Summary

Clust. #	Tree #	Cavity Type	Status_02	Status_03
5	20	Natural	Active cavity	Active
5	21	Natural	Active cavity	Active
5	22	Natural	Active cavity	Active
5	23	Natural	Active cavity	Active
5	92	Natural	Inactive start	Inactive start
5	93	Natural	Active cavity	Active
5	94	Natural	Active cavity	Inactive; flooded
5	95	Natural	Abandoned; enlarged	Abandoned; enlarged
5	96	Natural	Inactive; dying	Inactive; dead
5	97-1	Natural	Active cavity	Active; snapped at lower cavity by Isabel
5	97-2	Natural	Active cavity	Active; snapped at lower cavity by Isabel
5	98	Natural	Active cavity	Active
5	99	Natural	Active cavity	Died, Spring 2003
5	127	Artificial	Not present	Replacement cavity
5	136	Artificial	Not present	Replacement cavity
5	191	Artificial	Not present	Replacement cavity
6	10	Artificial	Inactive	Inactive
6	11	Artificial	Active	Inactive; blown down by Isabel
6	12	Artificial	Inactive	Inactive
6	13	Artificial	Inactive	Inactive: blown down by Isabel
6	113	Artificial	Not present	Inactive
6	116	Artificial	Not present	Inactive
6	135	Artificial	Not present	Inactive
7	110	Artificial	Inactive	Inactive
7	111	Artificial	Inactive	Active
7	112	Artificial	Inactive	Inactive
7	113	Artificial	Active	Active
7	114	Artificial	Inactive	Inactive; blown down by Isabel
7	195	Artificial	Not present	Replacement for 114
2	ALL	Artificial	Inactive	Inactive ( #s 60, 61(dead), 62, 63)
8	ALL	Artificial	Inactive	Inactive ( #s 170, 171, 172, 173)
10	ALL	Artificial	Inactive	Inactive ( #s 150, 151, 152, 153)
11	ALL	Artificial	Inactive	Inactive ( #s 140, 141, 142, 143)
12	ALL	Artificial	Inactive	Inactive ( #s 130(Isabel), 131, 132, 133, 189)
13	121	Artificial	Inactive	Inactive
13	122	Artificial	Inactive	Inactive
13	123	Artificial	Inactive	Active
13	124	Artificial	Inactive	Inactive

## Banding

Since the spring of 1998, 41 different birds have been banded within the Piney Grove complex (Table 4). This includes 10 birds in 1998 and 11, 7, 6, and 7 birds respectively each year from 2000 through 2003. All birds banded since 2001 have been nestlings. The seven nestlings banded in 2003 yielded 4 males and 3 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 tended to utilize cavities that are beyond the height reachable with the telescopic net. Monitoring is ongoing to determine when or if these birds relocate to situations that would allow for safe capture.



*Bander Ryan Speckman from Jay Carter & Assoc. prepares to retrieve chicks from Cluster 3 Tree #3.*

## Cluster Interactions

The most significant inter-group interaction that was observed in 2003 involved an encroachment of Cluster 3 and Cluster 5 birds into Cluster 1. On 23 April, within minutes after sunrise, 4 birds from Cluster 3 and a lone bird from Cluster 5 arrived at Cluster 1 and ignited what appeared to be a prolonged territorial dispute. Among those present were the breeding male and female from Cluster 3 along with a male helper and juvenile female. In addition, a juvenile female from Cluster 5 was present. At that time, the only birds present at Cluster 1 were the two bachelor males: 1 resident and 1 translocatee from SC. Intense vocalizing and tail-chasing went on for more than an hour, until the observer (D. Bradshaw) departed. Upon departing Bradshaw noted an adult Cooper's Hawk perched nearby, which flushed upon his approach.

On 24 April, Bradshaw arrived at Cluster 1 again and located the remains of what was later determined to be the Cluster 3 breeding male in the center of Cluster 1. (*See Mortalities section for details*). Later that same day the two bachelor males at Cluster 1 were observed interacting with the Cluster 3 breeding female and a juvenile female from the same cluster. As dusk approached, the C1 breeding male was observed flying to each of three vacant cavities seeming to urge the females to roost there. The adult female finally left in time to roost in Cluster 7. The juvenile left moments later, but was retrieved by the C1 red male who chased her out of sight and returned with her 5 minutes later. Again he vocalized intensely around two of the vacant cavities, each of which the juvenile female visited and departed. As darkness was settling in, the young female finally departed to the west, and went unfollowed.

On 30 April, the young C3 female was again seen in Cluster 1 but was being chased aggressively by both of the Cluster 1 males. She was finally chased out of the cluster area. The two males then returned and were seen engaging in muted tones with a new female, a young bird from Cluster 5, hatched in 2002.

On several occasions Cluster 3 and Cluster 5 birds were observed engaged in territorial disputes along the fire break that separates those two clusters. This typically involves the breeding male and at least 1 to 2 male helpers from each cluster.

**Table 4.** Summary of individual Red-cockaded Woodpeckers banded within Piney Grove (1998-2003).

Date	CI	FWS	Left	Right	Age	Sex	Wing	Culmen	Weight
01/11/98	1	1581-66206	DG/YE/DG	DB/AL	AHY	M	—	—	—
08/15/98	1	1581-66209	DG/YE/DG	PU/AL	AHY	F	—	—	—
04/05/00	1	1581/66211	DG/YE/DG	RE/AL	AHY	F	122	17.9	47.5
05/29/00	1	1581-66219	DG/YE/DG	WH/AL	~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/AL	AHY	F	120	16.6	—
04/28/01	1	1581-66224	DG/YE/DG	RE/AL	AHY	M	118	16.9	48.0
06/12/03	1	1581-66245	DG/YE/DG	AL/LB	~8d	M <sup>2</sup>	—	—	23.0
06/12/03	1	1581-66246	DG/YE/DG	AL/PU	~8d	- <sup>3</sup>	—	—	13.0
02/10/98	3	1581-66203	RE/DB/RE	YE/AL	AHY	F	117	17.0	47.8
02/11/98	3	1581-66204	RE/DB/RE	PU/AL	AHY	F	—	—	—
02/11/98	3	1581-66205	RE/DB/RE	DG/AL	AHY	M	—	—	—
08/10/98	3	1581-66208	RE/DB/RE	PK/AL	HY	U	—	—	—
05/12/00	3	1581-66214	RE/DB	WH/AL	~7d	U	—	—	11.0
01/29/02					SY	M	119	16.8	48.5
05/12/00	3	1581-66215	RE/DB	LG/AL	~7d	U	—	—	12.0
05/12/00	3	1581-66216	RE/DB	RE/AL	~7d	U	—	—	12.0
05/09/01	3	1581-66225	RE/DB/RE	RE/AL	~7d	M <sup>2</sup>	—	—	25.0
05/09/01	3	1581-66226	RE/DB/RE	LG/AL	~7d	F <sup>2</sup>	—	—	27.0
05/09/01	3	1581-66227	RE/DB/RE	PK/AL	~7d	M <sup>2</sup>	—	—	29.0
05/09/01	3	1581-66228	RE/DB/RE	PU/AL	~7d	M	—	—	22.0
05/10/02	3	1581-66234	RE/DB/RE	AL/YE	~5d	F <sup>2</sup>	—	—	13.0
05/10/02	3	1581-66235	RE/DB/RE	AL/RE	~5d	F <sup>2</sup>	—	—	19.0
05/10/02	3	1581-66236	RE/DB/RE	AL/DB	~5d	M <sup>2</sup>	—	—	20.0
05/26/03	3	1581-66242	RE/DB/RE	AL/LB	~9d	F <sup>2</sup>	—	—	29.0
05/26/03	3	1581-66243	RE/DB/RE	AL/PI	~9d	F <sup>2</sup>	—	—	32.5
05/26/03	3	1581-66244	RE/DB/RE	AL/DG	~9d	M <sup>2</sup>	—	—	32.5
02/09/98	5	1581-66201	WH/LB/WH	RE/AL	AHY	M <sup>1</sup>	—	—	—
02/10/98	5	1581-66202	WH/LB/WH	LG/AL	AHY	M	121	18.0	—
02/12/98	5	1581-66207	WH/LB/WH	WH/AL	U	F <sup>1</sup>	—	—	—
08/16/98	5	1581-66210	WH/LB/WH	DB1/AL	HY	U	—	—	—
04/20/00	5	1581-66212	WH/LB/WH	YE/AL	AHY	M	118	17.5	46.0
04/30/00	5	1581-66213	WH/LB/WH	DB2/AL	AHY	F	122	17.0	44.0
06/16/00	5	1581-66220	WH/LB/WH	PU/AL	~7d	U	—	—	30.0
06/16/00	5	1581-66221	WH/LB/WH	PK/AL	~7d	U	—	—	32.0
06/16/00	5	1581-66222	WH/LB/WH	AL/RE	~7d	U	—	—	26.0
05/16/01	5	1581-66229	WH/LB/WH	DG/AL	~7d	F <sup>2</sup>	—	—	24.0
05/16/01	5	1581-66231	WH/LB/WH	PK/AL	~7d	M <sup>2</sup>	—	—	22.0
05/10/02	5	1581-66230	WH/LB/WH	AL/YE	~7d	F <sup>2</sup>	—	—	26.0
05/10/02	5	1581-66232	WH/LB/WH	AL/DB	~7d	M <sup>2</sup>	—	—	27.0
05/10/02	5	1581-66233	WH/LB/WH	AL/LB	~7d	F <sup>2</sup>	—	—	24.0
05/12/03	5	1581-66237	WH/LB/WH	AL/RD	~8d	M <sup>2</sup>	—	—	21.0
05/12/03	5	1581-66238	WH/LB/WH	AL/PU	~8d	F <sup>2</sup>	—	—	25.0
05/12/03	5	1581-66239	WH/LB/WH	AL/DG	~8d	- <sup>3</sup>	—	—	25.0
05/12/03	5	1581-66240	WH/LB/WH	AL/LG	~8d	M <sup>2</sup>	—	—	25.0

<sup>1</sup> Initially banded as opposite sex but behavioral observations confirm sex.<sup>2</sup> Gender determined during fledge checks.<sup>3</sup> Chick did not survive to fledging.

## Historic Sites

### Route 460 Site (Sussex County)

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

Cavity tree status – None detected.

Bird status – No evidence of activity present.

### Route 608 Site (Sussex County)

Site Condition – The site was harvested in 2000, but has recently been purchased by a business partnership who have discussed the potential of restoring the site to longleaf pine. No information on the status of that proposal.

### Route 35 Site (Southampton County)

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

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

Bird status – No evidence of birds was detected on two visits to the site in 2003.

### Route 612 Site (Southampton County)

Site Condition – This site was harvested in summer 2003 by Virginia-Carolina Properties (VACAR) with the exception of 135 acres that surrounds the existing cavity tree. The harvest was carried out under agreement with DGIF and USFWS pending the resolution of an Incidental Take Permit application to harvest the remaining timber. The permit application was submitted in conjunction with a Habitat Conservation Plan prepared for VACAR by the Center for Conservation Biology. The plan proposes that the lone remaining bird be captured and transferred to Piney Grove upon approval of the permit, in addition to other habitat management assistance at Piney Grove.

Cavity tree status – The cavity tree appeared quite active with copious amounts of fresh resin exuding from resin wells when last visited in late October 2003. This cavity was a new cavity excavated in 2002 in a boundary pine on the edge of a forest stand approximately 120 meters south of the historic cluster site. The historic cluster site contained one abandoned cavity, one abandoned start cavity, and one cavity tree that had split at

the level of the cavity in a summer storm. There had been no evidence of activity at this site for over a year.

Bird status – A lone bird was observed working on resin wells at the new cavity tree on 18 August, 2003. A visit at dusk of that day turned up only the single bird going to roost. No other birds were detected. The tree still appeared quite active in late October suggesting the bird was still present at that time, although no dawn or dusk survey was conducted.

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

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

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

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



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**Appendix I. Piney Grove Field Observations - 2003.**

Cluster 1 Observations - 2003		
Date	Observer	Notes
2/25/03	B. van Eerden B. Watts  Cavity inspections	Tree 35 – Inactive Tree 36 – Inactive – no squirrels, flooding, or enlargement Tree 38 – Still a start cavity, not completed. Tree 39 – Active cavity, no water inside Tree 45 – Inactive, no flooding Tree 47 – Cavity not complete Tree 48 – Active, no flooding Tree 50 – Artificial cavity, some other species using cavity Tree 51 – Artificial cavity, standing water
4/16/03	D. Bradshaw	First bird out at 0640 and was SC OR/WH (left leg), DB/DB/WH (right leg) from tree #39. Did not detect the C1 red male emerging from tree #48, but within seconds after the SC bird emerged two other birds flew in from the southwest (from direction of C7 or C11) and joined up with the SC bird. They were the C1 red male and an unbanded bird. They foraged down toward the nest tree (#48), then crossed back over to the historical cavity trees at the far eastern edge of the stand, and then move to the south out of range. Departed site at 0715
4/23/03	D. Bradshaw	Set up at 0618 near tree #45. Heard birds immediately in the vicinity of tree #48 so it appeared that the two birds may have already emerged. Then at 0620 the SC male emerged from tree #39 and flew down toward #48. When I arrived there were 3 birds present, then a fourth bird arrived and ignited hostile interactions from the resident birds. Then at 0635 a fifth bird arrived from the southwest and joined the interactions, followed by a sixth bird a minute or so later. By 0640 there were 7 birds present and much chasing and vocalizing among all birds involved, all in the vicinity of the nest tree #48. I observed this activity for over half an hour and identified the birds as follows: C1 red male; C1 SC male; C3 DG/AL; C3 YE/AL; C3 AL/YE; unbanded bird, and C5 unidentified bird. I departed the area and moved out to check the status of some of the cavity trees to see how many appeared to be active and returned after another half hour (now 0735). I began to watch the birds again but now there were only 5 birds present, although they were still engaged in active territory disputes it appeared. I stayed with the birds until 0930 and they were still within 100 meters of the nest cavity when I departed. I was only able to identify 4 of the remaining 5 birds and they were the: C1 red male, the C1 SC male, the C3 YE/AL, and the C3 AL/YE. As I departed I noticed an adult Cooper's Hawk perched nearby. It flushed as I approached.
4/24/03	D. Bradshaw	Got set up between C7 and C11 at 0620. Within minutes a bird emerged from C7 and flew over my head bypassing C11 and heading toward C1. Waited until 0645 to be sure no other birds were coming by, then moved down to C1. When I arrived there were 4 birds present: C1 red male, C1 SC male, C3 YE/AL and C3 AL/YE. There was still much interaction and vocalizing between all birds. I stayed with the birds until 0915 when they departed to the southeast out of sight. I then moved back into the C3 cluster area and noticed a pile of RCW feathers laying approx. 5 meters west of tree #48. It included most of the primaries, secondaries, and tail feathers along with substantial body plumage, some of which harbored traces of blood and bits of flesh. I assumed this to be either the C3 unbanded bird or the C3 DG/AL breeding male, both of whom were present here the day before. I did not locate any skeletal remains or evidence of leg bands, and departed the area shortly thereafter.  Returned to C1 at 1700 and took up a position approx. 50 meters west of tree #48. Birds started moving in at 1850 coming from the southeast. The C3 AL/YE female spent time evaluating two potential roost cavities: #s 47 & 36. She peered ( <i>cont.</i> )

<b>Cluster 1 Observations(cont.) - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
4/24/03 <i>cont.</i>	D. Bradshaw	into # 36 a couple of times but did not enter. At 1920 the adult female (YE/AL) departed the area and headed toward C7. At 1925 the juvenile female headed out due west toward C6. The C1 red male pursued her out of sight. Five minutes later he returned with the C3 juvenile female, and directed her to Tree #36. She peered in again but did not enter. After a few minutes of jockeying around the tree she departed again. The male did not follow this time, instead moving to roost in #48. The SC male had roosted minutes earlier in #39. I departed at 1945.
4/30/03	D. Bradshaw	Moved down to C1 at 0730. Heard lots of vocalizing as I arrived to find 4 birds engaged in hostile interactions. The two resident males were chasing the C3 AL/YE female all through the cluster while the a C5 AL/YE juvenile female waited quietly on one of the cavity trees. This behavior continued until I departed at 0845. No other birds were observed.
5/20/03	D. Bradshaw	Arrived at 0550. Birds were already out. I located and identified 3 birds: C1 red male; SC male; and a juvenile female from C5, AL/YE. They foraged around the cavity tree cluster for about 10 more minutes then flew out of sight to the west. Departed the area at 0630.
6/5/03	D. Bradshaw	Arrived with the peeper and peeped the cavity tree (#48) at Cluster 1 at 0730. The female would not leave the cavity but it was clear that there was at least one chick present that appeared not more than 1 day old. There was also one egg that appeared to be "pipping" and one other unhatched egg. I departed the area immediately after peeping the cavity and heard one other bird in the area as I walked out.
6/12/03	Banding Team	Arrived with B. Watts (bander), Larry Lynch, B. van Eerden, Tim & Wanda Sanjule, and Bo Williams. Banded two young 8 days old: C1 AL/PU, C1 AL/LB. One young was almost twice the weight of the other.
6/23/03	D. Bradshaw B. Williams	Visited site with peeper to evaluate nest success. Peeped the cavity and found only one chick present, a male (AL/LB). The chick appeared to be within 2 to 3 days of fledging.
8/11/03	B. van Eerden  Cavity Inspection	Tree 46 – inactive, not climbed or peeped Tree 52 – inactive, interior dry/chips on floor, no squirrels, entrance not enlarged. Tree 51 – lightning strike, empty/some material inside, but inactive. Tree 50 – inactive, face plate needs putty, entrance blown out; 1 squirrel removed Tree 45 – dry, inactive(?); some material at base. Tree 35 – entrance ok, inactive (?), few resin wells; cavity incomplete. Tree 36 – inactive; face plate exposed, needs putty. Tree 48 – active, heavy resin flow; empty; fine materials at base. Tree 49 – no peep/climb. New tree – entrance ok; resin flow fresh; too tall for peeper/climbing Tree 37 – did not peep; cavity entrance suggests no new excavation work Tree 47 – incomplete cavity. Tree 39 – active, excellent cavity. Tree 38 – completed cavity; scattered small resin wells, dry interior; excellent cond.
<b>Cluster 1 Bird /Cavity Use Summary</b>		
<b>Birds Present During 2003</b>	<b>Tree/Cavity Use</b>	
DG/YE/DG – RE/AL	Present all year in cavity #48	
AL/OR – DB/DB/WH	Present all year in cavity #39	
WH/LB/WH – AL/YE	Present since May; cavity unknown, thought to be new un-numbered new cavity	
DG/YE/DG – AL/LB	2003 Fledgling; thought to use cavity #38.	

<b>Cluster 3 Observations(cont.) - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts  Cavity inspections	Tree 79 (lower cav) – advanced start, possible roost site Tree 79 (upper cav) – active Tree 1 – active Tree 2 – active Tree 3 – active Tree 4 – active Tree 7 – did not peep, appears active Tree 75 – not active Tree 74 – active
4/04/03	B. van Eerden T. SanJule	Tree 81 – dry, but stains inside suggest flooding Tree 82 – dry, with some active resin flow Tree 83 – fresh resin flow, dry, some sawdust inside Tree 84 – no resin flow, appears inactive
4/14/03	D. Bradshaw	Arrived at 0655. 4 birds working around cavity trees: C3 WH/AL, C3 PU/AL, C3 AL/RE, and Red/AL (right leg) – BK/YE/DB (left leg) Departed at 0715 after birds moved out to east. Other birds must have moved out earlier.
4/16/03	D. Bradshaw	Arrived at 1630 and set up down in the bottom between nest tree (#79) and trees 3 & 4. Could initially hear birds calling in muted tones toward C4, but they were just moving around in the forest still foraging. Birds could be heard only at a distance until 1800 when they finally started moving into the central cluster area. The first bird was seen at 1815 and was the C3 AL/RE. He roosted in the insert #2. A second bird moved out from the central area and over toward Tree #74. A third bird moved over to insert #1 but then regrouped with another bird in the central area and moved down toward C4. One of these birds, the C3 AL/PU bird stopped at C3 and appeared to roost there, but I could not confirm that. Another bird, the C3 WH/AL bird went on out toward the C4 inserts and was not seen again. A 4 <sup>th</sup> bird, the Gates County red female was seen with the others but it was not determined where she roosted. I did not detect any other birds although I suspect I observed more birds than I actually identified, but I did not see where they all went. As it neared darkness, I could still hear birds calling toward C4 but departed the area to avoid more disturbance.
4/17/03	D. Bradshaw	Arrived at 0620 to take a position between Cluster 4 and trees 3 & 4 in the bottom. At 0638 the first bird came out of C4 insert #83 and flew out into the middle of the cluster area and started calling. Approx. 30 seconds later, a second bird flew out of the crown of insert #83, apparently having been open roosting, and joined the first in the center of the C4 site. Seconds later a bird was heard emerging from either tree 3 or 4. Then at 0644 the two C4 birds flew out to the north toward the central area of C3 where BVE was stationed. I identified the two birds as the C3 WH/AL female and the Gates Co female. BVE said he detected his first bird emerging from one of the two trees in the bottom (#s 3 or 4). Immediately after that, a bird emerged from insert #2. Those two birds joined up and then met up with the two birds moving up from C4 that had just left me, and then all moved out to the east. As I was walking across to meet Brian, I noticed a RCW peering out of tree #3, which I believed to be the C3 AL/PU bird.  Brian and I then walked back down to that tree approximately 20 minutes later (now 0710) and tapped on the tree to find the bird still inside. It never departed while we were there. We departed and returned approximately 30 minutes later with the peeper to investigate for evidence of squirrels or flooding.

<b>Cluster 3 Observations(cont.) - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
10/25/03	D. Bradshaw	Arrived at C3 at 0815 and encountered birds moving back into the site from the east. Was able to confirm the presence of at least 6 C3 birds plus at least one foreign bird. At least 2 or 3 of the C3 birds were aggressively calling and chasing another bird out of the cluster area. I presumed this was probably one of the interlopers from C7. Visibility was poor so few ID's were made. Only confirmed individuals were an unbanded bird, the C3 breeding female from SC, and the C3 AL/DG fledgling from 2003.

### **Cluster 3 Bird /Cavity Use Summary**

<b>Birds Present During 2003</b>	<b>Tree/Cavity Use</b>
RE/DB/RE – DG/AL	Died April 23; formerly used Cavity #79-1 which was usurped by WBNU.
RE/DB/RE – YE/AL	Disappeared late April; formerly roosted in Cavity #83
RE/DB/RE – PU/AL	New breeding male; present in Cavity #3 all year
BK/YE/DB – RE/AL	New breeding female; unknown roost location; observed open roosting in #83
Unbanded bird	Present all year; observed roosting in #4 in late spring
RE/DB – LB/AL	Present all year; roosted in #74 prior to Isabel, current roost unknown
RE/DB/RE – WH/AL	Present all year; observed using insert # 82 in early spring
RE/DB/RE – AL/RE	Present all year; observed through spring; used insert #2
RE/DB/RE – AL/LB	2003 fledgling; no information on roost tree
RE/DB/RE – AL/PI	2003 fledgling; no information on roost tree
RE/DB/RE – AL/DG	2003 fledgling; no information on roost tree

<b>Cluster 5 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
4/14/03	D. Bradshaw	Got there at 0720 as van Eerden was wrapping up NNeck Audubon field trip. They left around 0745 with several birds present in the area. I identified C5 YE/AL; C5 AL/YE; C5 AL/DB; C5 AL/LB; C5 WH/AL; C5 LG/AL; C5 PforPU/AL; and unbanded. The white band on the breeding female is really coated in resin and almost appears as faded yellow. All birds moved west across the clearcut @ 0800.
4/22/03	D. Bradshaw	Arrived at 0615. First bird out of the nest cavity at 0620 then another couple of birds out of the line of 3 trees plus at least two other birds from outside the circle. After the initial emergence one bird returned to the nest cavity and went in. Eventually, the other birds all made their way over to the nest tree and peered inside for a few seconds each, before they all started making their way out of the cluster. However one bird remained in the nest cavity. Only birds identified were the Pink/Purple?? Bird, light green male, unbanded bird, and YE/AL bird from Tree 98. I departed the area at 0645.
4/24/03	D. Bradshaw	Arrived at 0615. First bird out of nest cavity at 0622. Then at least 5 other birds emerged in the cluster. After a few minutes of foraging, the C5 WH/AL bird returned to the cavity. She was spelled after 15 minutes by the LG male. After another 15 minutes, the WH/AL bird returned and stayed until I departed at 0715. Other birds arrived periodically to peer in from time to time. Other identified birds included unbanded, AL/DB, and YE/AL.
4/27/03	D. Bradshaw	Arrived at 0630. Birds were out and foraging nearby. At 0640 an unidentified bird departed the nest cavity and was replaced by the AL/WH female. All other birds departed the area and the female was still in the cavity when I departed at 0730.
4/29/03	D. Bradshaw	Arrived at 0600. Birds emerged at 0605. The unbanded bird emerged from the lower cavity in tree 97. The LG male and WH female switched places in the nest cavity a couple of times before 0700 with the WH female remaining after the other birds had moved off.
5/05/03	D. Bradshaw	Arrived at 0615. Birds were already out. Observed 6 visits to the cavity in the first 20 minutes by different birds. At least 3 of these appeared to be food deliveries. There was an approximate 15 minute lull, then another sequence of deliveries began. This time food items were clearly visible in most of the bills seen entering the cavity. Departed the site at 0700.
5/12/03	Banding Team	Ryan Speckman (bander) with Tim and Wanda Sanjule, Brian van Eerden, Jerry Guyant and others. Banded 4 healthy chicks: AL/RD; AL/PU; AL/DG/ AL/LG. The chicks appeared to be approx. 8 days old.
5/20/03	D. Bradshaw	Arrived about 1000 to see how close the nestlings were to fledging. The nestlings could be heard vocalizing in the cavity and there were numerous food deliveries from adults. Adults identified included: unbanded bird; the WH/AL breeding female; the LG/AL breeding male. Departed the area at 1020.
5/31/03	D. Bradshaw	Arrived at 0550. Birds had already emerged and departed the area. Walked down the trail toward the C4 inserts at 0615. Just past the C4 inserts on the trail I encountered 5 birds coming in from the north with lots of tail chasing and vocalizing. I identified 3 C5 birds (PU/AL, YE/AL + 1 unidentified) and 2 C3 birds (LG/AL + 1 unidentified) in the mix. They appeared to be engaged in aggressive territorial defense displays and this went on for several minutes. I observed the birds until 0715 then moved back out through the C5 cluster site and down toward 604 hoping to encounter the C5 fledglings with the other C5 adults. I did not detect any other birds and departed the site at 0745.



<b>Cluster 5 Observations(cont.) - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
6/5/03	D. Bradshaw	Arrived and set up at C5 at 0530. Birds emerged at 0540. Could determine at least 8 birds present at one time although unclear where they all emerged from. At least one bird came from the direction of C3 but from north of the known new cavities outside the circle. Adult birds identified included: PU/AL, YE/AL, LG/AL, WH/AL, and the unbanded bird. Fledglings observed and identified were the AL/RE (male); AL/LG (male) and the AL/PU (female). The fourth nestling (AL/DG) was not observed. The birds began foraging out to the northeast as far as the fire trail, then turned and moved back into the cluster site briefly. From there they moved out to the southeast toward C4 and then turned due south and away. I departed the area then at 0700 since the weather was deteriorating and I did not want to risk disturbing them further.
8/11/03	B. van Eerden  Cavity Inspections	Tree 23 – heavy resin flow; active; floor with small chips Tree 22 – heavy resin flow; active; could not peep; ht = 53 ft. Tree 24 – fresh resin wells; too tall to peep Tree 21 – heavy resin flow; woodpecker feathers covering floor Tree 93 – active; fresh resin wells; too tall to peep Tree 98 – active; fresh resin wells; large flakes (pieces of bark?) on floor; return and climb to confirm Tree 99 – dead Tree 94 – flooded Tree 97 – both upper and lower cavities appear active
9/22/03	D. Bradshaw	Isabel aftermath: C5-Tree 97 snapped at level of lower cavity; C3 -Tree 74 snapped at cavity, Tree 81 blown down.
11/04/03	B. van Eerden  Cavity Inspections	Tree 127 – cavity floor dry and clear Tree 136 – floor dry and clear; wasp on cavity floor Tree 191 – cavity dry and empty Tree 95 – squirrel All other trees in Cluster 5 beyond reach of peeper scope. In general, all cavities appear to be active and in good condition. No noticeable cavity enlargement observed. Several RCWs seen/observed foraging in cluster – no counts or Ids made.

### Cluster 5 Bird /Cavity Use Summary

<b>Birds Present During 2003</b>	<b>Tree/Cavity Use</b>
WH/LB/WH – LG/AL	Breeding male; observed periodically using #97-1 and #22
WH/LB/WH – WH/AL	Breeding female; observed periodically using #97-1, other cavities not known
Unbanded bird	Present all year; thought to be using #23
WH/LB/WH – YE/AL	Present all year; uses #98 primarily; has been observed using #20 also
WH/LB/WH – PK/AL	Present all year; unknown roost site
WH/LB/WH – AL/YE	Present through April; then moved to C1
WH/LB/WH – AL/DB	Present through spring; status unknown now
WH/LB/WH – AL/LB	Present through spring; status unknown now
WH/LB/WH – AL/RE	2003 fledgling; status unknown
WH/LB/WH – AL/LG	2003 fledgling; status unknown
WH/LB/WH – AL/PU	2003 fledgling; status unknown

<b>Cluster 6 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts	Tree 10 – large chunks of bark/plaster? Fungus? Tree 11 – active; heavy resin flow Tree 12 – fungus on floor? Tree 13 – acorns/pine seeds on bottom of floor
4/7/03	B. van Eerden	All cavities dry, in good condition. Cluster has at least 3 accessible roost cavities.
4/16/03	D. Bradshaw	Arrived at 0745, walked around and did not detect any birds. None of the resin on the cavity trees appeared very fresh. Departed the site and Piney Grove at 0830.
4/17/03	B. van Eerden	Tree 11 – shavings in cavity, with several acorn husks Tree 10 – Cavity floor clean except for what appears to be feces, possibly squirrel. Drove down to C6 at 0630. Thought I heard a bird, so I played about 30 seconds of
5/20/03	D. Bradshaw	RCW vocalization on a tape and the C1 SC male came in alone, from the west. I waited for a few minutes but no other birds arrived, so I departed the area at 0715. This occurred less than 10 minutes after this bird and the other two C1 birds departed C1 heading west at about 0622.
10/26/03	D. Bradshaw	Arrived on site at 0650. Sunrise was at 0720 and no birds emerged. However at 0718 two birds were heard approximately 100 meters to the north of the cluster site and were moving toward the site. These birds were determined to be a SC male (AL/OR-left leg; YE/YE/WH-right leg) and a SC female (AL/YE-left leg; DG/DG/LG-right leg). They never entered the cluster area, but stopped short, foraged around the loading dock there, then moved out to the northwest. I may have been inhibiting their access into the cluster area, so I departed the area immediately after they begin moving off so as not to disturb them further.
10/31/03	B. van Eerden	Cavity checks in this cluster yielded no squirrels, no water, and no evidence of RCWs. At @ 1630, two birds were heard coming toward the cluster from the southwest. The birds bypassed C6 and flew west toward C13.

<b>Cluster 7 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts	Tree 111 – dry floor, unknown object on floor; need to climb and inspect At @ 1715, a solitary RCW arrived from east, then departed at 1718
3/7/03	B. van Eerden	Tree 111 – Cavity dry, entrance not enlarged, fresh resin wells, scattered fine material on cavity floor; 1 wasp. Tree 110 – Cavity dry, entrance not enlarged; restrictor plate partly exposed. Replace w/ smaller diameter restrictor plate. Some bark chipping evidence. Tree 114 – Entrance enlarged to restrictor plate edge. Entire cavity needs to be replaced. Interior dry. Tree 112 – Entrance enlarged, but possible to build floor of entrance back up. Replace cavity restrictor w/ smaller diameter restrictor. Nuts/acorns in cavity – squirrel cache. Tree 113 – Entrance enlarged to restrictor plate. Replace cavity. Dense bedding suggests squirrel use.
4/17/03	B. van Eerden T. SanJule W. SanJule	Tree 110 – entrance to cavity repaired; putty applied to plate Tree 111 – 3 male flying squirrels removed from cavity. Cavity has fresh resin wells. Tree 113 – cavity entrance repaired with putty by Tim
4/23/03	D. Bradshaw	Arrived at 0940 after leaving C1. It appeared that three of the trees had signs of activity associated with them, but no birds were in the area at the time. I walked the trail that runs west from C7 back behind C3 and did not encounter any birds
6/20/03	D. Bradshaw	Walked down to C7 about 0640; turned up a bird emerging from Tree #113. It was the C3 AL/YE juvenile female from 2002. She spent about 35 minutes working on resin wells. At one time a bluebird arrived at the cavity and the RCW entered the cavity. The bluebird peered in a number of times and was greeted by hostile vocalizations from the RCW. After a couple of minutes, the bluebird departed the area and the RCW re-emerged and continued to work on the cavity tree. I departed the site at 0730.
8/11/03	B. van Eerden	Tree 111 – dry, inactive; loose material on floor. Tree 112 – dry, inactive; pine straw and loose twigs on floor. Tree 113 – sap flecks around base, face very active; entrance looks good. Tree 110 – wasp nest.
9/30/03	B. van Eerden	At 0720 a bird flushed from #113, and flew immediately west toward C3.
10/25/03	D. Bradshaw	Got set up at 0710 at position along the path behind the cavity trees. Two birds emerged simultaneously at 0736 from trees 113 and 111. The birds were identified as a SC male (AL/YE; DG/DG/MV) and the C3 AL/YE female from 2002. The birds moved quickly out of sight to the west toward C3.
11/04/03	B. van Eerden	No squirrels or water in any cavities. Tree 113 – active; lots of fresh resin flow Tree 111 – possibly active, some evidence of resin well activity Tree 110 – 6 wasps and 2 roaches observed in cavity Tree 112 – possible resin well work, but appears inactive Tree 114 – inactive

### Cluster 7 Bird /Cavity Use Summary

<b>Birds Present During 2003</b>	<b>Tree/Cavity Use</b>
RE/DB/RE – YE/AL	Roosted in #113 for brief period in late April before disappearing
RE/DB/RE – AL/YE	Arrived in May and has roosted reliably in #113
AL/YE – DG/DG/MV	Released in C6 on 2 October; now roosting in #111 at C7.

<b>Cluster 8 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts Cavity Inspections	Tree 170 – coarse, long chips; possible flying squirrel Tree 171 – same as tree 170 Tree 172 – 2 flying squirrels inside Tree 173 – standing water, tree with minor resin flow
11/04/03	B. van Eerden Cavity Inspections	Tree 170 – 1 squirrel Tree 171 – wasp nest inside Tree 172 – acorn husks on cavity floor Tree 173 – floor dark, possibly due to flooding in past

<b>Cluster 11 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts	All cavities inactive; cavity 142 flooded.
10/25/03	D. Bradshaw	Arrived just after sunrise; no sign of birds, or of bird activity on any cavity.
11/04/03	B. van Eerden	141 – squirrel nest material present; wood roaches observed 140 – dry; spiders in cavity 142 – dry; several chips and dead insects on floor 143 – dry and empty

<b>Cluster 12 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts	Tree 133 – standing water Tree 132 – dry, but 2 wasps on floor of cavity; probable nest in roof area Tree 131 – dry w/ feces Tree 130 – dry, some bark and wood chips on floor
5/20/03	D. Bradshaw	Drove over to C12 at 0745. Tree #121 & #122 both showed signs of relatively recent work, probably from early spring. Played the tape for a few minutes, but no signs of activity in the area. Departed the area around 0820.
10/31/03	B. van Eerden	Cavity checks on all 4 trees yielded no squirrels, no standing water (although Trees 131 and 132 could have had water recently), and no evidence of RCWs.

<b>Cluster 13 Observations - 2003</b>		
<b>Date</b>	<b>Observer</b>	<b>Notes</b>
2/25/03	B. van Eerden B. Watts	Tree 121 – active, dry interior, with dead bird ( <i>See Mortalities section</i> ) Tree 122 – active, dry Tree 123 – active, dry Tree 124 – dry, with wood chips.
5/20/03	D. Bradshaw	Arrived at 0700. Played 2 minutes of RCW vocalizations and detected no response.
10/31/03	B. van Eerden	Tree 121 – No squirrels, no water, no bird evidence; some possible squirrel nest material on the floor Tree 122 – No squirrels, water, or RCW evidence; nest materials on floor Tree 123 – RCW entered cavity at 1715. Only one RCW observed in cluster. Tree 124 – Cavity entrance enlarged; need to clean cavities; install new cavity.

### **Cluster 13 Bird / Cavity Use Summary**

<b>Birds Present During 2003</b>	<b>Tree/Cavity Use</b>
AL/OR – WH/WH/MV	Released in C8 in 2002. Found dead in C13 #121 on 2 February, 2003.
AL/OR – YE/YE/WH	Released in C11 on 2 October; seen near C13 later; roost sites unknown
AL/YE – DG/DG/LG	Released in C6 on 2 October; seen near C13 later; roost sites unknown
***	Tree # 123 harbored at least one bird as of late October, although no ID was ever made. Thought to be one of above two birds.

