

TECHNICAL REPORT

Fiscal Year 2001

ESTABLISHMENT OF A VIABLE POPULATION OF  
RED-COCKADED WOODPECKERS AT THE SAVANNAH RIVER SITE

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## INTRODUCTION

The U. S. Forest Service-Savannah River (USFS-SR), and the Southern Research Station began research on the red-cockaded woodpecker (RCW), (*Picoides borealis*), on the Savannah River Site (SRS) in 1985, with the objective of restoring a viable population. USFS-SR assumed sole responsibility for the monitoring of the RCW in 1998, as well as management responsibilities. This project is conducted in cooperation with the Department of Energy (DOE).

The program consists of a stabilization and an expansion phase. The stabilization phase (1985-1987) focused on preventing the extirpation of the RCW population. During this phase the number of breeding pairs of RCWs increased from 1 to 3, and the total population increased from 5 to 14 individuals. We are currently in the expansion phase (1987-present).

To promote population expansion of RCW at the SRS, several management strategies have been implemented. These strategies include the control of midstory vegetation, installation of artificial cavities, translocations of RCWs to SRS and within the population, installation of metal restrictor plates around cavity entrances, and banding of all RCWs. Additionally, squirrel excluder devices (SQEDs), and removal of the southern flying squirrel, (*Glaucomys volans*) during cavity inspections have been used to reduce interspecific competition with RCWs. For the purpose of clarity, 'group' refers to one or more RCWs in an area, and 'cluster' refers to a collection of cavity trees.

## ACCOMPLISHMENTS

### Habitat Improvements

Minimizing the amount of vegetation present in the mid-story of a cluster is essential, as RCWs will abandon the cluster if the mid-story becomes too thick. No RCW stands were treated with herbicide this year. About 150 acres were treated with a mechanical chipping machine. Finally, 9,408 acres of RCW habitat were burned in the dormant season, (from the end of January to the middle of March), and 2,452 were burned during the growing season, (the end of April to the beginning of August). This represents an effort to manage the woodpecker habitat more intensively with prescribed burning, relying less on herbicide use to control hardwoods and midstory, while stimulating herbaceous growth.

### Artificial Cavity Construction and Recruitment Stands

The availability of roosting/nesting cavities can be a limiting factor for RCWs. Due to the relatively young condition of the forests on SRS, there is a shortage of trees of suitable size and age for RCW use. This condition has led to the use of artificial cavities inserted into a mature pine tree so as to promote colonization of unoccupied habitat. USFS-SR has relied on artificial cavities in the past for providing roosting and nesting sites for the RCWs. The shortage of suitable cavities combined with the long time required for RCWs to excavate natural cavities posed a serious impediment to restoring this population. Artificial cavities provide immediate roosting and nesting sites for the birds to use, allowing them to concurrently reproduce and create their own natural cavities. A recruitment stand is a stand of trees that is managed for the woodpeckers, in an attempt to promote colonization of these sites. These stands typically include 4 artificial cavity trees, ready for RCW use.

New recruitment stands are in the process of being identified for construction in FY 2002. The sites are being selected based primarily on the quality of the existing habitat and their proximity to active groups, as well as to promote unification between the northern and southern sub-populations. No new recruitment stands were constructed this year, as it is a transition year as we begin to implement the experimental design for Dr. Jeffery Walters' current research. An analysis of population dynamics, and GIS data representing RCW cluster locations, was performed by Walters of Virginia Polytechnic Institute and State University. Walters concluded that the "growth was limited by the inability of non-breeding birds to locate breeding vacancies, including vacant recruitment clusters". An experimental analysis of this hypothesis is proposed for the next five years, to determine whether the transition from non-breeding bird to breeding status is limited by the relative location of recruitment clusters to existing groups. This study will attempt to demonstrate that strategic recruitment stand location can adequately promote natural colonization, and thus reduce or eliminate the need for translocations, thereby reducing management efforts and cost.

Only four artificial cavities were constructed this year. Two were added to existing recruitment stands to compensate for trees that had died, or were otherwise unsuitable for the woodpeckers. The other two were added to a natural cluster discovered this spring, (26.16), which had one natural tree with two cavities, one of which had an enlarged entrance. Three artificial cavity trees died this year. Three new natural cavities were created by the woodpeckers, and two new cavities were completed on start trees. There are 79 natural cavities in 66 trees, 60 additional start trees, and 352 functional artificial cavities (Table 1).

All RCW clusters were inventoried for cavity and start trees in the spring. The trees were given a new number and mapped for the GIS database using GPS coordinates. GIS coverage assigned cavity height, aspect, species of tree, etc. to each tree. It was decided that the trees which were no longer being

monitored, due to a change in the suitability of the habitat from when they were first identified (in some cases, 20-30 years ago), or trees that no longer had any sign of RCW activity should not be included in the inventory. These tree were dropped from the inventory, thus resulting in a change in the continuity of the data. We felt this was justified to more accurately represent the current condition.

The destruction of cavities by other species has decreased dramatically with the use of metal cavity restrictor plates. The plates fit around the entrance, such that they prohibit larger woodpeckers from enlarging the entrance. Enlarged entrances make cavities less desirable, or unuseable by the RCWs. Six restrictor plates were added to natural cavities when signs of enlargement were first noticed, effectively preventing them from being enlarged further. As a result, these cavities are still being used by RCWs. Restrictor plates are standard equipment on all new artificial cavities.

#### Southern Flying Squirrel Control

Southern flying squirrels are removed and destroyed when found in RCW cavities during cavity inspections. We continue to climb each cluster, as well as perform group observations, every other month. In 2001 we conducted 1,918 cavity checks in 82 clusters, resulting in the removal of 369 flying squirrels (Table 2). 101 flying squirrels were removed from natural cavities and 268 were removed from artificial cavities.

#### Group Observations and Reproduction

SRI personnel spent hundreds of hours observing RCW groups in 2001. During the 2001 breeding season, the SRS population consisted of 30 breeding pairs (a group of birds that laid at least one egg), and a total of 110 adults (Figure 1). Thirty-nine groups were active (1.00, 2.00, 3.00, 5.00, 15.00, 16.00, 18.00, 19.00, 19.00A, 20.00, 20.50, 22.14, 23.05, 23.44, 24.01, 24.04, 24.05, 24.17, 24.32, 24.33, 25.18, 25.43 (formerly 25.21), 26.16, 27.33, 28.00, 28.04, 30.00, 30.26, 30.82, 39.00, 40.00,

43.00, 55.20, 79.06, 80.28, 80.49, 82.42, 82.106 (formerly 82.44), and 82.107) during the breeding season of 2001 (Table 3). All groups contained at least one pair of birds, with the exception of 30.26 and 55.20, which consisted of a lone male and lone female, respectively. Of the thirty-seven pairs of birds, seven (23.44, 24.01, 24.32, 26.16, 27.33, 30.82, 82.107) failed to nest. Twenty-seven groups successfully fledged at least one young this year. Twenty-five groups were successful on their first nesting attempt (1.00, 2.00, 5.00, 15.00, 18.00, 19.00, 19.00A, 20.00, 20.50, 22.14, 24.04, 24.05, 24.17, 25.18, 25.43, 28.00, 30.00, 39.00, 40.00, 43.00, 79.06, 80.28, 80.49, 82.42, 82.106); two groups were successful on their second attempt (3.00, 24.33). No groups attempted to reneest more than twice. One group was unsuccessful after attempting to nest once, (23.05), and two groups failed two attempts, (16.00, 28.04). All young in the SRS population were banded in the nest, and identified to sex, with the exception of two young in 80.28 that were not banded, and one young in 82.106 that was not sexed.

A total of 71 young were banded in the nest, 53 of which fledged, resulting in a mean reproductive rate of 1.77 fledglings per nesting pair. This measure of reproductive success is lower than previous years, and may reflect the fact that 11 birds moved into breeding positions in established clusters, and six more bred for the first time. In addition, the number of helpers in the population dropped to 7, down from 21 in 1999 and 11 in 2000. These data suggest a dispersal trend for the 2000 breeding season, in which there was a reorganization of primary birds, (helpers and breeders) among a significant number of groups. This led to the creation of new groups, with lower reproductive rates within groups. This was most likely due to inexperience with breeding, reduction of helper assistance, or a combination of both. The number of fledglings declined from 56 in 2000 to 53 in 2001, (Figure 2). The number of fledglings plus the number of adults brings the total population size to 163 individuals, down from 166 last year. Lower reproductive rates may be associated with the drought conditions experienced this year.

Compared to previous years, reproductive effort was down as represented by the number of nesting attempts, and number of eggs laid (35 and 95 respectively, in 2001, compared to 44 and 125, in 2000). This was particularly pronounced in the northern subpopulation, and may be related to formation of new groups, and population expansion. The northern subpopulation had only 16 groups successfully breed, out of 25 potential breeding groups, as opposed to 11 out of 12 in the south. Although overall, reproduction was higher in the northern subpopulation, providing 29 of the 53 fledglings, the number of fledglings per breeding group, was 2.2 for the south, as opposed to 1.6 in the north. Furthermore, the number of fledglings per *potential* breeding group was 2.0 for the south and 1.2 for the north. In addition, of the seven helper males identified in 2001, only one of 26 groups in the north had a helper male, (about 4%), whereas 6 of twelve groups, (50%) had a helper male in the south. On the other hand, all of the new groups for 2001 were in the northern subpopulation, (one in the eastern area of the site, between the north and south). Number of groups is the recognized parameter or metric used to measure RCW populations. Even though reproductive numbers may be down slightly, the number of groups increased at a rate of 15% from last year. The increase in numbers of groups should result in a rebound in reproductive numbers in the near future.

The time spent climbing trees, banding young, and observing RCW groups provides USFS-SR staff with valuable data on the RCW population at SRS. These data provide information on age, reproductive status, cavity usage, and population trends in mortality, immigration, and emigration. It is critical information for planning future translocations. These intensive research and management activities have been instrumental in expanding the RCW population at SRS.



## Translocations

Translocations have been an important factor in the stabilization and growth of the RCW population at SRS. Translocations serve to introduce males to recruitment stands where it is hoped they will establish a territory. In addition, they are used to pair a juvenile female with an unpaired male which has established a territory. Translocations from other forests not only allow for the possibility of new territory formation and the creation of pairs, but also maintains a diverse gene pool. Two of the seven birds translocated from Brosnan Forest in 1999 successfully bred in 2001. In addition, two of the six birds moved from the Carolina Sandhills Nation Wildlife Refuge (CSNWR) last year have been located in two of the new groups formed this past year, (27.33 and 30.82). It is hoped that these birds will breed in 2002, and continue to expand the genetic diversity at SRS. No additional translocations from other populations are planned, or expected any time in the future due to the growth of the RCW population on SRS, as we have exceeded the number of groups to be considered as a recipient population by the U. S. Fish and Wildlife Service (USFWS). In addition, in accordance with Walter's study plan, no translocations will be planned within the SRS for the next two years, with the exception of pairing females with unpaired males, as necessary. This issue has been relatively insignificant, as there has only been a couple of lone male groups over the past couple of years. Currently, there is only one lone male group which we will target for translocation, assuming that a female does not move into the cluster on her own.

## Survival, Gender, and Demographics

The sex ratios of the total population and of fledglings are of interest in evaluating the reproductive potential of the population and in determining the number of translocations that may be conducted within the SRS population, and from other populations (Figures 2 & 3). The sex ratio of

fledglings was significantly different in 1988 and 1998, when females outnumbered males, and in 1993, when males were more prevalent than females. The sex ratio this year was again skewed in favor of females, with 20 males, and 32 females, and one unknown.

#### Photodocumentation

All RCW stands were digitally photographed in August and September as a means of documenting their condition. A photograph was taken facing north, south, east, and west from the nesting tree in active clusters, or from the most centralized tree in recruitment stands. This data serves as a benchmark, and will be used to make management decisions and document habitat improvement of the RCW stands over time.

#### **PLANS FOR FISCAL YEAR 2002**

The primary focus for fiscal year 2002 will be continued habitat and population management to promote expansion of the RCW at SRS. We will leave the squirrel excluder devices, (SQEDs), in the active groups where they have been constructed, and evaluate their success. However, squirrel removal will now be carried out only in half of the active groups, and then only during the breeding season. We will attempt to determine the need for passive or active squirrel control at this site by comparing reproductive success between the groups with squirrel control, and without. Ongoing observation activities and banding are essential for monitoring the population status at SRS. USFS-SR staff will continue to create artificial cavities in active clusters, and establish new recruitment sites until the population goal has been reached. The study being conducted by Dr. Jeffery Walters is under way with experimental and control recruitment stands having been identified. According to Dr. Walter's study plan eight control and eight experimental recruitment sites have been identified. The control recruitment stands will be located at least 2 kilometers from an active cluster, and the experimental recruitment

stands will be between 500 meters and 2 kilometers from at least three active clusters. Five control and experimental recruitment stands will be located in the north, and three of each will be in the south. Four additional recruitment clusters will remain open, as they are considered captured clusters. Captured clusters may be used by some individuals of an active group, but are too close to active clusters to be considered suitable recruitment clusters. All other recruitment clusters will be screened off for use. The recruitment clusters that are screened over will continue to be managed for habitat, and may be opened in the future, as needed. Once the total site population reaches 40 groups we will increase the total number of recruitment stands to ten control and ten experimental.

The long term goal for SRS is to become a secondary core population. This would require the SRS to support 250 groups. The USFWS expects this goal to be met by the year 2037, assuming a 10% rate of growth. Secondary core populations provide gene flow into a primary core population, and act as a reserve in the event of a stochastic event, such as a hurricane or disease outbreak. 418 groups are expected to be able to survive on the SRS, assuming all potential habitat is utilized. We will continue the implementation of the revised SRS RCW management plan. The primary differences from the previous plan include a shift in RCW management area delineation, the establishment of a RCW supplemental management zone which will provide some management flexibility, and longer timber rotation within the RCW management zone.

Table 1. Summary of cavity availability from 1990-2001.

Year	Number of Artificial cavities	Number of Natural Cavities	Number of Natural Starts
1990	33		
1991	48		
1992	101		
1993	151		
1994	195	116	
1995	245	111	
1996	292	120	
1997	285	137	
1998	302	77 *	58 *
1999	309	87 *	62 *
2000	345	97*	67*
2001	352	79 <sup>+</sup>	60 <sup>+</sup>

\* = Includes inactive clusters that are not checked on a regular basis. This data is drawn from SRI records, and is not consistent with previous Southern Research Station data, and records.

+ = Includes only trees with visible sign of RCW activity, and those trees which are actively monitored.

Table 2. Summary of flying squirrel removal, and cavity inspections from 1990-2001.

Year	# of flying squirrels removed	# of cavities inspected	# of flying squirrels removed from:		
			natural cavities	artificial cavities	nest boxes
1990	110 (12 months)	900	N/A	N/A	N/A
1991	94 (12 months)	1300	35	54	5
1992	120 (10 months)	1500	34	70	16
1993	142 (10 months)	1600	38	97	7
1994	187 (6 months)	1449	32	135	20
1995	527 (13 months)	4594	82	435	15
1996	731 (12 months)	4492	148	583	
1997	712 (12 months)	4944	122	590	
1998	878 (12 months)	4152	182	696	
1999	375 (12 months)*	2424	55	320	
2000	284 (12 months)*	1758	67	217	
2001	369 (12 months)*	1918	101	268	

Note: Nest boxes were put up to facilitate the removal of flying squirrels. The use of nest boxes was discontinued after 1995.

\* = These data were collected on a bi-monthly schedule over the entire year.

Table 3. Red-cockaded woodpecker production by group and year, Savannah River Site, South Carolina.  
Numbers represent the number of male/female fledglings.

\*, + denote clusters of a solitary male/female adult respectively

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Group	Northern Subpopulation											
1.00					1/1	1/2	1/2	1/1	1/2	2/1	3/0	0/2
2.00	1/1	1/1	0/0	2/1	0/1	2/0	1/0	1/1	0/3	3/0	0/1	2/0
3.00	0/0*	0/1	0/2	3/0	1/1	0/0	1/2	2/1	0/2	1/0	2/1	1/1
18.00			0/0*	0/2	1/2	0/0	0/0	0/0	1/2	1/1	0/1	1/0
19.00	1/0	1/1	2/1	2/1	1/2	2/2	1/2	1/0	0/0	1/1	0/3	1/1
19.A											0/1	1/0
20.00									0/0	0/2	1/2	0/2
20.50										0/0*	0/0	0/1
22.14									0/0+	0/0+	0/0	1/0
23.05									0/0	0/2	0/2	0/0
23.44										0/0	0/2	0/0
24.01								0/0	0/0	2/1	0/1	0/0
24.04						2/0	1/1	1/1	2/0	1/2	1/1	0/2
24.05		0/0*	0/0	0/0	1/1	2/0	0/0	2/1	1/2	3/0	1/1	1/1
24.17											0/0	1/0
24.32												0/0
24.33							0/3	0/2	0/1	0/0	1/1	0/1
25.18N										0/0		
25.18						0/1	1/1	1/0	0/0	0/0*	1/1	1/1
25.43						0/1	0/0	1/1	1/2	2/1	1/1	0/3
26.16												0/0
27.33												0/0
28.00	1/1	0/0*	0/0	0/0	1/1	1/1	1/2	1/1	1/0	1/2	0/1	1/0
28.04									0/0	0/1	1/1	0/0
29.37							0/0*					
29.55								0/0*				
30.00									0/0*	0/1	0/2	0/2
30.26											0/0*	0/0+
30.82												0/0
	Southern Subpopulation											
5.00	1/1	1/1	0/0	1/0	1/1	2/0	3/0	1/1	1/2	1/0	1/2	0/1
15.00						1/1	2/0	1/1	1/1	1/3	2/1	1/2
16.00	1/1	0/2	2/1	1/1	3/1	2/1	1/1	1/1	0/0	1/2	0/1	0/0
39.00		0/2	1/1	1/2	2/1	0/2	1/1	1/1	1/2	0/3	0/0	0/2
40.00	0/0*			1/1	0/2	0/2	2/2	1/2	0/2	2/2	1/0	2/1
43.00			1/2	3/0	4/0	2/1	2/2	2/1	1/1	0/2	3/0	2/2
79.06						2/0	0/0	0/0	0/3	0/1	2/1	1/2
80.28					1/1	1/2	3/1	1/0	2/1	2/0	1/1	0/2
80.49											0/0	1/1
82.42							0/0*	0/2	1/1	0/1	3/1	1/1
82.106							0/2	2/1	0/1	0/0	0/0	0/1/1?
82.107										1/0	1/0	
84.17								0/0*				
Totals	5/4	3/8	6/7	14/8	17/15	20/16	21/22	21/19	14/28	24/30	26/30	19/32/1?

Figure 1. Number of RCW Groups at the Savannah River Site

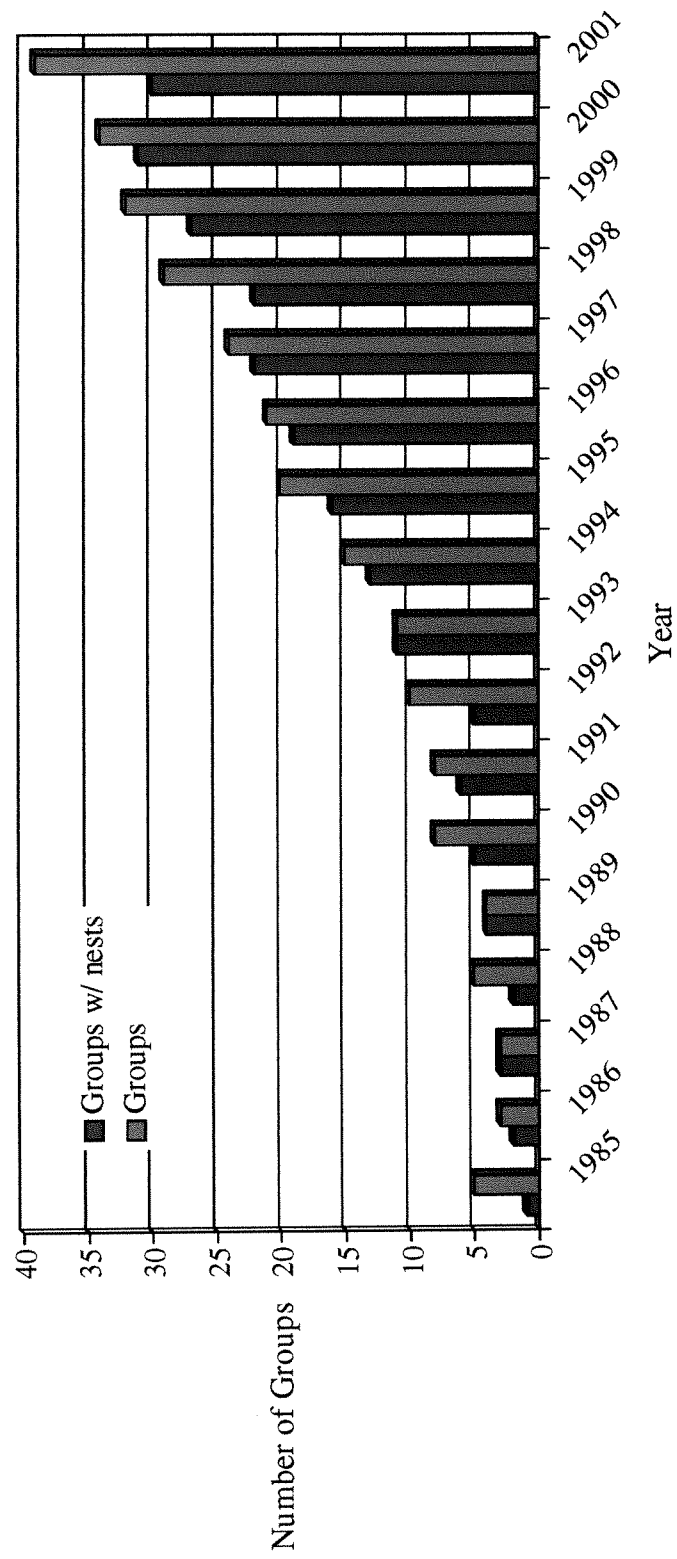
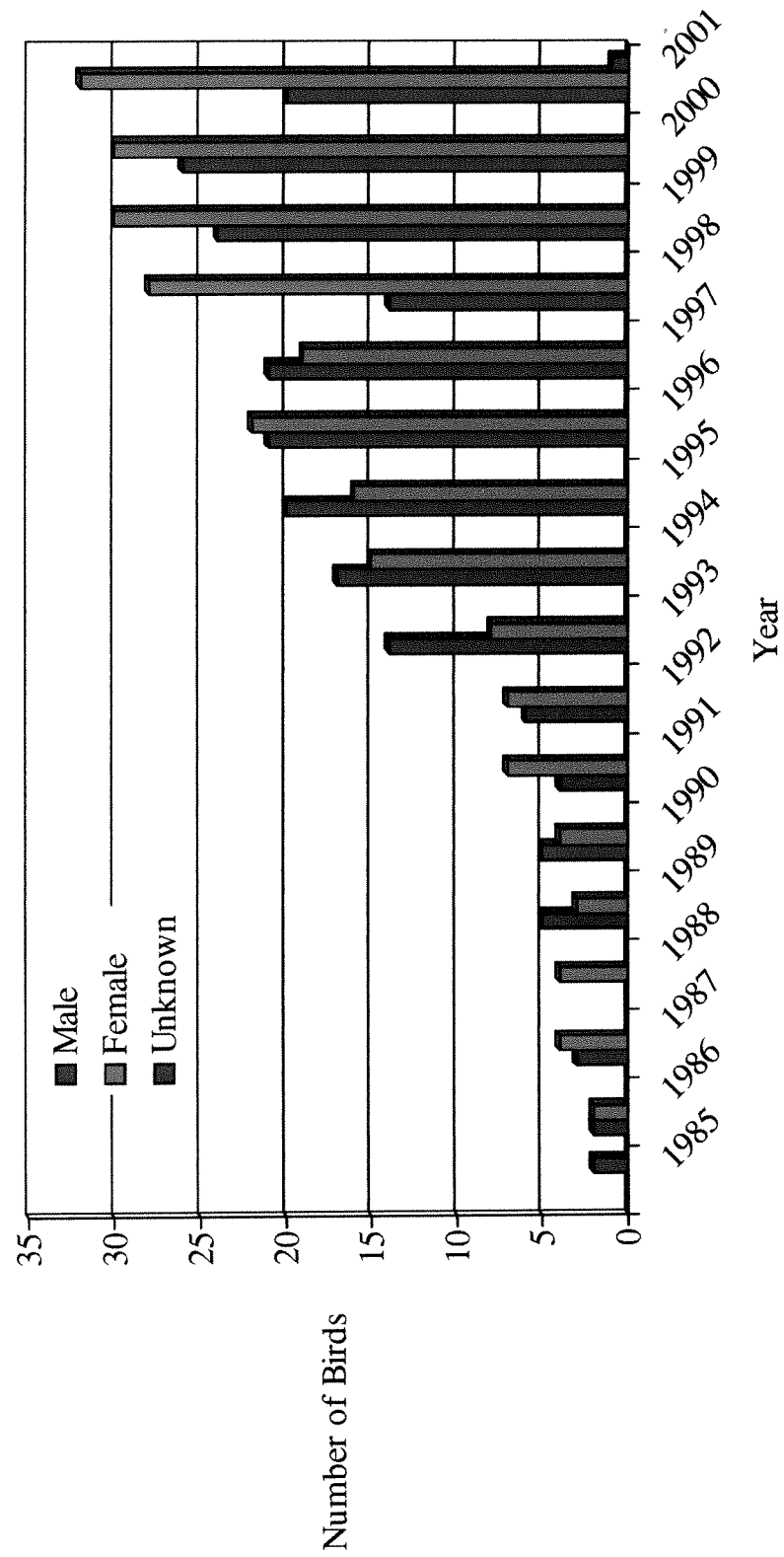


Figure 2. Number of Red-cockaded Woodpecker  
Fledglings at the Savannah River Site





**Figure 4. RCW Clusters and Management zones on the Savannah River Site**

