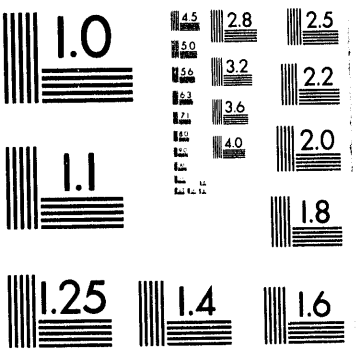
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ANNUAL REPORT

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

Department of Energy, Savannah River Site

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Program Summary to Date

In 1985 the Southeastern Forest Experiment Station (SEFES) in cooperation with the Department of Energy, the Savannah River Forest Station (SRFS) and the Savannah River Ecology Laboratory (SREL) initiated a research/management program to restore a viable population of red-cockaded woodpeckers (RCW) to the Savannah River Site (SRS). We managed to stabilize the population in the first couple of years through an intensive flying squirrel removal project as well as augmentation of female RCW's to the SRS population. By 1987 we had increased the number of breeding pairs from 1 to 3 and brought the population to a total of 14.

We are now in the expansion phase of the project. This phase is strongly dependent on habitat enhancement by both the SRFS and SEFES. As old age pine stands are cleared of hardwood midstory by the SRFS, we excavate cavities for the RCW's which seems to promote population expansion. Four excavated cavities are presently being used in 2 different colonies. Neither of these colonies would probably be active without the excavated cavities. By August 1990 we had increased the number of breeding pairs to 5 and the number of active colonies to 7. Currently, there are 25 RCW's on SRS in 7 colony sites:

1. An adult pair, an auxiliary male, and a fledgling male and female in colony 2.
2. A yearling male in colony 3.
3. An adult pair, a helper male and a fledgling male and female in colony 5.
4. An adult pair, a helper male and a fledgling male and female in colony 16.
5. An adult pair, and a fledgling male in colony [illegible].
6. An adult pair, and a fledgling male and female in colony 28.
7. A probable pair (1 male and 1 unknown) in colony 40.

Genetic surveys conducted by Peter Stangel of SREL revealed that small populations of RCW's can be subject to reduced genetic variability. However, his

results also indicated that the SRS population does not exhibit indications of genetic deterioration.

Since April of 1986, we have continued to remove flying squirrels from RCW cavities. Over the past several years we have intensified our efforts in both the frequency in which we remove squirrels and the number of cavities we inspect for squirrel removal. Since April 1986 we have removed a total of 487 flying squirrels from RCW colonies. The loss of one RCW nest may have been attributed to flying squirrels. Fortunately those birds renested.

The SRFS has implemented habitat improvements in active and inactive colony sites and in recruitment and replacement (R and R) stands. The number of R and R stands designated has greatly increased in the last year. A combination of mechanical removal of hardwoods, commercial and noncommercial thinning, broadcast herbicide, herbicide injection and burning have all been used to reduce hardwood midstory. The treatments have been working well. All active colonies and many inactive colonies and R and R stands are devoid of a hardwood midstory.

In 1990 we have focused our efforts on:

1. Developing a cavity excavation method and excavating cavities in suitable habitat.
2. Flying squirrel control.
3. Translocation of RCW's.
4. Monitoring clan composition and reproduction.
5. Identification of old-growth stands with the potential of providing new nesting habitat to support population expansion.
6. Surveying lands near SRS where RCW's were thought to exist.

The following report summarizes activities for FY 1990 and plans for FY 1991.

RCW Cavity Excavation

The cavity excavation project was initiated to promote RCW population expansion. Population expansion is extremely rare in RCW's. In fact, it has only been documented in one case. The major obstacle seems to be a lack of

suitable nesting habitat with cavities. Red-cockadeds use old age trees to make cavities for nesting and roosting. In many places, even where suitable nesting habitat occurs in the form of R and R stands, RCW's are reluctant to colonize. This is probably because of the relative long length of time it takes a bird to construct a cavity (several months to several years). However, RCW's recolonize abandoned or inactive colonies much more readily, especially if the cavities are unaltered by competitors and the habitat is clear of a hardwood midstory. Our intent was to see if we could promote population expansion by excavating high quality cavities in inactive colonies and R and R stands.

Our excavation techniques went through several phases. We already knew that an artificial cavity on the outside of a tree would meet with limited success. We attempted this in 1987 and 1988 and only had one cavity used in 4 active sites. In early 1989, after experimenting with several techniques on the Clemson forest, we cut 5 cavities in inactive colonies on SRS using a chainsaw. For this method, we used wood to build back the outer portion of the hole, leaving an entrance tunnel for access to the cavity inside. This technique was known as the 2 x 4 technique and was quite promising. The first RCW that dispersed to an inactive colony chose an excavated cavity to roost in. This technique did however have drawbacks. The cavities could only be constructed in old growth trees with a large amount of heartwood. If there was too little heartwood, sap would leak into the cavity creating a dangerous situation for the woodpeckers. Furthermore, even on some trees that appeared to have sufficient heartwood, small amounts of sap would seep into the cavity. The tree must also be large in diameter. The concern is that these trees may snap at the cavity in high winds. One of these trees did get blown over in a large tornado that ran through the colony, but the tree did not break at the cavity. Another tree nearby with an excavated cavity withstood the wind when many trees around it did not.

The next phase of cavity excavation involved cutting an 8" x 4" x 6" (height, width, depth) hole out of the tree with a chainsaw and then inserting a

prefabricated cavity of exactly that dimension into the hole. This insert would preclude sap from getting in the cavity. These cavities can be excavated in any age tree with any heartwood/sapwood ratio. The only restriction is the tree must be at least 14"-17" in diameter at the height of the cavity. It is not yet known if we can attract RCW's to relatively young stands where cavities have been excavated, but this may be a strong asset of the method. We do not feel that this technique replaces the need for old growth stands or hardwood control in RCW management.

Last September, just before we were to start excavating more cavities on the SRS, hurricane Hugo hit the coast of South Carolina and destroyed 87% of the active RCW cavities on the Francis Marion National Forest (FMNF). The FMNF had contained one of the 2 largest populations of RCW's left. We used the cavity excavation technique developed at SRS at the FMNF where we excavated 279 cavities. Approximately 55% of those cavities are now being used by RCW's, and 32% of RCW colonies with inserts had nests. As we excavated these cavities on the FMNF we were able to fine tune the technique in a way not possible with the small sample size of cavities to be put on the SRS. We are now making all inserts 2" deeper as a result of information passed on by SEFES personnel on the FMNF.

From December 1989 to February 1990 we excavated 28 more cavities on the SRS. All but one of these were in inactive colonies or R and R stands but near active colonies. The last one was excavated in active colony 28. Generally 2 or 3 inserts were put in each site. Table 1 describes where all excavated cavities were placed and the condition of the colonies/R and R stands.

Five excavated cavities have been used by RCW's for roosting. Four are being used now in 2 different colony sites. Both these colonies were inactive before the cavities were excavated, and one of the colonies may well represent another breeding pair. All cavities were worked by the RCW's and sap flows on the trees as if the cavities were natural.

We are now working on a Forest Service publication to describe the cavity excavation technique. We receive many inquiries about the technique and the publication is meant as a user manual so the technique can be even more widely applied.

Translocations and Reproduction

In FY 1990 we translocated 5 RCW's. One was moved within the SRS. One was brought to the SRS from Fort Bragg, and 3 were brought to the SRS from the FMNF.

In December 1989, a juvenile female from colony 19 was captured and translocated about 13 miles to colony 5. Colony 5 contained a breeding male and his 2 juvenile male offspring. The past breeding female was lost earlier last year. The introduced female was initially chased off by the resident males. She soon started to roost in a nearby inactive colony and by March was seen roosting in colony 5 and associating with the breeding male. Just as breeding appeared eminent, she was found dead, stuck to the sap on a natural cavity tree. Fortunately, there was still time for a female (which we had moved from FMNF) to pair and breed with the male in colony 5.

In March 1990, a yearling female from Fort Bragg, NC was translocated to colony 28 which contained a 3 year old bachelor male. An initial pair bond seemed to form very quickly. However, this female was soon displaced by a probable older female which we moved from the FMNF.

In March and April 3 female RCW's were translocated from the FMNF to lone males on the SRS. One was released in colony 2 which contained a past breeding male. These two mated and fledged 2 young this year. The other 2 females were released in colonies (3, 43) containing yearling males. Both these introduced females eventually left the young males, then paired and mated with older, more experienced males in colonies (28, 5) nearby. Each of these pairs also fledged one male and one female.

On SRS a total of five clans bred and fledged young this year. Nine young were produced (5 males, 4 females). There are now 7 active colonies. The

youngest active colony (40) gained its active status in April when a young male from colony 2 moved 13 miles to take residence in inactive colony 40. Two months later an unbanded immigrant to the SRS population began roosting in colony 40 also. This is the first time since the SEFES has been working on the RCW project on the SRS that we have attracted a bird from off the site. The sex of the immigrant is still unknown but behavior by the birds suggests it to be a female.

A major effort is being made to keep inbreeding to a minimum. Although colony 16 contains a half sibling pair, this is the only known inbreeding to occur on the SRS. We are now working very closely with Dr. Susan Haig of the U. S. Fish and Wildlife Service to prevent genetic degradation of the SRS population. Dr. Haig has developed a complete pedigree of the SRS birds. She is also genetic fingerprinting each bird. This information along with her extensive knowledge of genetics and conservation biology will aid us in many decisions (especially translocations) in the future.

Flying Squirrel Control

Flying squirrels continue to be a major problem. Cavities are inspected each month and squirrels are removed from active colonies as well as inactive colonies and R and R stands near active colonies (Table 2). In FY 1990, 110 squirrels were removed from cavities. One active RCW cavity was usurped by a flying squirrel this year, and one clutch of eggs may have been destroyed by squirrels.

Although results are not final, Dr. Susan Loeb (SEFES) is obtaining some very worthy information on squirrels. It now seems clear that flying squirrels prefer small entrances to cavities and do not seem to be inhibited by sap flow on the tree. Dr. Loeb has also indicated that preliminary results show flying squirrels to have an avoidance (nonpreference) of open pine stands that lack a significant hardwood component.

Unfortunately, we do not have a good method for flying squirrel control. Hardwood removal seems to be our best tool. Removing squirrels from cavities

keeps most squirrels out of active cavities and generally reduces their numbers in the colony sites. However, this is a very labor intensive method. We will continue our search for other ways to control squirrels and continue removing them from cavities until a better method is available.

Stand Treatments by SRFS

Three colonies (5, 15, 16), 2 of which were active, were burned this year for a total of 204 ac. These burns were on the same day and were quite hot. Hardwood control was excellent. Approximately 234 ac were treated with herbicide in colony sites and R and R stands. One hundred acres are planned for mechanical removal of hardwoods and much has already been accomplished. Where applied, a combination of the above treatments has been very successful.

The SRFS (particularly Glen Gains, Wildlife Biologist) has done an exceptional job of selecting key R and R stands. Twenty-four new stands (585 ac) have been selected. Most of this acreage is high quality RCW habitat in locations near active colony sites. Our new cavity excavation technique can be used in these stands to promote population expansion.

RCW Populations Near SRS

The small pockets of RCW's north of SRS that have existed in the past have apparently been lost. Until last year there was one male RCW that resided on the Midland Valley Golf Course and at least one clan of RCW's in a residential section in Aiken on or near Kalmia Street. Surveys in these areas showed no birds present. The Creek Plantation just south of SRS off Hwy 125 also showed no signs of RCW's. However, several other private plantations within 20 miles of the southern border of SRS show promise.

In May and June we visited the best of these prospects. Groton Plantation contains 23,000 ac of fields, swamp and pine stands, much of which is old growth. The pine stands are managed primarily for quail hunting. Most pine stands are burned every year. Hardwoods in these stands are injected with herbicide.

Thirty-nine active colonies were located. Since some of the area was not covered, we estimate a total number of active colonies to be about 45. Of 21 clans observed, 16 nests were found indicating good reproduction. Although no banded birds were seen, there may be some genetic exchange between the SRS and Groton populations. The immigrant RCW in colony 40, for example, could well be from Groton. The more genetic exchange the SRS population receives, the less likely it is to exhibit effects from genetic degradation.

Plans for FY 1991

The primary focus in 1991 will continue to be promotion of population expansion. We will continue to excavate cavities for RCW's in colony sites and R and R stands as management efforts (hardwood control) make those stands suitable. We will concentrate on stands within 3 miles of active colonies. This may also aid in attracting RCW's from off the SRS such as the occurrence in colony 40.

Juvenile red-cockadeds generally do not begin roosting in cavities until late summer, fall or even winter. Mortality rates are highest among these juveniles who roost in the open. Often, one reason young RCW's do not begin roosting in cavities earlier may be a simple lack of suitable cavities. This year we plan to begin excavating cavities in all active colonies which do not contain at least 5 suitable cavities. If we can entice these birds into cavities before winter, we may increase survivorship in this critical period. Survivorship data from the last several years will be compared to the next 2 years to determine if cavity excavation in active colonies increases survivorship of juveniles.

Further modifications of the insert technique will be looked into. We wish to examine the possibilities of inserts with removable faces to allow access to the nests. We currently have no method for marking or moving RCW eggs. Better access to the nests would open possibilities of translocating eggs, hatch order studies, as well as making it easier to band nestlings.

Clan composition and reproduction will be monitored on a continuing basis. Translocations from within the site and from other forests will continue as opportunities arise. Dr. Haig's work will be used to aid us in decisions on translocations. We have been most successful moving unpaired females to males over one year old that have established territories. Other translocations will be attempted on an experimental basis. Unfortunately, the FMNF woodpecker population is in a rebuilding phase so we have lost the convenience of that donor population. We have, however, made arrangements with Region 8 of the Forest Service to obtain RCW's from another large population (probably the Apalachicola National Forest) if needed.

We will continue monthly removal of flying squirrels from colonies 1, 2, 3, 5, 6-43, 15, 16, 18, 19, 28, 30, 39 and 40 as well as excavated cavities in R and R stands 46, 48, 49 and 51. In addition, any newly excavated cavities will be inspected monthly and all squirrels will be removed.

Habitat conditions at all active and inactive colony sites will be inspected. Recommendations of habitat improvements will be made as appropriate. Recommendations for selection and management of R and R stands will also be made when appropriate.

Metal cavity restrictors have been quite successful in keeping the RCW cavities from being further enlarged. Since RCW's do not seem to be reluctant to use restricted cavities, we will continue to put restrictors on cavities which are being enlarged. Excavated cavities will be monitored closely as candidates for restrictors since these cavities are easily enlarged by competitors. Any active cavities restricted will be monitored to make sure the RCW's do not reject the restrictors. Other methods of renovating enlarged cavities will be studied. If a promising technique is found, we will implement the technique on SRS and monitor the use of those cavities by RCW's.

Table 1. Location of excavated cavities and condition of site on the Savannah River Site, South Carolina.

| Colony or R and R Stand | No. and Type of Cavities Excavated | Condition of Site Prior to Excavation |
|---|---|---|
| C-28 | 1 insert | Active, 5 enlarge cavities |
| C-1 | 2 inserts | Inactive, 1 partially enlarged cavity |
| C-3 | 1 2x4<br>2 inserts | [a]Inactive, no cavity trees remain |
| C-6-43 | 2 2x4[b]<br>3 inserts | [c]Inactive, 5 enlarged cavities |
| C-15 | 1 2x4<br>2 inserts | Inactive, 2 partially enlarged cavities |
| C-18 | 2 inserts | Inactive, 2 enlarged cavities |
| C-30 | 2 inserts | Inactive, 1 enlarged and 3 partially enlarged cavities |
| C-39 | 1 2x4<br>2 inserts | Inactive, 1 enlarged cavity |
| C-40 | 2 inserts | [a]Inactive, 1 partially enlarged cavity |
| RR-46 | 2 inserts | Inactive, no cavities |
| RR-48 | 3 inserts | Inactive, 1 partially enlarged cavity |
| RR-49 | 3 inserts | Inactive, no cavities |
| RR-51 | 2 inserts | Inactive, no cavities |

[a] These colonies are now active as a result of cavity excavation.
[b] One of these trees was blown over in a tornado. The tree did not snap at cavity height.
[c] This colony was active as a result of cavity excavation, however, the bird has since dispersed to colony 2.

Table 2. Number of flying squirrels removed from RCW colonies from October 1989 through August 1990 on the Savannah River Site, South Carolina.

| Active Colony | Natural Cavities | Excavated Cavities | [a]Artificial Cavities | Squirrel Boxes | Total |
|---|---|---|---|---|---|
| 2 | 0 | - | 0 | 1 | 1 |
| 3 | - | 1 | - | - | 1 |
| 5 | 6 | - | 0 | 0 | 6 |
| 16 | 16 | - | 0 | 0 | 16 |
| 19 | 12 | - | 1 | 2 | 15 |
| 28 | 7 | 7 | 0 | 0 | 14 |
| **Inactive Colony** | | | | | |
| 1 | - | 0 | - | - | 0 |
| 6-43 | 4 | 6 | 1 | - | 11 |
| 15 | 6 | 7 | 0 | - | 13 |
| 18 | - | 1 | - | - | 1 |
| 30 | 7 | 0 | 0 | 0 | 7 |
| 39 | 0 | 10 | - | - | 10 |
| [b]40 | - | 0 | - | - | 0 |
| **R and R Stands** | | | | | |
| 46 | - | 0 | - | - | 0 |
| 48 | - | 4 | - | - | 4 |
| 49 | - | 11 | - | - | 11 |
| 51 | - | 0 | - | - | 0 |
| Total | 58 | 47 | 2 | 3 | 110 |

[a] All but 2 artificial cavities were removed from colony sites by Jan. 1990.

[b] Colony 40 was inactive for most of the year.

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