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Experimental Reintroduction of Red-cockaded Woodpeckers

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The Red-cockaded Woodpecker (*Picoides borealis*) is an endangered species endemic to the pine forests of the southeastern United States (Jackson 1971). Deforestation and habitat alteration have severely affected Red-cockaded Woodpecker populations; current populations are isolated and most are declining (Jackson 1971, Lennartz et al. 1983, Conner and Rudolph 1989, Costa and Escano 1989). The species has been extirpated from significant areas of suitable or potentially suitable habitat.

The cooperative-breeding social structure (Ligon 1970, Walters et al. 1988) and the dependence on the availability of adequate roost and nest cavities (Walters et al. 1992) strongly influence the biology of the species. A direct consequence of this social structure in remnant populations is the demographic collapse resulting from the failure of or extended lag time involved in the natural replacement of breeding individuals. This effect becomes increasingly severe as individual woodpecker groups become more isolated in the declining populations (Conner and Rudolph 1989). Potentially, the recently available techniques of artificial cavity construction (Copeyon 1990, Allen in press) and translocation of first-year adults (DeFazio et al. 1987) have provided managers with the ability to minimize this problem. A major void in management procedures is the current lack of a technique to artificially establish woodpecker groups and populations *de novo*.

Previous efforts to relocate Red-cockaded Woodpecker breeding pairs met with limited success (Odom et al. 1982, Jackson et al. 1983). The recent improvements in cavity-construction techniques and experience in translocating individual birds convinced us that it was time to revisit the issue of the reintroduction of breeding pairs to vacant habitat.

An inactive cluster of cavity trees on the Davy Crockett National Forest in eastern Texas was chosen for the attempt. The site had been inactive for about two years. The site contained two natural cavities. One had a metal restrictor to reduce the enlarged entrance (Carter et al. 1989), and the other was a single artificial cavity (insert type). Cavity competitors, flying squirrels (*Glaucomys volans*) and Red-bellied Woodpeckers (*Melanerpes carolinus*), were removed as necessary before and during the reintroduction. Resin wells were reopened using a wood chisel prior to introduction of the birds.

The chosen site was approximately 3.5 km from the nearest woodpecker group, which consisted of a breeding pair and a helper male. All three birds were color banded, and the helper had joined the pair during the previous six months. The helper male was known to have visited the reintroduction site at least once prior to the reintroduction. Due to the familiarity of this helper male with the site, we elected to use him as the reintroduction male. The reintroduction female was a bird of unknown origin associating with a male/female pair on the Davy Crockett National Forest. Eight additional clans were located within 10 km of the reintroduction site.

Standard translocation techniques (DeFazio et al. 1987) were employed. Briefly, the birds were netted from their roost cavities, transported in mesh cages, and placed in a natural cavity (male) and insert (female) on the night of 17 February 1991. The respective cavity trees were approximately 20 m apart. Wire mesh was tacked over the entrances to contain the birds until dawn. A nylon cord attached to the mesh allowed the birds to be released by a person stationed at the base of each cavity tree. The birds were released simultaneously at dawn on 18 February.

The birds immediately established vocal and visual contact, and remained in the immediate area for approximately 30 min. During this period, vocalizations and following behavior were similar to that which we have come to associate with successful translocations of juvenile birds to an established mate. It started to rain at this time, and we left the site. The two birds returned to the site on the evening of 18 February and roosted in the immediate vicinity, but not in the cavities. The birds were next checked on the evening of 20 February. The female was still present and roosted in the open. The male had returned to his original group and was roosting in his original cavity.

Rather than relocate the male a second time, or depend on his voluntary return, we decided to obtain a second male. During the night of 21 February, we translocated a juvenile male (fledged 28 May 1990) from his natal group on the Angelina National Forest, Texas. The male was released from the introduction cavity shortly after the female became active on the morning of 22 February. Due to the distance (150 m) between the roost site of the female (still roosting in the open) and the introduction cavity for the male, they did not make contact before the female left the area to forage. On the evening of 22 February, both birds returned to the cluster of cavity trees. Their behavior resembled that of an established pair. They eventually roosted in the open that night.

Due to the reluctance of the birds to use the available cavities, two additional artificial cavities (inserts) were installed on 25 February to provide additional roosting options. On the evening of 28 February, two of the new inserts exhibited signs of use; one and possibly both birds roosted in these inserts.

Subsequent roost checks verified that the two birds continued to roost in the inserts. Behavior appeared normal and, on 18 May 1991, the birds were incubating three eggs in one of the inserts. On 26 May nestlings were being fed. A single male fledged in June. We consider this initial attempt at reintroduction a complete success. In fact, this pair of birds also fledged at least one offspring in 1992.

A number of observations follow from this effort. The choice of a nearby male familiar with the new site and probably more than one year of age may have been a mistake. Combined with the failure of attempts in Texas to translocate a juvenile female to an extraterritorial roosting male in hopes of establishing a new breeding pair, it appears that older helper males may be resistant to this type of manipulation. Also, it is possible that the proximity of the male's prior cavity tree and/or the reluctance of the male to use the available roost cavities may have been factors.

A second successful attempt to reintroduce a pair of Red-cockaded Woodpeckers was carried out on 5 February 1992 on the Sabine National Forest. Both birds used in this attempt were fledged the previous spring, a female from the Angelina National Forest and a male from the Davy Crockett National Forest. The site chosen was an abandoned cluster site with unusable cavities. Two inserts were installed prior to the reintroduction. After release, the birds were not seen at the cluster, but they apparently remained in the area. On 23 April 1992, two inserts were active and the birds were present at the site. Logistical limitations prevented determination of any breeding activity.

The implications of a viable reintroduction technique are apparent. Given a sufficient donor population, such a technique provides the option of reintroducing Red-cockaded Woodpeckers to currently unoccupied habitat once the basic habitat requirements are present. It also provides a method of increasing the viability of existing small populations by the strategic placement of additional breeding units to reduce isolation within these populations (Conner and Rudolph 1989) and, thus, to increase directly the population size. We suggest that donor males be obtained from groups of sufficient size so that at least one potential helper male remains.

Walters et al. (1992) have demonstrated that new groups will become established under certain circumstances if artificial cavities are provided. Population size and isolation of sites may influence the success of their technique. In situations where their technique is not feasible, the ability to establish new groups by reintroduction will be of value.

In the case of reintroductions to vacant habitat, we strongly support the use of simultaneous multiple reintroductions. The simultaneous reintroduction of 5 to 10 pairs in a spatial array dense enough to permit social contact of adjacent pairs could immediately result in the establishment of at least a partially functioning population. This could then serve as a nucleus for future population growth by both natural and artificial means.

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Specific Status and Nomenclature of *Hemitriccus minimus* and *Hemitriccus aenigma*

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Zimmer (1940) described *Hemitriccus aenigma* based on two specimens from the east bank of the lower Rio Tapajós in Amazonian Brazil. In the same publication, he considered *Snethlagea minima* Todd, 1925 to be a subspecies of *Snethlagea minor,* without mention of having examined Todd's series. Todd (1925) described *Snethlagea minima* from 12 specimens collected by Samuel Klages on both banks of the lower Rio Tapajós, comparing it with a series of *Snethlagea minor* from the same and nearby localities. Since Zimmer (1940), *minima* has usually been treated as a weakly defined subspecies of *minor.*

I recently examined those series used by Todd in describing *minima* at the Carnegie Museum of Natural History (CM). The specimens include representatives of two species. One of these is a population of *Hemitriccus minor.* It is represented in the series Todd examined by 15 specimens at the Carnegie Museum, and 7 others since exchanged to other museums (examined and confirmed by Kenneth Parkes). The holotype of *Snethlagea minima* (CM 77082), a male from Itaituba, on the west bank of the Rio Tapajós, and three other specimens (CM 77702, 77879, and 78150) are examples of the taxon that Zimmer called *aenigma,* based on comparison to a specimen (MZUSP 47086) that I had previously compared to the type and paratype of *aenigma.* Hence, under the rule of priority, *Euscarthmornis aenigma* Zimmer, 1940 becomes a junior synonym of *Snethlagea minima* Todd, 1925, and the species now should be called *Hemitriccus minimus.*

Hemitriccus minimus differs from *minor* in having strong yellowish edgings to the coverts, forming a double wingbar, compared to the dull greenish edgings to the coverts in *minor.* Other plumage characters distinguishing *minimus* include sharper, darker streaks on the throat, dark centers to the much longer crown feathers, and obvious pale yellow edgings to the inner remiges contrasting with nearly plain outer remiges. *Hemitriccus minimus* also has a distinctive wing formula, shared with *H. zosterops,* in which the outer secondaries are slightly longer than the inner primaries, rather than slightly shorter than the inner primaries as in *minor* and other *Hemitriccus* (Zimmer 1940). In addition, male *minimus* have a substantially shorter wing (42-45 mm, $n = 5$) and tail (30-33.5 mm) than male *minor* (wing 48-55 mm and tail 38.5-43.7 mm, $n = 26$); females of the two species, however, have approximately the same wing and tail length. Two female specimens of *minimus* have wing measurements of 41 and 42 mm, and tail measurements of 29 and 30 mm, all within the range of female *minor* (wing 39-45 mm, tail 28.3-32.7 mm, $n = 14$). Finally, *H. minimus* has nostrils like those of most other species in the genus, elongate and placed near the base of the bill with feathering reaching the proximal edge. *Hemitriccus minor* has odd external nares; these are round and placed farther out on the bill, a millimeter or more from the end of feathering. On the basis of this character, *minor* was placed in the monotypic genus *Snethlagea* (Berlepsch 1909) until it was moved to the expanded genus *Hemitriccus* and treated as a subgenus by Traylor (1979). Because *minimus* lacks this distinctive nostril configuration, it properly belongs in the subgenus *Hemitriccus.*

Although Zimmer apparently did not examine any of Todd's material, he concluded that the type (a male) was a missexed female of *Hemitriccus minor,* overlooking the similarity of its measurements to his *aenigma.* Since Todd's (1925) description was based on a mixed series of *minor* and *minimus,* it was somewhat misleading and may have contributed to the initial confusion. Todd correctly described the strong yellow