

Preservation of Red-Cockaded Woodpecker Habitat

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Ever since 1973, when the Endangered Species Act came into being, conservationists and private landowners have been debating over whether to preserve the habitats of many endangered species found in unprotected areas (Ligon et al, 1986). Increasing levels of human development has led to the cutting of old-growth forests and construction of roads and other physical barriers to wildlife. These activities have greatly contributed to the fragmentation of wildlife habitat, which has had detrimental effects on the population structure and survivorship of the affected area's indigenous species. One species that has been affected by habitat fragmentation is the red-cockaded woodpecker (*Picoides borealis*), a nonmigratory bird with a home range covering most of the southeastern United States (Roise et al, 1990). Habitat fragmentation has led to the loss of genetic variability, nesting sites, and suitable population sizes to support cooperative breeding requirements. These factors have been responsible for the precipitous decline of the red-cockaded woodpecker. Because the red-cockaded woodpecker provides important ecological and economic benefits to both humans and the environment, we should strongly consider enacting a conservation plan for this species.

The red-cockaded woodpecker, an inhabitant of mature pine forests and pine-grassland ecosystems from Maryland to eastern Texas, has had a troubled history within the last decade (Roise et al, 1990). Ten years ago, James documented a population decline in America's largest remaining red-cockaded woodpecker population (1991). Of the 2,157 clusters, or living groups, contained in national forests, 693 of them were located in Florida's Apalachicola National Forest (James, 1991). Shortly later, the U.S. Fish and Wildlife Service (USFWS) estimated that 500 clusters is the criterion for woodpecker population viability based on genetic considerations (Reed et al, 1993). However, Bonnie points out that only 6 or 7 national forests, including

Apalachicola, have enough land to support 500 clusters. From this, it seems no surprise that smaller red-cockaded populations are experiencing precipitous population declines.

Never before has the need for a conservation plan been greater. Habitat fragmentation has taken a toll on woodpecker populations in three ways. The first problem is genetic isolation. As Stangel and others explain, fragmentation of large sections of pine forests have led to the creation of island habitats inhabited by isolated woodpecker populations (1992). Because the populations are geographically isolated, no genetic exchange can occur between them. This lack of genetic exchange can increase the likelihood of extinction among these isolated populations through the loss of heterozygosity, a measure of a population's ability to evolve in response to changing conditions (Stangel et al, 1992).

The two other problems stemming from habitat fragmentation involve reproductive inhibition, as described by Ligon and others (1986). First, the availability of nesting sites is reduced when mature longleaf pine forests, the primary habitat of red-cockaded woodpeckers, are cut down. The lack of nesting sites means that these birds cannot find a place to reproduce, leading to eventual extinction of affected populations. Second, the isolated woodpecker populations resulting from habitat fragmentation often do not contain enough individuals for cooperative breeding (Ligon et al, 1986). Breeding pairs feed and look after their young with the help of non-breeding birds, and if there are not enough woodpeckers available, then the survivorship of the offspring declines due to inadequate care (Bonnie, 1997). All three of the above changes in this species' population structure have been greatly responsible for its continuous population decline.

Preservation of red-cockaded woodpecker habitat has its benefits and disadvantages, as determined from reading several sources on this subject. However, as we will show later, many

of the disadvantages can be substantially reduced. Reasons why we should preserve woodpecker habitat include 1) the preservation of important ecological benefits provided by woodpeckers, and 2) woodpecker habitat preservation may actually aid a region's economic growth rather than hinder it. However, we might not want to preserve woodpecker habitat if 1) current conservation attempts often cause greater ecosystem changes than they correct, and 2) habitat conservation causes conflicts with timber management regimes considered optimal for pine production. However, if these disadvantages can be lessened, then there should be little resistance against enacting a conservation plan for the woodpecker.

Red-cockaded woodpeckers play an important role in the maintenance of longleaf pine forests by keeping its insect prey populations in check. Prey consists of wood-boring insect larvae, beetles, grubs, ants, crickets, caterpillars, scales, bark lice, and grasshoppers (USGS, 2000). Woodpeckers help to control possible infestations of herbivorous insects, many of which can severely damage trees or other vegetation if their populations were left unchecked. Maintaining the population of woodpeckers will therefore alleviate the costs for pest control of these infested trees. In general, by allowing red-cockaded woodpeckers to continue maintaining the health of their ecosystem, we prevent having to deal with any new cleanup or restoration costs. This is both an ecological and economic benefit that these woodpeckers provide for us.

Preserving woodpecker habitat can also lead to economic growth. As described by Bonnie, the "Safe Harbor" program in the Sandhills region of North Carolina has provided a cost-effective solution to landowners who want to lessen the costs of preserving woodpecker habitat on their property (1997). Although these landowners must often forego profits from timber or development to protect their habitats, landowners who increase the woodpecker population on their property can sell "safe harbor rights" to other landowners who wish to exploit their

woodpecker habitat. By allowing the population to increase in one area and decrease in another, the total woodpecker population will be protected from further decline, and landowners will receive the economic incentive of selling safe harbor rights to others. Bonnie's example demonstrates that woodpecker conservation plans do not have to be economically detrimental to be effective (1997).

Now that we have addressed the benefits, we will now address the economic disadvantages of preserving woodpecker habitat. One important disadvantage stems from the fact that we are uncertain of how to increase woodpecker population without sacrificing the welfare of other species. Two general approaches toward preserving woodpecker habitat have been identified from several sources—*protection* and *restoration*. Woodpeckers are protected in many national forests, but the limited number and size of national forests means that many populations are still subject to habitat fragmentation. Protecting these birds by creating new national forests carries a high economic impact by limiting human expansion into those areas (Lancia et al, 1989). This is a problem that pine foresters currently face; the acreage of woodpecker habitat cannot be increased without reducing timber production (Roise et al, 1990).

Restoration of an endangered species' habitat can also have negative economic impact. Often, changing the ecosystem to benefit one species can lead to a decline in the populations of other species, which may lead to a greater overall preservation cost. For example, Wilson has described how wildlife stand improvement (WSI), a common woodpecker restoration practice, has affected other bird populations in a detrimental and costly way (1995). During WSI in Arkansas' Ouachita National Forest, midstory and codominant trees were cut down, and routine fires were set in order to create a pine-grassland ecosystem. While the populations of red-cockaded woodpeckers increased, an unanticipated side effect of this restoration was an increase

in the number of brown-headed cowbirds. Cowbirds are common nest parasites in the southeastern US, and their population increase has led to the population decline of many songbird species. This is an example of how restoration can sometimes be quite costly, since its outcome is an even greater number of species that require protection. However, if we developed a better understanding of the interspecies relationships within a stand of wilderness, then restoration may not be such a costly disadvantage (Wilson, 1995).

Despite the environmental and economic disadvantages of habitat preservation described above, we should still preserve the woodpecker's habitat because there are ways to reduce the disadvantages. One might believe that this is impossible to do without great economic costs. However, careful reflection will show that habitat conservation plans are not necessarily economic detriments, since carefully-designed ones can actually *benefit* the economy. The development of "safe harbors" in the Sandhills region of North Carolina demonstrated that we *can* limit the economic costs of protection to a value that will not stifle economic growth (Bonnie, 1997). Coupled with the benefits of keeping red-cockaded woodpeckers alive and thriving, we have a clear-cut reason to enact a conservation plan for this species.

There are both advantages and disadvantages to conserving the red-cockaded woodpecker's habitat, but if the disadvantages can be mitigated, then it makes sense to enact a habitat conservation plan. Although isolated populations of woodpeckers have been rapidly declining, we know that even the most vulnerable populations can recover if careful conservation and population planning is undertaken, with respect to short- and long-term effects of demographic, genetic, and environmental change on the population (Haig et al, 1993). Will the red-cockaded woodpecker survive through the 21st century? The prognosis for its survival seems optimistic, but only if we take the steps to enact a conservation plan *now*.

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