

# *Trading Habitat Patches for the Red-Cockaded Woodpecker: Incorporating the Role of Landscape Structure and Uncertainty in Decision Making*

## **Background:**

On and around military installations, habitat trading has emerged as a useful tool for mitigating habitat fragmentation and its associated impacts on training, management costs, and conservation benefits. Habitat fragmentation, in particular, has slowed recovery of red-cockaded woodpecker (RCW) populations. A scientifically defensible habitat trading system that incorporates parameters such as the patch's location in the landscape, the history of the landscape, and the natural history of RCW populations would improve estimations on how habitat fragmentation affects RCW metapopulations. Such estimates could then be used to compare various management alternatives and improve the utility of habitat trades.

## **Objective:**

The objectives of this project are to (1) conduct a feasibility study on a tradable permit system for RCW habitat that mitigates the effects of fragmentation; (2) examine the cost effectiveness of having the Department of Defense (DoD) pay landowners for habitat protection in perpetuity; and (3) identify the most cost-effective allocation of RCW habitat that ensures long-term stability.

## **Process/Technology Description:**

A spatially explicit population model (SEPM) will be constructed by assimilating existing data on habitat preferences, demography, behavior, and population genetic structure of the RCW. A model describing the growth and succession of longleaf pine forests also will be integrated with the SEPM to estimate the role of forest management for persistence of RCW populations. The demographic-genetic SEPM will be integrated with landscape equivalency analysis (LEA), landscape-scale approach to resource-based compensation, to estimate spatially explicit credits that may be traded. LEA uses metapopulation services to analyze tradeoffs between economic and conservation goals set at different spatial scales. LEA will calculate tradable credits based on proportional changes in three metapopulation service flows (abundance, genetic variance within breeding groups, and genetic variance among breeding groups). The approach will direct the trading of habitat patches within an endangered metapopulation to minimize the effects of fragmentation. The uniqueness of this approach lies in the ability of LEA to incorporate the unequal contribution of habitat patches and areas between patches to each metapopulation service flow. Land parcels providing optimal

habitat and key linkages in the landscape will be assigned a higher conservation value. Landowners who contribute or could contribute greatly to metapopulation services would benefit from protecting or restoring habitat if a market for habitat credits were established.



**Habitat fragmentation has slowed recovery of RCW populations.**

## **Expected Benefits:**

Exploring threatened and endangered species protection from a landscape perspective will allow DoD to achieve species conservation goals while maintaining military readiness. This project specifically will aid recovery of the endangered RCW through a comprehensive approach that incorporates regulatory requirements, landscape ecology, and resource economics, ultimately resulting in reduced conservation management costs and training restrictions. (Anticipated SEED Project Completion - 2007)

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