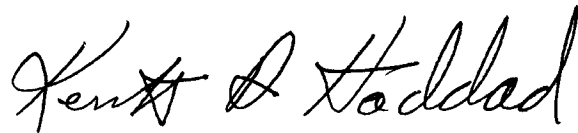


MANAGEMENT PLAN
RED-COCKADED WOODPECKER

Picoides borealis

Approved:

A handwritten signature in black ink that reads "Kenneth D. Haddad". The signature is written in a cursive style with a horizontal line underneath it.

Kenneth D. Haddad
Executive Director
August 8, 2003

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MANAGEMENT PLAN

RED-COCKADED WOODPECKER

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) proposes to reclassify the red-cockaded woodpecker, *Picoides borealis*, as a Species of Special Concern pursuant to the procedural requirements embodied in Rule 68A-27.0012, Florida Administrative Code (F.A.C.) (Appendix 1). The FWC also proposes to prohibit the take, harassment, possession, sale, or transport of red-cockaded woodpeckers and their eggs, nests, or dens (i.e., cavities) except as authorized by permit from the executive director, with such permits being issued for activities that further the goals and objectives of this management plan. Collectively, these rules provide a legal basis, at the state level, to (1) continue the prohibition of direct take imposed under the species' existing designation as Threatened, (2) regulate impacts related to management, monitoring, and research activities, and (3) authorize incidental take under such programs as Safe Harbor or approved Habitat Conservation Plans (HCP) if they further the goals and objectives of the management plan.

This management plan provides the framework for conserving and managing the red-cockaded woodpecker in Florida and includes (1) an assessment of the threats responsible for the species' apparent status as a Species of Special Concern, (2) a clear statement of the conservation goal and objective targeted by the management plan, and (3) the conservation actions, FWC regulations, and incentives believed necessary to achieve the stated goal and objective. A monitoring plan for assessing future status, an implementation strategy for the management plan, and areas for future research also are included.

The FWC conservation goal for the red-cockaded woodpecker is to secure and maintain a stable or increasing Florida population at a level above the threshold defining a Species of Special Concern. Based on the premise that Florida will continue to represent at least 25% of the range-wide population, the conservation objective is to secure and maintain at least 1,349 potential breeding groups (1,686 active clusters) in Florida by the year 2020 and beyond. To facilitate achievement of the stated goal and objective, conservation actions will focus on 6 geographically discrete management units and the 17 metapopulations identified therein (Figures 1-7).

This management plan fulfills the requirements of Rule 68A-27.0012, F.A.C. (Appendix 1), which went into effect June 29, 1999. The listing process for red-cockaded woodpeckers was initiated in September 2001 by FWC acceptance of a valid petition for listing action (Appendix 2). FWC staff reviewed the status of the red-cockaded woodpecker relative to Florida's listing criteria (Appendix 3) and summarized the results in a Final Biological Status Report (Appendix 4). Based on that report, in January 2002, the Commission determined that listing the red-cockaded woodpecker as a candidate for Species of Special Concern designation was warranted

and directed FWC staff to develop a management plan for the species. This document fulfills that directive pursuant to Rule 68A-27.0012, F.A.C. (Appendix 1). Consideration of the management plan by the FWC was scheduled for the November 20-22, 2002 Commission meeting, but subsequently was postponed until the September 3-5, 2003 meeting.

Public comments and outside review were formally solicited and incorporated at several junctures during the listing process (Appendix 5). Public comment periods were noticed in the Florida Administrative Weekly (1) to solicit information on the biological status of the red-cockaded woodpecker to be considered during the development of the Final Biological Status Report, (2) to solicit information on the conservation needs of the red-cockaded woodpecker and any economic and social factors that should be considered in its management, and (3) to solicit public input on the Draft Management Plan, including any information regarding the anticipated regulatory economic and social impacts of management plan implementation. Public comments also were heard at the September 5–7, 2001 FWC meeting, when the petition to initiate the listing process was presented, at the January 23-25, 2002 FWC meeting, when the results of the biological status assessment were reported, and at the September 3-5, 2003 FWC meeting when the management plan and associated rule changes were considered by the Commission.

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SPECIES MANAGEMENT PLAN

INTRODUCTION

The red-cockaded woodpecker (*Picoides borealis*) is a small bird (19.0-21.6 cm [7.5-8.5 in] in length) with a black cap and nape, black and white barred back, white underparts, and large white cheek patches. A territorial cooperative breeder, the red-cockaded woodpecker typically inhabits open, mature pine forests with sparse midstory vegetation and excavates its cavities exclusively in old growth, living pines. Although cavities are excavated in at least 7 different pine species, longleaf pine (*Pinus palustris*) is considered preferred where it occurs (U.S. Fish and Wildlife Service 2003). Once a common bird throughout the southeastern United States, the current distribution of the red-cockaded woodpecker is highly fragmented and characterized by a preponderance of relatively small, isolated populations. The species has been extirpated from 6 of the 17 states where it previously occurred (Hooper et al. 1980, Jackson 1994, U.S. Fish and Wildlife Service 2003) and has been reduced to less than 3% of its estimated abundance prior to European settlement (U.S. Fish and Wildlife Service 2003). Loss and degradation of suitable habitat are the primary reasons for decline, and they remain the greatest obstacles to the species' recovery (U.S. Fish and Wildlife Service 2003).

In June 2001, Florida Fish and Wildlife Conservation Commission (FWC) staff conducted a preliminary status review of the red-cockaded woodpecker. The review was not based on a perceived change in the species' status, but rather was undertaken as a precursor to the development of a species management plan according to the procedural requirements of Florida's 2-phase listing process (Rule 68A-27.0012, Florida Administrative Code [F.A.C.]; Appendix 1). The results of the preliminary status review prompted FWC staff to develop a petition (Appendix 2) to reclassify the red-cockaded woodpecker as a Species of Special Concern in accordance with the criteria defined in Rule 68A-1.004, F.A.C. (Appendix 3). Currently, the species is on the state list of Threatened species (Rule 68A-27.004, F.A.C.) and listed as Endangered by the U.S. Fish and Wildlife Service (USFWS, 50 CFR 17). In September 2001, the FWC determined the petition was sufficient and directed staff to undertake a comprehensive assessment of the red-cockaded woodpecker's biological status and to summarize the results in a Final Biological Status Report (Appendix 4). Based upon that report, in January 2002, the FWC determined that listing the red-cockaded woodpecker with a Species of Special Concern designation was warranted and directed staff to develop a management plan for the species. This document fulfills that directive pursuant to Rule 68A-27.0012, F.A.C. (Appendix 1). Consideration of the management plan by the FWC was scheduled for the November 20-22, 2002 Commission meeting, but subsequently was postponed until the September 3-5, 2003 meeting.

Public comments and outside review were formally solicited and incorporated at several junctures during the listing process (Appendix 5). The following public comment periods were noticed in the Florida Administrative Weekly: (1) September 28–November 13, 2001 to solicit information on the biological status of the red-cockaded woodpecker to be considered during the development of the Final Biological Status Report; (2) February 15–April 5, 2002 to solicit information on the conservation needs of the red-cockaded woodpecker and any economic and social factors that should be considered in its management; and (3) September 13–October 28, 2002 to solicit public comment on the Draft Management Plan, including any information

regarding the anticipated regulatory economic and social impacts of management plan implementation. Public comments also were heard at the September 5–7, 2001 FWC meeting, when the petition to initiate the listing process was presented, and at the January 23–25, 2002 FWC meeting, when the results of the biological status assessment were reported. The September 3–5, 2003 Commission meeting provided a final opportunity for public comment on the management plan and the proposed listing action.

The red-cockaded woodpecker management plan includes (1) an assessment of the threats responsible for the species' status as a Species of Special Concern; (2) a statement of the conservation goal and objective targeted by the management plan; (3) conservation actions, incentives, and regulations recommended to achieve that goal and objective; (4) a monitoring plan to assess red-cockaded woodpecker status; (5) an implementation strategy for the management plan; and (6) suggested areas for future research. Many of the techniques recommended as conservation actions are fundamental to red-cockaded woodpecker management and should be considered carefully by agencies, managers, and landowners seeking to enhance the species on their lands. However, the specific mixture of activities will depend on the history of the land in question, the current status of the resident red-cockaded woodpecker population, the overall management objective, and the availability of existing and future financial resources.

Traditionally, number of active clusters has been the standard measure of population size for the red-cockaded woodpecker. A new standard, number of potential breeding groups, was established in the federal recovery plan (U.S. Fish and Wildlife Service 2003) and is considered preferable because it more accurately reflects the health and reproductive potential of a population. Accordingly, the conservation objective of this management plan is expressed in terms of potential breeding groups. Active clusters, however, are used to describe existing populations because most previous data are reported in that format. To facilitate use of the new standard, comparisons between potential breeding groups and active clusters are provided throughout the plan based on the estimated average ratio of 1.25 active clusters per potential breeding group (U.S. Fish and Wildlife Service 2003).

DEFINITIONS

The following glossary defines scientific terms as they pertain to red-cockaded woodpecker assessment, conservation, and research described in this management plan.

Active Cavity Tree	Any tree containing 1 or more cavities exhibiting fresh pine resin associated with cavity construction, cavity maintenance, or resin well excavation by red-cockaded woodpeckers.
Active Cluster	The aggregate of active and inactive cavity trees used and defended by a group of red-cockaded woodpeckers.
Artificial Cavity Tree	Any tree containing 1 or more artificial (i.e., constructed) cavities. There are 2 types of artificial cavities: drilled (Copeyon 1990) and inserts (Allen 1991).

Area of Occurrence	The geographic area inhabited by all individuals in a population. Typically, the amount of habitat in which individuals are known to occur.
Augmentation	The use of translocation to increase the size of a population or metapopulation.
Extent of Occurrence	The geographic area encompassing all locations of individuals of a species, including intervening areas of unoccupied habitat. Synonymous with range.
Florida Population	All individuals of the species within the state of Florida.
Generation	The average age of breeders in a population. Using Vortex 8.41 software (Miller and Lacy 1999), the estimated generation times for male and female red-cockaded woodpeckers were 6.5 and 5 years, respectively (FWC, unpublished data).
Group	The social unit in red-cockaded woodpeckers, which consists of a breeding pair with or without 1 or more helpers, or a solitary bird.
Helper	An adult that delays its own reproduction to assist in the rearing of another breeding pair's young. Helpers typically are related to the breeding pair they assist.
Immigration	The movement of 1 or more individuals into a population or metapopulation.
Long-term	An extended period of time relative to the life span of individuals in a population. Length is based on commonly used viability procedures and practicality, but is typically at least 100 years.
Management Unit	One of a set of 6 areas in Florida designated to ensure a geographically balanced approach to red-cockaded woodpecker conservation efforts and continued representation of habitat types and genetic resources.
Metapopulation	For the purpose of this management plan, the term applied to a designated aggregate of neighboring red-cockaded woodpecker populations within a management unit. Genetic exchange within and/or among metapopulations is important to the long-term viability of the species and may be accomplished through immigration or translocation.

Population	Individuals of the same species that occur in a defined area at the same time and regularly interact or interbreed.
Potential Breeding Group	An adult male and adult female that occupy the same active cluster and attempt to nest or successfully fledge young, with or without the assistance of 1 or more helpers.
Range-wide Population	All individuals of the species throughout the entire extent of its area of occurrence. For red-cockaded woodpeckers, the range-wide population includes individuals found in Florida, Georgia, South Carolina, North Carolina, Virginia, Mississippi, Alabama, Louisiana, Arkansas, Oklahoma, and Texas.
Recruitment Cluster	A cluster of artificial cavity trees, or suitable inactive natural cavity trees, located in suitable habitat and close to existing groups.
Restrictor	A metal plate used to prevent or repair an enlarged cavity entrance (Carter et al. 1989).
Suitable Cavity	A dry, clean cavity with a single entrance, a solid base, and an entrance tunnel and chamber that are not enlarged.
Translocation	The artificial movement of juvenile red-cockaded woodpeckers between or within populations or metapopulations. Typically single females are moved to single males, or unrelated pairs are moved to recruitment clusters.
Viable Population	A stable population with a high probability (e.g., more than 90%) of surviving for a long-term period (e.g., 100 years).

THREAT ASSESSMENT

FWC staff undertook an assessment of the underlying reasons for the range-wide decline of the red-cockaded woodpecker as a necessary precursor to the design and implementation of effective conservation measures. First, FWC staff examined the population parameters that put the species at risk in relation to the criteria used to define listed species in Florida (Rule 68A-1.004, F.A.C.; Appendix 2). The Final Biological Status Report for the red-cockaded woodpecker (Appendix 4) specified 1 criterion underlying the proposed designation as a Species of Special Concern.

1. **Population reduction.** There was an estimated range-wide population reduction of at least 20% over the last 20 years based on (a) an observed decline of all monitored populations except 1 between 1970 and the early 1980s (U.S. Fish and Wildlife Service 2003), (b) an estimated decline of at least 23% in the range-wide population during the 1980s (James 1995), and (c) the inference that population gains due to aggressive management during the 1990s were not enough to offset losses in the previous decade.

Furthermore, there is a suspected range-wide population reduction of at least 20% during the next 20 years based on (a) a potential extirpation rate of 11-23% for small and/or isolated populations as predicted by 2 demographic models (Letcher et al. 1998, Walters et al. 2002), (b) the potential for the continued loss of suitable habitat especially on private lands, and (c) the low probability of sustaining population gains made during the 1990s without the continued application of aggressive management techniques.

The second assessment step involved an examination of the threats, past and present, responsible for the range-wide decline of the red-cockaded woodpecker. The following factors have been well documented in the literature as having an adverse impact on the species' distribution, abundance, and long-term viability.

1. **Large-scale loss of suitable habitat**, especially through the following practices:
 - a. **Intensive logging of old-growth pine forests** during the late 1800s and early 1900s and subsequent conversion to agricultural fields and other land uses.
 - b. **Clearcutting of second-growth pine forests**, beginning in the 1950s and continuing to date, and subsequent conversion to agricultural fields, real estate, or pine plantations with short stand rotations.
2. **Degradation and/or unsuitability of remaining pine habitat** due to:
 - a. **Exclusion and suppression of fire**, which may lead to smaller group sizes, reduced productivity, cluster abandonment, and/or low-quality foraging habitat due to (i) replacement of native pines by off-site pine species and hardwoods, (ii) increased hardwood encroachment at the expense of pines and groundcover, (iii) higher stand densities and a predominant midstory, and (iv) changes in the abundance, species composition, and distribution of the arthropod community.
 - b. **Reliance on dormant season prescribed burns**, which are not as effective as early or mid growing season burns at reducing hardwoods and promoting native groundcover vegetation (Sparks et al. 1998, 1999).
 - c. **Low availability of old-growth pines**, which are required for cavity excavation and are an important component of optimal foraging habitat.
3. **Habitat fragmentation and group isolation**, which increase the species' vulnerability to local extirpations due to adverse genetic, demographic, and environmental events.

CONSERVATION GOAL AND OBJECTIVE

Red-cockaded Woodpecker Conservation Goal

Given knowledge of the current population status and the threats underlying previous population decline, it should be possible to set a scientifically defensible, reasonable, and explicit conservation goal for the red-cockaded woodpecker in Florida. **The most ambitious and optimistic conservation goal, and the one toward which this management plan is aimed, is to secure and maintain a stable or increasing Florida population of the red-cockaded woodpecker at a level above the threshold defining a Species of Special Concern.** If that goal was met and the species' range-wide population trend also was stable or increasing, the FWC could determine that removing the red-cockaded woodpecker from the Species of Special Concern list was warranted.

On the other hand, future population declines in Florida or elsewhere may necessitate the less optimistic goal of maintaining the red-cockaded woodpecker as a Species of Special Concern. Given the FWC's lack of jurisdiction outside of Florida, the absolute minimum conservation goal would be to ensure that the Florida population of red-cockaded woodpeckers does not decline to the extent that it causes, solely or in part, the species to meet the criteria defining a Threatened species.

Red-cockaded Woodpecker Conservation Objective

To facilitate assessment of progress toward the conservation goal, FWC staff established a highly measurable conservation objective for the red-cockaded woodpecker. Two main factors were carefully considered: (1) the distribution and status of the Florida population in 2000, and (2) the FWC listing criteria for a Species of Special Concern. Appendix 6 presents a complete discussion of these factors and the process used to develop the conservation objective. However, because the derivation of the objective is not intuitive without some explanation, the main points are summarized below.

1. In 2000, the distribution of the red-cockaded woodpecker in Florida was highly fragmented and restricted to areas where suitable habitat remained (Figure 1). Although the species' was known to occur on at least 34 properties (Table 1), only 4 properties (12%) supported more than 50 active clusters (40 potential breeding groups). Property ownership favored state lands (53%), but 70% of the active clusters occurred on federal properties in northern Florida.
2. In 2000, the range-wide population of red-cockaded woodpeckers was estimated at 5,627 active clusters (4,502 potential breeding groups) (U.S. Fish and Wildlife Service 2003). Florida represented 25% of the range-wide population, with an estimated 1,404 active clusters (1,123 potential breeding groups) (Table 1).
3. Based on the premise that Florida will continue to represent at least 25% of the range-wide population, numerically the Florida population could remain stable, or decline by

9% over the next 20 years, and still meet the minimum delisting requirements for a Species of Special Concern (Table 2). However, long-term viability models for individual populations strongly suggest that maintaining the Florida population at or below the 2000 level would be problematic given the species' fragmented distribution and the preponderance of properties supporting fewer than 50 active clusters (40 potential breeding groups). Furthermore, a stable or declining Florida population would not provide a buffer against losses that might occur elsewhere in the species' range.

Upon consideration of these factors, FWC staff concluded that setting the conservation objective at the 2000 status level or at the minimum delisting size for a Species of Special Concern would not insure achievement of the stated conservation goal for the red-cockaded woodpecker. Instead, FWC staff determined that it would be more appropriate to use a geographic approach to derive the numerical component of the conservation objective. To this end, 6 discrete management units were established in Florida (Figure 1) and 17 metapopulations were identified therein (Table 3, Figures 2-7). Next, the set of guidelines listed below were developed and applied to the targeted management units and metapopulations. These guidelines considered both the numerical and spatial components of long-term viability and included 2 important assumptions. First, all metapopulations and populations would be managed to achieve optimal habitat conditions and spatial configuration of active clusters, and second, periodic exchange of genetic material would occur within and among metapopulations either through immigration or translocation.

1. **By the year 2020, achieve at least a 20% increase in the Florida population.** This increase is considered necessary to secure a stable or increasing Florida population of red-cockaded woodpeckers and to offset declines that might occur elsewhere in the species' range.
2. **By the year 2020, secure and maintain (a) at least 100 potential breeding groups per management unit, (b) at least 2 metapopulations per management unit, and (c) 40 or more potential breeding groups in at least 1 of the metapopulations in each management unit.** This distribution is necessary to maintain existing habitat types and genetic resources, and to buffer losses due to hurricanes or other catastrophic events. It also will facilitate a statewide approach to conservation efforts and ensure that each management unit contains at least 1 metapopulation large enough to persist for 100 years.
3. **By the year 2020, increase metapopulations within management units (a) to at least 10 potential breeding groups if below 10 potential breeding groups in 2000, (b) to at least 25 potential breeding groups or 15% growth (whichever is higher) if above 9 but below 25 potential breeding groups in 2000, (c) to at least 40 potential breeding groups or 15% growth (whichever is higher) if above 24 but below 40 potential breeding groups in 2000, (d) by at least 15% or a net increase of 10 potential breeding groups if above 39 but less than 100 potential breeding groups in 2000, and (e) by at least 10% if above 99 potential breeding groups in 2000.** These increases are necessary to achieve a 20% increase in the Florida population and to maximize the number of metapopulations capable of long-term persistence.

Based on the application of these guidelines to the targeted management units and metapopulations (Table 3), the conservation objective recommended by FWC staff is **to secure and maintain at least 1,349 potential breeding groups (1,686 active clusters) of red-cockaded woodpeckers in Florida by the year 2020 and beyond.** This would constitute a 20% increase in the Florida population over the next 20 years (2000-2020). Upon achievement of the conservation objective, each management unit would support between 2 and 4 metapopulations and between 100 and 609 potential breeding groups (Table 3), which would allow confident prediction of continued population stability and satisfy the future trend component of the listing criteria (Appendix 3). Annual monitoring of metapopulations will be necessary through 2020 to ensure adequate progress toward the conservation objective.

This conservation objective provides multiple provisions for attaining the conservation goal of removing the red-cockaded woodpecker from Florida's Species of Special Concern list. It will result in at least a 20% increase in the Florida population over the next 20 years, which is considered necessary to secure a stable or increasing population and to offset declines that might occur elsewhere in the species' range; it will insure the continued representation of the species' habitats and genetic resources throughout Florida; and it will facilitate the establishment and maintenance of individual metapopulations large enough to persist for at least 100 years. Achievement of Florida's conservation objective also will be an important contribution towards the range-wide recovery of the species, especially on properties designated as Essential Support Populations in the federal recovery plan (U.S. Fish and Wildlife Service 2003).

The conservation objective is ambitious but certainly not unrealistic. Because Florida already supports a relatively large number of red-cockaded woodpeckers, the objective is not designed to affect a substantial increase in the Florida population, but rather to secure and maintain enough viable metapopulations to insure the species' long-term occurrence throughout the state. Furthermore, in 2000, 46% of the Florida properties with a known occurrence of red-cockaded woodpeckers had developed a management plan for the species and 69% had an active monitoring program (FWC, unpublished data). The continuation and possible expansion of these existing activities is much less daunting than the task of developing a statewide management and monitoring program from the ground up. Finally, and perhaps most importantly, because the life history and habitat requirements of the red-cockaded woodpecker are well known, a variety of proven management techniques exist. Thus, the biggest challenge to achieving the conservation objective may be the ability of agencies, managers, and landowners to secure the funds necessary to manage the species on a long-term basis.

Strategies to Achieve the Conservation Objective

Maintaining the Florida red-cockaded woodpecker population at a level above the threshold for listing as a Species of Special Concern will require an organized and comprehensive approach. Extensive and intensive efforts will be necessary to (1) manage metapopulations and populations for long-term viability and growth, (2) coordinate and conduct survey and monitoring activities, (3) periodically assess the status of the Florida and range-wide populations, and (4) conduct research specific to the species' management and conservation in Florida. Completion of these tasks cannot be accomplished by the FWC alone, but will require partnerships with public and private land managers.

Based on the concept of management units and metapopulations previously described, FWC staff identified 2 key strategies required to achieve the conservation objective.

1. **By the year 2020, secure and maintain a Florida population of at least 1,349 potential breeding groups (1,686 active clusters) of red-cockaded woodpeckers within the 17 targeted metapopulations.**
 - a. Establish a Memorandum of Agreement (MOA) with the USFWS regarding the role of each agency in:
 - i. Prioritizing, coordinating, and funding conservation activities in Florida.
 - ii. Facilitating the development of management plans for targeted metapopulations and/or individual properties within metapopulations.
 - b. Conduct a risk assessment for each metapopulation and prioritize metapopulations according to their immediate management needs.
 - c. For each metapopulation, establish a MOA among the relevant property owners to determine the role of each in coordinating, funding, and conducting management and monitoring activities on federal, state, local government, and private lands. Initially focus on the metapopulations ranked highest in the risk assessment.
 - d. Develop and implement a long-term management plan for each metapopulation. Initially focus on the metapopulations ranked highest in the risk assessment.
 - i. Include the results of the risk assessment.
 - ii. Establish a numerical goal and a timeline for achieving that goal. The metapopulation goals in this plan (Table 3) represent the minimum size required to meet Florida’s conservation objective; setting higher goals based on the amount of potential habitat within each metapopulation is strongly encouraged.
 - iii. Identify needs and opportunities to manage and/or restore habitat.
 - iv. Identify needs and opportunities to increase the number, distribution, and/or density of potential breeding groups. Once existing populations are stabilized, consider reintroducing the species in areas where it has been extirpated (Appendix 7).
 - v. Develop strategies to achieve and maintain optimal immigration rates. When immigration is achieved through translocation, develop a strategy to map the genealogy of translocated birds to prevent deleterious genetic effects.
 - vi. Assess existing monitoring activities and identify additional needs and opportunities.
 - vii. Submit draft management plans to the FWC and USFWS for review and comments.
 - e. FWC will seek funding to conduct the metapopulation risk assessment and to facilitate development of the metapopulation MOAs and management plans. FWC also will implement management plans for the metapopulations where it is the lead as designated by the MOA to the extent possible given budget and staffing constraints.
 - f. Establish a Florida red-cockaded woodpecker working group to promote communication between and among agencies, managers, biologists, and private

landowners. FWC will organize and facilitate this group, which will meet at least once a year to discuss management achievements and failures, new techniques, translocation strategies, regulatory issues, data collection and management, training needs and opportunities, and other topics as deemed necessary. Initially the group will meet to assist with the metapopulation risk assessment (Conservation Strategy 1b) and the identification and ranking of unsurveyed and potential properties (Conservation Strategies 2a and 2b). Thereafter, it may be possible for the group to meet in conjunction with the annual regional translocation strategy meeting, which is facilitated by the USFWS and usually held in Tallahassee in August.

2. **Locate extant but unknown potential breeding groups of red-cockaded woodpeckers within management units and metapopulations.**

- a. Identify and rank, according to priority, properties where red-cockaded woodpeckers are known to occur but a baseline survey of potential breeding groups has not been completed or conducted recently (Appendix 8). Consider amount of suitable habitat and proximity to known populations during the ranking process.
- b. Identify and rank, according to priority, potential properties where red-cockaded woodpeckers are not known to occur but suitable habitat may exist (Appendix 9). Consider the likelihood of occupancy and proximity to known populations during the ranking process.
- c. Establish a MOA between the FWC and the relevant property owners to determine the role of each in coordinating, funding, and conducting red-cockaded woodpecker surveys on federal, state, local government, and private lands where landowners willingly grant access to their property.
- d. FWC will seek funding to identify and rank properties, and to the extent possible, will plan and conduct surveys on properties where it is the lead as designated by the MOA.
- e. Complete baseline surveys on occupied but incompletely surveyed properties, with emphasis placed on the highest ranked properties.
- f. Conduct surveys on potential properties, with emphasis placed on the highest ranked properties.
- g. Manage properties with completed surveys and/or confirmed occupancy in accordance with Conservation Strategy 1.
- h. Because extant but unknown potential breeding groups do not constitute an actual increase in the Florida population, modify metapopulation descriptions and management plans to account for groups found through increased survey efforts and revise the numerical component of the conservation objective accordingly.

RECOMMENDED CONSERVATION ACTIONS

Proposed FWC Regulations

The FWC considers the following rules necessary to protect red-cockaded woodpeckers and facilitate their conservation while efforts to secure the species in Florida are underway.

1. **List the red-cockaded woodpecker, *Picoides borealis*, as a Species of Special Concern.**
2. **Prohibit the take, harassment, possession, sale, or transport of red-cockaded woodpeckers, *Picoides borealis*, and their eggs, nests, or dens (i.e., cavities) except as authorized by permit from the executive director, with such permits being issued for activities that further the goals and objectives of the species' management plan.**

Collectively, these rules provide a legal basis, at the state level, for prosecuting direct take in accordance with Florida Statute 372.0725 (killing or wounding of any species designated as Endangered, Threatened, or Species of Special Concern) and for regulating impacts related to management, monitoring, and research activities. Furthermore, the proposed rules provide a basis for authorizing incidental take under such programs as Safe Harbor or approved HCPs (see section on Private Lands below).

Management Actions

Accomplishment of the conservation objective will require a long-term commitment by numerous agencies, managers, and landowners to manage red-cockaded woodpeckers and their habitat in Florida. Fortunately, much is known about the life history and habitat requirements of the species and a variety of proven management techniques exist. The management actions listed below briefly outline the key principles and activities that should be considered when developing the metapopulation management plans. A more comprehensive discussion of red-cockaded woodpecker management is included in the federal recovery plan (U.S. Fish and Wildlife Service 2003). The specific mixture of management actions undertaken for each metapopulation will depend on the history and existing condition of the properties located therein, the current status of the resident red-cockaded woodpecker population(s) on those properties, other resource management considerations, and the availability of existing and future funding.

1. **Monitor clusters and potential breeding groups in existing populations.**
 - a. Determine cluster status (active or inactive) annually during the nesting season (April-July).
 - b. Determine number of potential breeding groups by monitoring active clusters for nests and/or conducting group censuses during the nesting season.
2. **Maintain and protect active clusters in existing populations.**
 - a. Mark and map individual cavity trees to facilitate identification in the field.
 - b. Maintain at least 4 suitable cavities in each active cluster. If necessary, install restrictor plates on existing cavities (Carter et al. 1989) or construct artificial cavities (Copeyon 1990, Allen 1991).
 - c. Prescribe burn active clusters every 1 to 3 years to maintain an open forest structure, control midstory encroachment, and promote pine regeneration. When possible, burn during the growing season to retain or restore native groundcover.

- Dormant season burns and/or mechanical removal of midstory vegetation may be required for initial fuel reduction.
- d. Protect individual cavity trees against damage from fire, wind, root compression, and southern pine beetle infestations.
 - e. Retain and protect older pines (over 60 years old) as potential cavity trees.
 - f. Retain dead and dying cavity trees and all other snags, unless they present a safety hazard.
 - g. Minimize human disturbance in active clusters, especially during the nesting season.
 - h. If necessary, initiate efforts to restore appropriate ground cover species.
3. **Increase the number of potential breeding groups in existing populations.**
- a. Translocate potential mates to active clusters occupied by single birds (i.e., place a juvenile female with a single male or a juvenile male with a single female).
 - b. Construct recruitment clusters to facilitate new group formation through natural dispersal. The distance between recruitment clusters and existing active clusters should be greater than 0.4 km (0.25 mile) but less than 3.2 km (2 miles) (U.S. Fish and Wildlife Service 2003).
 - c. Augment populations with less than 30 potential breeding groups (U.S. Fish and Wildlife Service 2003) by translocating unrelated pairs of juveniles to recruitment clusters. Locate recruitment clusters near existing groups (see above) to optimize occupancy, increase group density, and minimize isolation. (Note: Translocation should not be considered until the factors contributing to a population's small size have been identified and corrected.)
 - d. If necessary, improve and/or restore habitat in sites selected for recruitment clusters prior to constructing artificial cavities. Thereafter, manage recruitment clusters like active clusters (i.e., mark and map cavity trees, prescribe burn, etc.).
4. **Provide quality foraging habitat for active clusters and recruitment clusters (active or inactive) in existing populations.**
- a. On public lands, use the recovery standard (Appendix 10) established in the federal recovery plan (U.S. Fish and Wildlife Service 2003). This standard also is recommended for private lands being managed for increased population size. Where warranted, use silviculture to achieve the pine habitat conditions recommended under the federal recovery plan (U.S. Fish and Wildlife Service 2003).
 - b. On private lands, use the standard for managed stability (Appendix 11) established in the revised federal recovery plan (U.S. Fish and Wildlife Service 2003). When warranted, use silviculture to achieve the pine habitat conditions recommended under the standard for managed stability.
 - c. Consult with the FWC and USFWS to develop site-specific foraging habitat guidelines for areas where achieving the federal standard for recovery on public lands or for stability on private lands would be difficult due to low pine basal area or other habitat characteristics (e.g., central and southern Florida).
 - d. Prescribe burn foraging habitat every 1 to 3 years to maintain an open forest structure, control midstory encroachment, and promote pine regeneration. When

possible, burn during the growing season to retain or restore native groundcover. Dormant season burns and/or mechanical removal of midstory vegetation may be required for initial fuel reduction.

5. **Identify and secure private properties with existing or potential red-cockaded woodpecker habitat.**
 - a. Rank properties based on the number of potential breeding groups, amount of existing or potential habitat, proximity to occupied habitat, and potential for connecting isolated populations or groups.
 - b. Contact owners of highest ranked properties to discuss Safe Harbor, public acquisition, conservation easements, and other options.
6. **Restore or create red-cockaded woodpecker habitat in currently unoccupied areas.**
 - a. Use prescribed fire or mechanical methods to promote regeneration of native pines and to reduce hardwoods and other midstory vegetation. Use growing-season burns to mimic the natural fire regime and promote native groundcovers. Dormant season burns may be necessary for initial fuel reduction.
 - b. Consider the value of off-site pines as existing and potential habitat. When warranted, remove off-site pines and seed and/or plant native pine and groundcover species on sites where restoration cannot be achieved through prescribed fire alone. Rather than clear-cutting off-site pines, consider conducting a seed tree cut and underplanting with the native pine species.
 - c. Prioritize restoration sites based on their proximity to existing occupied habitat and their potential for connecting isolated groups or populations.

Private Lands Incentives

Private lands will play an important role in the long-term conservation of the red-cockaded woodpecker in Florida. Although most of the properties targeted for management are under public ownership, 7 of the 17 designated metapopulations include private lands (Table 3). To promote the enhancement of red-cockaded woodpeckers on private lands in Florida, FWC staff will:

1. **Develop and implement a statewide Safe Harbor program for red-cockaded woodpeckers in Florida.** The establishment of a Safe Harbor program in Florida would provide heretofore nonexistent incentives for private landowners to manage, maintain, or increase the number of red-cockaded woodpecker groups on their property without fear of additional land-use restrictions. Private landowners enrolling in Safe Harbor voluntarily agree to manage for red-cockaded woodpeckers and to maintain a “baseline” number of groups on their property (i.e., the number of groups present at the time they enroll in the program). In exchange, they are authorized to incidentally take groups above the established baseline if they are in compliance with the program. Under a statewide Safe Harbor program, administrative authority would be transferred from the USFWS to the FWC (U.S. Fish and Wildlife Service 2001). Florida’s Safe Harbor program should be proactive and seek to enroll private lands with the greatest conservation value to red-cockaded woodpeckers. Potential candidates include the private properties within the targeted metapopulations (Table 3) and/or private properties

that are inhabited by red-cockaded woodpeckers and adjacent to public lands being managed for the species.

- 2. Inform private landowners of existing land-use incentive programs.** These include the Florida Forestry Stewardship Program, the Wildlife Habitat Incentives Program, the Environmental Quality Incentives Program, the Landowner Incentive Program, and the Private Stewardship Grants Program. FWC staff will review these and other programs to determine which provide the best incentives for managing red-cockaded woodpeckers on private lands and disseminate their findings through brochures, pamphlets, and/or the FWC's home page on the Internet (<http://www.floridaconservation.org>). FWC staff also will seek to identify and/or develop other innovative programs to encourage the conservation of red-cockaded woodpeckers on private lands. To the extent possible, FWC staff will work with private property owners on a case-by-case basis to develop the best management strategies for the red-cockaded woodpeckers on their lands.

The HCP process will be used to mitigate for the loss of red-cockaded woodpeckers on private lands due to otherwise lawful activities. Incidental take will require the development of a management plan and mitigation strategy for each property under consideration and subsequent approval by both the FWC and the USFWS. Public lands within metapopulations should be considered as potential HCP mitigation sites.

Monitoring Plan

Monitoring will be necessary to measure the success of management actions undertaken for red-cockaded woodpecker conservation in Florida. The primary purpose of monitoring will be to detect changes in abundance and trends in the Florida population by determining the number of active clusters and the number of potential breeding groups in the metapopulations targeted for management (Table 3). The federal recovery plan (U.S. Fish and Wildlife Service 2003) provides a thorough description of the methods used to monitor these parameters. In general, cluster status should be assessed during the nesting season (April- July) by checking the cavity trees within each potentially active cluster for evidence of recent red-cockaded woodpecker activity. Number of potential breeding groups also should be determined during the nesting season either by visiting each active cluster every 7 to 11 days until a nest is found or by determining group size in active clusters where nesting is not observed. For the purpose of evaluating statewide progress toward the conservation objective, active clusters and potential breeding groups should be monitored in accordance with the guidelines (Appendix 12) established in the federal recovery plan (U.S. Fish and Wildlife Service 2003).

Additional monitoring activities will depend on the management needs of individual metapopulations and/or the properties located therein. For example, color-banding adults and nestlings to obtain detailed data on group size and reproductive success is highly recommended in small or fragmented populations, and is required for sites that plan to donate or receive translocated birds (U.S. Fish and Wildlife Service 2003). Other types of monitoring may be needed to (1) assess the impact of translocation on donor populations; (2) determine the effectiveness of artificial cavities, recruitment clusters, midstory control, and other management techniques; (3) evaluate mitigation programs or research results; (4) determine cavity suitability;

or (5) delineate and assess foraging habitat. Monitoring needs and protocols beyond the inventory of active clusters and potential breeding groups should be developed in consultation with the FWC and the USFWS and included in the metapopulation management plans.

Agencies, biologists, and landowners within the targeted metapopulations will be asked to report their management activities and monitoring results to the FWC on an annual basis. In most cases, a copy of the annual report used by the USFWS will fulfill this request. (The report form is available on the Internet at <http://rcwrecovery.fws.gov>). FWC staff will review these data relative to the listing criteria for Species of Special Concern and Threatened status (Table 2). If monitoring reveals that any of the following thresholds have been reached, FWC will recommend reassessment of the red-cockaded woodpecker's biological status.

1. **Verification of 1,349 or more potential breeding groups (1,686 active clusters) in Florida.** This would meet the numerical component of the conservation objective and, depending on the species' range-wide status, could lead to its removal from Florida's Species of Special Concern list.
2. **Verification of 562 or fewer potential breeding groups (702 active clusters) in Florida or the loss of 28 potential breeding groups (35 active clusters) or more per year.** This would constitute, or predict, a 50% decline in the Florida population and trigger a re-evaluation of status for possible reclassification to Threatened under listing Criterion A (Table 2).
3. **Verification of the loss of 17 potential breeding groups (22 active clusters) or more per year in Florida.** This would trigger a re-evaluation of status for possible reclassification to Threatened under listing Criterion C (Table 2).

In addition, every 5 years FWC staff, in consultation with the USFWS, will review the status of the range-wide population. If the data indicate substantial or continued declines in other states, reassessment of biological status relative to the listing criteria will be recommended.

Future Research

Compared to many other listed species, the red-cockaded woodpecker has been the subject of considerable research and, as a result, much is known about its life history and habitat requirements. Accordingly, FWC staff limited their assessment of future research needs to topics deemed most relevant to the species' long-term management and conservation in Florida.

1. **Obtain additional demographic data for populations in central and southern peninsular Florida.** The conservation objective of this management plan is based, to a large extent, on long-term viability models derived for populations in North Carolina (Letcher et al. 1998, Walters et al. 2002). Yet available data suggest some basic demographic differences between peninsular Florida and more northern populations. In general, nest success and fledging production are lower, survival of breeding adults is higher, and there are more female helpers (DeLotelle and Epting 1992, DeLotelle et al. 1995, Bowman et al. 1997). Additional research is needed to further determine the extent

and reasons for these differences. Based on the results, modification of individual metapopulation goals and/or the numerical component of the conservation objective may be warranted.

2. **Describe and quantify foraging habitat characteristics in central and southern Florida.** In general, home ranges are larger in central and southern Florida than elsewhere in the species' range (Patterson and Robertson 1981, Beever and Dryden 1992, DeLotelle et al. 1987, Bowman et al. 1997). Although large home ranges generally are attributed to poor habitat conditions, other factors such as the density and distribution of potential breeding groups may be involved. Additional studies are needed to define optimal foraging habitat in central and southern Florida, which will facilitate the development of foraging habitat management guidelines specific to the region
3. **Re-evaluate genetic variability.** Translocation is an important tool for managing red-cockaded woodpecker populations in Florida and elsewhere. Because relatively few existing populations are large and/or stable enough to donate birds, recipient and donor sites often are far apart and located in different habitat types. Previous studies have revealed some genetic structure across the species' range, but no direct evidence of local adaptations has been found (Stangel et al. 1992; Haig et al. 1994, 1996; Stangel and Dixon 1995). As a result, concerns about the possible negative impacts of long-distance translocations on the species' genetics have been over-ridden by the need to stabilize or increase small populations before they become extirpated. Recent advances in DNA techniques, however, have greatly improved the precision with which genetic variation is detected (e.g., see references in Barrowclough et al. 1999, Milot et al. 2000). Additional testing of genetic material, using these new techniques, is needed throughout Florida to ensure that existing and future translocation practices do not have a deleterious effect on local genetic resources.

ANTICIPATED ECONOMIC AND SOCIAL IMPACTS

An assessment of the anticipated economic and social impacts of implementing the red-cockaded woodpecker management plan was based on the rules proposed therein and on issues raised through the public comment process. The rules proposed for FWC action are the addition of the red-cockaded woodpecker to the state Species of Special Concern list and a prohibition on take except as permitted by the FWC executive director. Seven sets of written comments were received during the comment period for the draft management plan. Technical, scientific, and editorial comments were considered during the revision and finalization of the plan, whereas the economic and social issues are discussed below. The parties potentially affected by the plan include public land managers, private landowners, scientific researchers, and citizens of the state of Florida.

Economic Impacts

1. **Cost of implementing the proposed rules.**
 - a. **Estimated cost to FWC.** The proposed rules will necessitate a commitment of staff time to review permit applications; to develop, implement, and oversee the

statewide Safe Harbor program; and to review permit applications for incidental take under Safe Harbor or through the HCP process. [REDACTED]

- b. **Estimated cost to potentially affected parties.** Overall, the proposed rules should not increase the costs incurred by parties affected by their implementation. There are no fees associated with the permits issued by FWC. Furthermore, private landowners already must obtain permits from the FWC and the USFWS to develop lands where red-cockaded woodpeckers occur, and they are required to finance the mitigation activities associated with permits under the HCP process. Moreover, the creation of a statewide Safe Harbor program in Florida could be financially beneficial to private landowners who, by participating in the program, might increase their eligibility to receive funds through state and federal land-management incentive programs.
2. **Cost of implementing the management plan.**
 - a. **Estimated cost to FWC.** Implementation of the management plan will require recurring funds for personnel, travel, meetings, equipment, management, and research. The full scope of the FWC's commitment will depend, in part, on the MOA with the USFWS and on the number of metapopulations where the FWC is the designated lead. [REDACTED] unknown number of full or part-time temporary biologists will be needed to coordinate and oversee implementation of the plan and to perform survey, monitoring, and management activities on the targeted metapopulations. Specific budget needs are difficult to project and will be addressed on an annual basis as part of the FWC's operational planning process.
 - b. **Estimated cost to other agencies and land managers.** Implementation of the plan will have a financial impact on numerous public agencies. Federal agencies (i.e., U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service, and U.S. Air Force) should be impacted the least, given their existing requirement to manage for red-cockaded woodpeckers pursuant to the Endangered Species Act. The financial impact on state agencies (i.e., Florida Division of Forestry, Florida Department of Military Affairs, Florida Park Service, and St. Johns River and South Florida water management districts) will likely be greater, but will not be known until the metapopulation MOAs and management plans are developed.

Social Impacts

The anticipated social impacts of implementing the management plan were difficult to assess because none of the public comments addressed this issue. Potentially positive social impacts include increased public awareness of red-cockaded woodpeckers and old-growth pine habitats in Florida, public recognition and support of the FWC for taking a comprehensive approach to red-cockaded woodpecker management, and the development of integrated working relationships among the various public agencies and private landowners involved with the species' management in Florida. Conversely, if the plan is not implemented there could be negative social implications. The red-cockaded woodpecker is a high-profile species and recognized by the public as an "indicator" of healthy, old-growth pine forests. Continued loss of the species and its habitat could erode public confidence in the FWC's ability to manage and

conserve the wildlife resources of the state. Furthermore, there would be fewer opportunities to encounter and study the species.

IMPLEMENTATION STRATEGY

A prioritized approach to the implementation of the management plan will help ensure achievement of the conservation objective for the red-cockaded woodpecker in Florida. Prioritization of strategies and conservation actions also will facilitate the extensive coordination and cooperation necessary to successfully implement the plan. Given the various constraints of the numerous public and private land managers potentially affected by the plan, the schedules and tasks associated with its implementation should be both justified and feasible.

Priority Actions

FWC staff considers the following conservation actions to be of the highest priority and recommends primary or significant participation by the FWC:

1. **Implement the proposed rules for the red-cockaded woodpecker.** These rules will provide a legal basis, at the state level, for prosecuting direct take; regulating research, monitoring, and management activities; and authorizing incidental take under Safe Harbor or an approved HCP.
2. **Develop an MOA with the USFWS.** Given the red-cockaded woodpecker's federal status as Endangered, the USFWS and FWC share responsibility for managing the species in Florida. The MOA will avoid duplication of conservation efforts and clarify how the 2 agencies will work together to prioritize, coordinate, and fund red-cockaded woodpecker conservation activities in Florida.
3. **Develop and maintain a red-cockaded woodpecker database for Florida.** FWC staff, in collaboration with Florida Natural Areas Inventory, will maintain a comprehensive database and map to document changes in the species' status as determined by monitoring. The database also will include basic information on ownership, habitat, and management activities for metapopulations and individual properties.
4. **Conduct a risk assessment for each metapopulation and prioritize metapopulations according to their immediate management needs.** Although all metapopulations are important, some will require more immediate attention than others. A prioritized risk assessment will allow available resources to be directed where they are most needed.
5. **Establish and convene a meeting of the Florida red-cockaded woodpecker working group.** Focus initial discussions of the metapopulation risk assessments and the identification and ranking of unsurveyed and potential properties.
6. **Coordinate the initiation of MOAs, management plans, and conservation activities for metapopulations.** Initially, FWC staff will focus their attention on the metapopulations with the most immediate management needs. Meetings will be held to

initiate communication among managers and landowners within these metapopulations. Emergency MOAs or management plans may be necessary to address critical situations.

7. **Coordinate with the USFWS to develop a statewide Safe Harbor program for red-cockaded woodpeckers in Florida.** Safe Harbor will provide heretofore nonexistent incentives for private landowners to manage, maintain, or increase red-cockaded woodpeckers on their property without fear of additional land-use restrictions.

Proposed 12-Month Implementation Schedule

Given existing FWC staffing and budget appropriations, it should be possible to initiate the following tasks between November 2003 and September 2004.

1. Implement the proposed rules for the red-cockaded woodpecker.
2. Develop the MOA with the USFWS to clarify each agency's role in prioritizing and coordinating conservation activities in Florida and reviewing and approving management plans for metapopulations and/or individual properties.
3. Develop and maintain the red-cockaded woodpecker database and map for Florida.
4. Organize and convene a meeting of the Florida red-cockaded woodpecker working group.
5. Prepare a risk assessment for each metapopulation and prioritize conservation activities based on the most immediate needs.
6. Draft a written plan for Florida's statewide Safe Harbor program and submit to the USFWS for review and comment.

Management Plan Review and Revision

To ensure steady progress toward the conservation objective, every 5 years FWC staff will review the status of the Florida population relative to the management plan's implementation. Revision of the plan may be warranted if monitoring data reveal a declining trend in Florida, despite management efforts. Future research on population demographics, habitat requirements, genetic variability, and/or management techniques also could necessitate a revision of the plan.

LITERATURE CITED

- Allen, D.H. 1991. An insert technique for constructing artificial red-cockaded woodpecker cavities. General Technical Report SE-73. 19pp.
- Barrowclough, G.F., R.J. Gutierrez, and J.G. Groth. 1999. Phylogeography of spotted owl (*Strix occidentalis*) populations based on mitochondrial DNA sequences: gene flow, genetic structure, and a novel biogeographical pattern. *Evolution* 53:919-931.

- Beever, J.W. III, and K.A. Dryden. 1992. Red-cockaded woodpeckers and hydric slash pine flatwoods. Transaction of the 57th North American Wildlife and Natural Resources Conference 57:693-700.
- Bowman, R., D.L. Leonard, L.M. Richman, and L.K. Backus. 1997. Demography of the red-cockaded woodpecker at the Avon Park Air Force Range. Report Number F08602-96-D0015. Archbold Biological Station, Lake Placid, Florida.
- Carter, J.H., III, J.R. Walters, S.H. Everhart, and P.D. Doerr. 1989. Restrictors for red-cockaded woodpecker cavities. Wildlife Society Bulletin 17:68-72.
- Copeyon, C.K. 1990. A technique for constructing cavities for the red-cockaded woodpecker. Wildlife Society Bulletin 18:303-311.
- Crowder, L.B., J.A. Priddy, and J.R. Walters. 1998. Demographic isolation of red-cockaded woodpecker groups: a model analysis. Project Final Report. U.S. Fish and Wildlife Service, Clemson, South Carolina, USA.
- Daniels, S.J., J.A. Priddy, and J.R. Walters. 2000. Inbreeding in small populations of red-cockaded woodpeckers: insights from a spatially-explicit individual-based model. Pages 129-147 in A.G. Young and G.M. Clark, editors. Genetics, demography and viability of fragmented populations. Cambridge University Press, London, UK.
- DeLotelle, R.S., and R.J. Epting. 1992. Reproduction of the red-cockaded woodpecker in central Florida. Wilson Bulletin 104:285-294.
- _____, R.J. Epting, and G. DeMuth. 1995. A 12-year study of red-cockaded woodpeckers in central Florida. Pages 259-269 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- _____, R.S., R.J. Epting, and J.R. Newman. 1987. Habitat use and territory characteristics of red-cockaded woodpeckers in central Florida. Wilson Bulletin 99:202-217.
- Engstrom, R.T., and F.J. Sanders. 1997. Red-cockaded woodpecker foraging ecology in an old-growth longleaf pine forest. Wilson Bulletin 109:203-217.
- Haig, S.M., J.M. Rhymer, and D.G. Heckel. 1994. Population differentiation in randomly amplified polymorphic DNA of red-cockaded woodpeckers *Picoides borealis*. Molecular Ecology 3:581-595.
- _____, R. Bowman, and T.D. Mullins. 1996. Population structure of red-cockaded woodpeckers in south Florida: RAPDs revisited. Molecular Ecology 5:725-734.
- Hooper, R.G., A.F. Robinson, Jr., and J.A. Jackson. 1980. The red-cockaded woodpecker: notes on life history and management. U.S. Forest Service General Report SA-GR-9.

- Jackson, J.A. 1994. Red-cockaded woodpecker (*Picoides borealis*). The birds of North America No. 85. Academy of Natural Sciences, Philadelphia, Pennsylvania, and the American Ornithologists' Union, Washington, D.C., USA.
- James, F.C. 1995. The status of the red-cockaded woodpecker in 1990 and the prospect for recovery. Pages 439-451 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- Letcher, B.H., J.A. Priddy, J.R. Walters, and L.B. Crowder. 1998. An individual-based, spatially-explicit simulation model of the population dynamics of the endangered red-cockaded woodpecker. *Biological Conservation* 86:1-14.
- Miller, P.S., and R.C. Lacy. 1999. VORTEX: A stochastic simulation of the extinction process. Version 8 user's manual. Conservation Breeding Specialist Group, Apple Valley, Minnesota.
- Mills, L.S., and F.W. Allendorf. 1996. The one-migrant-per-generation rule in conservation and management. *Conservation Biology* 10:1509-1518.
- Milot, E., H.L. Gibbs, and K.A. Hobson. 2000. Phylogeography and genetic structure of northern populations of the yellow warbler (*Dendroica petechia*). *Molecular Ecology* 9:667-681.
- Patterson, G.A., and W.B. Robertson, Jr. 1981. Distribution and habitat of the red-cockaded woodpecker in Big Cypress National Preserve. South Florida Research Center Report T-613, Everglades National Park, Homestead, Florida.
- Sparks, J.C., R.E. Masters, D.M. Engle, M.W. Palmer, and G.A. Bukenhofer. 1998. Effects of late growing-season and late dormant-season prescribed fire on herbaceous vegetation in restored pine-grassland communities. *Journal of Vegetation Science* 9:133-142.
- _____, R.E. Masters, D.M. Engle, M.E. Payton, and G.A. Bukenhofer. 1999. Influence of fire season and fire behavior on woody plants in red-cockaded woodpecker clusters. *Wildlife Society Bulletin* 27:124-133.
- Stangel, P.W., and P.M. Dixon. 1995. Associations between fluctuating asymmetry and heterozygosity in the red-cockaded woodpecker. Pages 239-247 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- _____, M.R. Lennartz, and M.H. Smith. 1992. Genetic variation and population structure of red-cockaded woodpeckers. *Conservation Biology* 6:283-292.

U.S. Fish and Wildlife Service. 2001. Safe harbor agreements for private property owners: questions and answers. U.S. Fish and Wildlife Service, Endangered Species Program (<http://endangered.fws.gov>).

_____. 2003. Recovery plan for the red-cockaded woodpecker (*Picoides borealis*): second revision. U.S. Fish and Wildlife Service, Atlanta, Georgia, USA. 296pp.

Walters, J.R., L. B. Crowder, and J.A. Priddy. 2002. Population viability analysis for red-cockaded woodpeckers using an individual-based model. *Ecological Applications* 12:249-260.

TABLE 1. Status of the Florida red-cockaded woodpecker population in 2000 by property ownership.^a

Ownership Property	AC	PBG	Percent of State Total
Federal (8 properties, 24%)	1,081	865	77
Apalachicola Ranger District, Apalachicola National Forest	486	389	
Avon Park Air Force Range	20	16	
Big Cypress National Preserve	42	34	
Eglin Air Force Base	301	241	
Ocala National Forest	22	18	
Osceola National Forest	63	50	
St. Marks National Wildlife Refuge	9	7	
Wakulla Ranger District, Apalachicola National Forest	138	110	
State (18 properties, 53%)	268	214	19
Babcock/Webb Wildlife Management Area	27	22	
Blackwater River State Forest	26	21	
Bull Creek Wildlife Management Area	1	1	
Camp Blanding Training Site	14	11	
Central Florida Reception Center, South Unit	1	1	
Citrus Tract, Withlacoochee State Forest	46	37	
Corbett Wildlife Management Area	13	10	
Croom Tract, Withlacoochee State Forest	5	4	
Goethe State Forest	30	24	
Hal Scott Preserve ^b	7	6	
KICCO Wildlife Management Area	1	1	
Ochlockonee River State Park	3	2	
Picayune Strand State Forest	3	2	
Platt Branch Mitigation Park	4	3	
St. Sebastian River State Buffer Preserve	8	6	
Tate's Hell State Forest	29	23	
Three Lakes Wildlife Management Area	49	39	
Triple N Ranch Wildlife Management Area	1	1	
Private (7 properties, 21%)	48	38	3
Avalon Plantation	7	6	
Escape Ranch	9	7	
Fisheating Creek Phase I Conservation Easement	3	2	
Florida Red Hills	6	5	
Other (2 properties)	15	12	
T.M. Ranch	8	6	

Ownership Property	AC	PBG	Percent of State Total
Local Government (1 property, 3%)	7	6	1
Stanton Energy Center	7	6	
TOTAL (34 properties, 100%^c)	1,404	1,123	100

^aAC = active cluster, PBG = potential breeding group. Potential breeding groups were estimated from active clusters based on the estimated average ratio of 1.25 active clusters per potential breeding group (U.S. Fish and Wildlife Service 2003).

^bCo-owned by State of Florida and Orange County.

^cTotal does not add to 100% due to rounding.

TABLE 2. Minimum Species of Special Concern delisting requirements and minimum Threatened species listing requirements for the red-cockaded woodpecker in Florida.^{a,b}

Listing Criterion	Florida 2000 Status	Minimum Species of Special Concern Delisting Requirements	Minimum Threatened Species Listing Requirements
A. Future Population Trend	1,404 AC 1,123 PBG	<20% decline within next 20 years ^c range-wide 81% of 1,404 AC = ≥1,137 AC (13 per year) 81% of 1,123 PBG = ≥910 PBG (11 per year)	≥50% decline within next 20 years ^c range-wide 50% of 1,404 AC = ≤702 AC (35 per year) 50% of 1,123 PBG = ≤562 PBG (28 per year)
B1. Extent of Occurrence^d	46,100 miles ²	≥7,700 miles ² range-wide 25% of 7,700 miles ² = ≥1,925 miles ²	<2,000 miles ² range-wide 25% of 2,000 miles ² = <500 miles ²
B2. Area of Occupancy^e	253 miles ² 1,404 AC 1,123 PBG	≥770 miles ² range-wide 25% of 770 miles ² = ≥193 miles ² 193 miles ² ÷ 0.18 miles ² = ≥1,072 AC 193 miles ² ÷ 0.18 miles ² = ≥858 PBG	<200 miles ² range-wide 25% of 200 miles ² = <50 miles ² 50 miles ² ÷ 0.18 miles ² = <278 AC 50 miles ² ÷ 0.18 miles ² = <222 PBG
C. Future Population Size and Trend	3,510 adults ^g 1,404 AC 1,123 PBG	≥10,000 adults AND <10% decline within next 20 years ^c range-wide ≥25% of 10,000 = ≥2,500 adults 91% of 1,404 AC = ≥1,277 AC (6 per year) 91% of 1,123 PBG = ≥1,022 PBG (5 per year)	<2,500 adults AND ≥20% decline with next 13 years ^f range-wide 25% of 2,500 adults = <625 adults 80% of 1,404 AC = ≤1,123 AC (22 per year) 80% of 1,123 PBG = ≤898 PBG (17 per year)
D. Mature Individuals	3,510 adults ^g	≥1,000 adults range-wide 25% of 1,000 adults = ≥250 adults	<250 adults range-wide 25% of 250 adults = <63 adults
E. Extinction Probability	Unknown	<10% probability within 100 years range-wide Unknown	≥20% probability within 33 years ^h range-wide Unknown

^aAC = active cluster, PBG = potential breeding group. Potential breeding groups were estimated from active clusters based on the estimated average ratio of 1.25 active clusters per potential breeding group (U.S. Fish and Wildlife Service 2003).

^bMinimum requirements were based on the status of the Florida population in 2000 and the premise that Florida will continue to represent at least 25% of the range-wide population. Appendix 3 provides a complete description of the FWC listing criteria.

^cTwenty years equal 3 generations based on the estimated generation time for male red-cockaded woodpeckers (6.5 years x 3).

^dFlorida extent of occurrence in 2000 was calculated by using ArcView GIS software to draw a convex polygon around the outer perimeter of the species' known range.

^eFlorida area of occupancy in 2000 was calculated by multiplying the number of active clusters by the average minimum home range size reported for the red-cockaded woodpecker (0.18m², Engstrom and Sanders 1997). Minimum active clusters and potential breeding groups for this criterion were derived by dividing the minimum Florida area of occupancy (25% of the range-wide area) by the average minimum home range size.

^fThirteen years equal 2 generations based on the estimated generation time for male red-cockaded woodpeckers (6.5 years x 2).

^gFlorida number of adults in 2000 was based on a mean group size of 2.5 adults per active cluster (U.S. Fish and Wildlife Service 2003).

^hThirty-three years equal 5 generations based on the estimated generation time for male red-cockaded woodpeckers (6.5 years x 5).

TABLE 3. Management units, metapopulations, and properties targeted for red-cockaded woodpecker management activities in Florida.^{a,b}

Management Unit Metapopulation Property	Ownership	2000 Status		2020 Goal	
		AC	PBG	AC	PBG
Western Panhandle		327	262	362	290
Blackwater River Metapopulation		26	21	31	25
Blackwater River State Forest	State	26	21		
Eglin Metapopulation		301	241	331	265
Eglin Air Force Range	Federal	301	241		
Eastern Panhandle		678	542	761	609
Apalachicola Metapopulation		665	531	730	584
Apalachicola Ranger District, Apalachicola National Forest	Federal	486	389		
Ochlockonee River State Park	State	3	2		
St. Marks National Wildlife Refuge	Federal	9	7		
Tate’s Hell State Forest	State	29	23		
Wakulla Ranger District, Apalachicola National Forest	Federal	138	110		
Red Hills Metapopulation		13	11	31	25
Avalon Plantation	Private	7	6		
Other Private Lands	Private	6	5		
Northern Peninsula		77	61	125	100
Camp Blanding Metapopulation		14	11	31	25
Camp Blanding Training Site	State	14	11		

Management Unit Metapopulation Property	Ownership	2000 Status		2020 Goal	
		AC	PBG	AC	PBG
Osceola Metapopulation ^c		63	50	94	75
Osceola National Forest	Federal	63	50		
North-Central Peninsula		108	87	145	116
Goethe Metapopulation		35	28	50	40
Goethe State Forest	State	30	24		
Private Lands	Private	5	4		
Ocala Metapopulation		22	18	31	25
Ocala National Forest	Federal	22	18		
Withlacoochee Metapopulation		51	41	64	51
Citrus Tract, Withlacoochee State Forest	State	46	37		
Croom Tract, Withlacoochee State Forest	State	5	4		
South-Central Peninsula		129	103	166	133
Avon Park Metapopulation		31	25	50	40
Avon Park Air Force Range	Federal	20	16		
KICCO Wildlife Management Area	State	1	1		
Private Lands	Private	10	8		
Big Econ Metapopulation		23	19	31	25
Central Florida Reception Center, South Unit	State	1	1		
Hal Scott Preserve	State/County	7	6		
Stanton Energy Center	City	7	6		
T.M. Ranch	Private	8	6		

Management Unit Metapopulation Property	Ownership	2000 Status		2020 Goal	
		AC	PBG	AC	PBG
St. Sebastian Metapopulation		8	6	13	10
St. Sebastian River State Buffer Preserve	State	8	6		
Three Lakes Metapopulation		60	48	72	58
Bull Creek Wildlife Management Area	State	1	1		
Escape Ranch	Private	9	7		
Three Lakes Wildlife Management Area	State	49	39		
Triple N Ranch Wildlife Management Area	State	1	1		
Southern Peninsula		85	68	126	101
Babcock/Webb Metapopulation		27	22	31	25
Babcock/Webb Wildlife Management Area	State	27	22		
Yucca Pens Unit, Babcock/Webb Wildlife Management Area	State	Unk	Unk		
Big Cypress Metapopulation		45	36	51	41
Big Cypress National Preserve	Federal	42	34		
Picayune Strand State Forest	State	3	2		
Private Lands	Private	Unk	Unk		
Corbett/Dupuis		13	10	31	25
Corbett Wildlife Management Area	State	13	10		
Dupuis Environmental Area	State	0	0		
Fisheating Creek Metapopulation		7	5	13	10
Fisheating Creek Phase I Conservation Easement	Private	3	2		
Platt Branch Mitigation Park	State	4	3		
Private Lands	Private	Unk	Unk		

Management Unit Metapopulation Property	Ownership	2000 Status		2020 Goal	
		AC	PBG	AC	PBG
TOTAL		1,404	1,123	1,686	1,349

^aAC = active cluster, PBG = potential breeding group. Potential breeding groups were estimated from active clusters based on the estimated average ratio of 1.25 active clusters per potential breeding group (U.S. Fish and Wildlife Service 2003).

^bThe following guidelines were used to establish the management unit and metapopulation goals for 2020: (1) by the year 2020, achieve at least a 20% increase in the Florida population over the next 20 years; (2) by the year 2020, secure and maintain (a) at least 100 potential breeding groups per management unit, (b) at least 2 metapopulations per management unit, and (c) 40 or more potential breeding groups in at least 1 of the metapopulations in each management unit; and (3) by the year 2020, increase metapopulations within management units (a) to at least 10 potential breeding groups if below 10 potential breeding groups in 2000, (b) to at least 25 potential breeding groups or 15% growth (whichever is higher) if above 9 but below 25 potential breeding groups in 2000, (c) to at least 40 potential breeding groups or 15% growth (whichever is higher) if above 24 but below 40 potential breeding groups in 2000, (d) by at least 15% or a net increase of 10 potential breeding groups if above 39 but less than 100 potential breeding groups in 2000, and (e) by at least 10% if above 99 potential breeding groups in 2000. Appendix 6 provides a complete description of these guidelines and the process used to develop the conservation objective for the red-cockaded woodpecker in Florida.

^cTo achieve at least 100 potential breeding groups in the Northern Peninsula Management Unit, the 2020 goal for the Osceola Metapopulation was set at 75 potential breeding group.

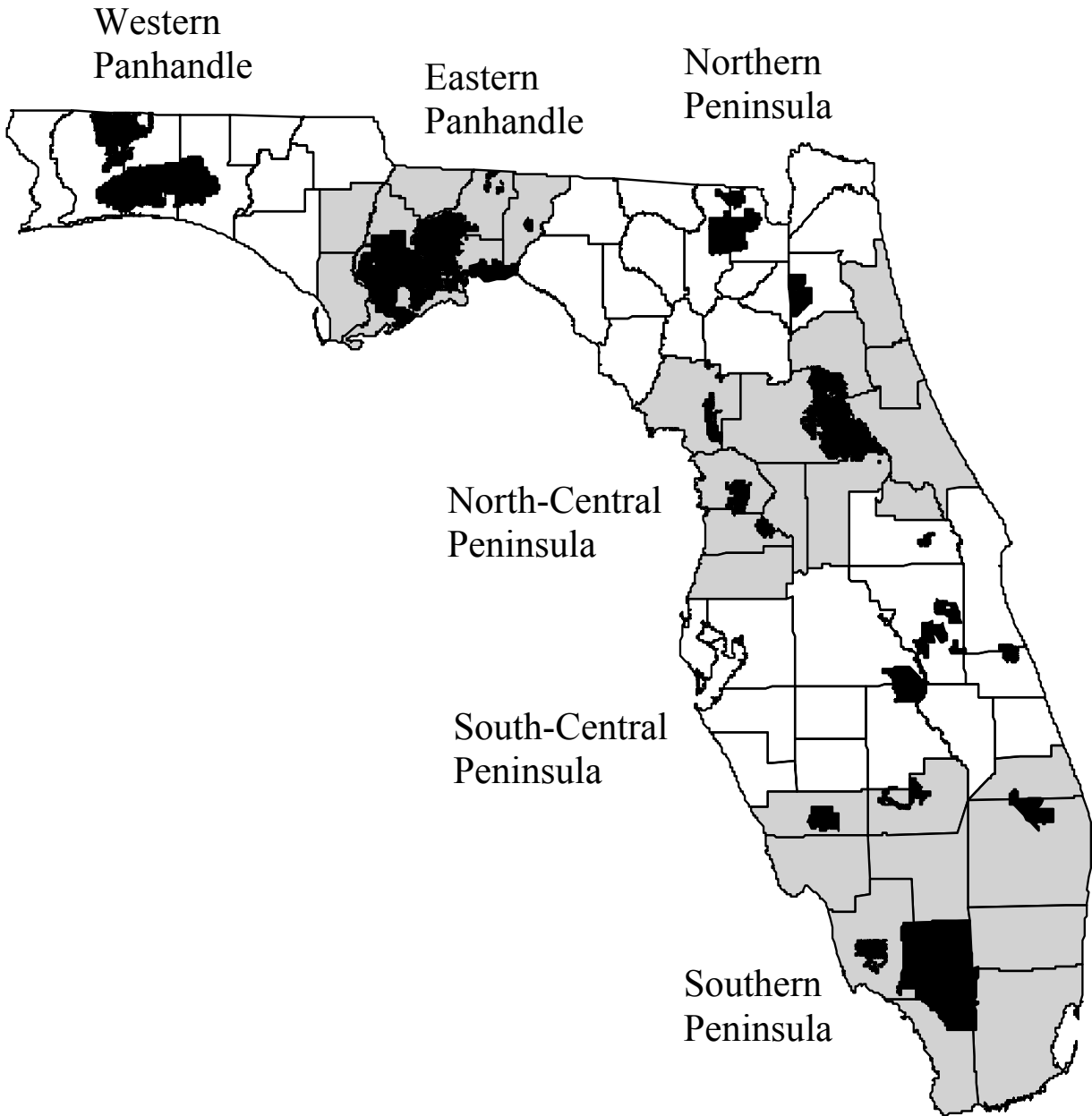


Figure 1. Distribution of the Florida red-cockaded woodpecker population in 2000 and location of designated management units.

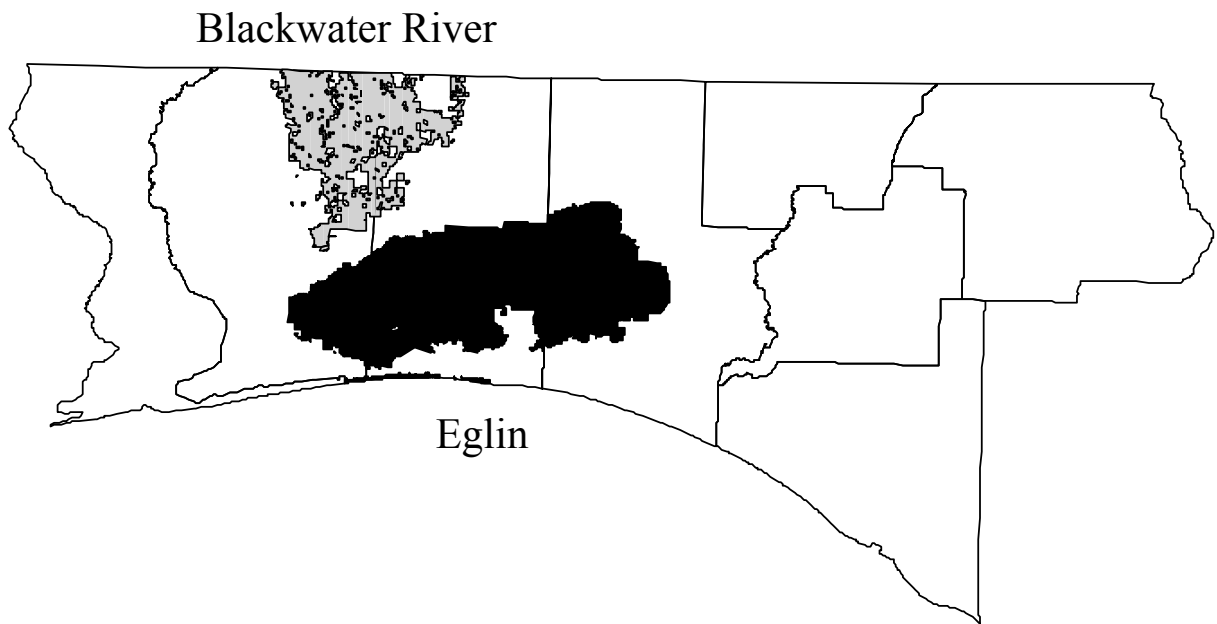


Figure 2. Metapopulations in the Western Panhandle Management Unit. (See Table 3 for a list of individual properties in each metapopulation.)

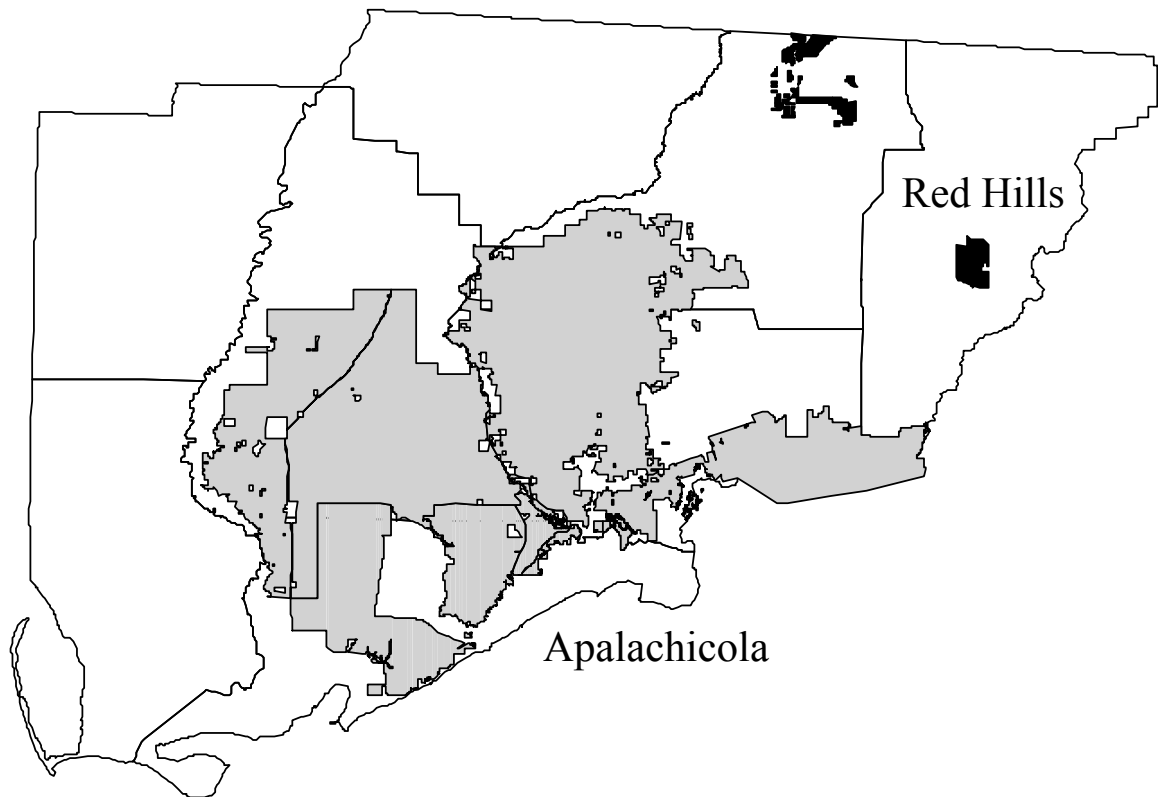


Figure 3. Metapopulations in the Eastern Panhandle Management Unit.

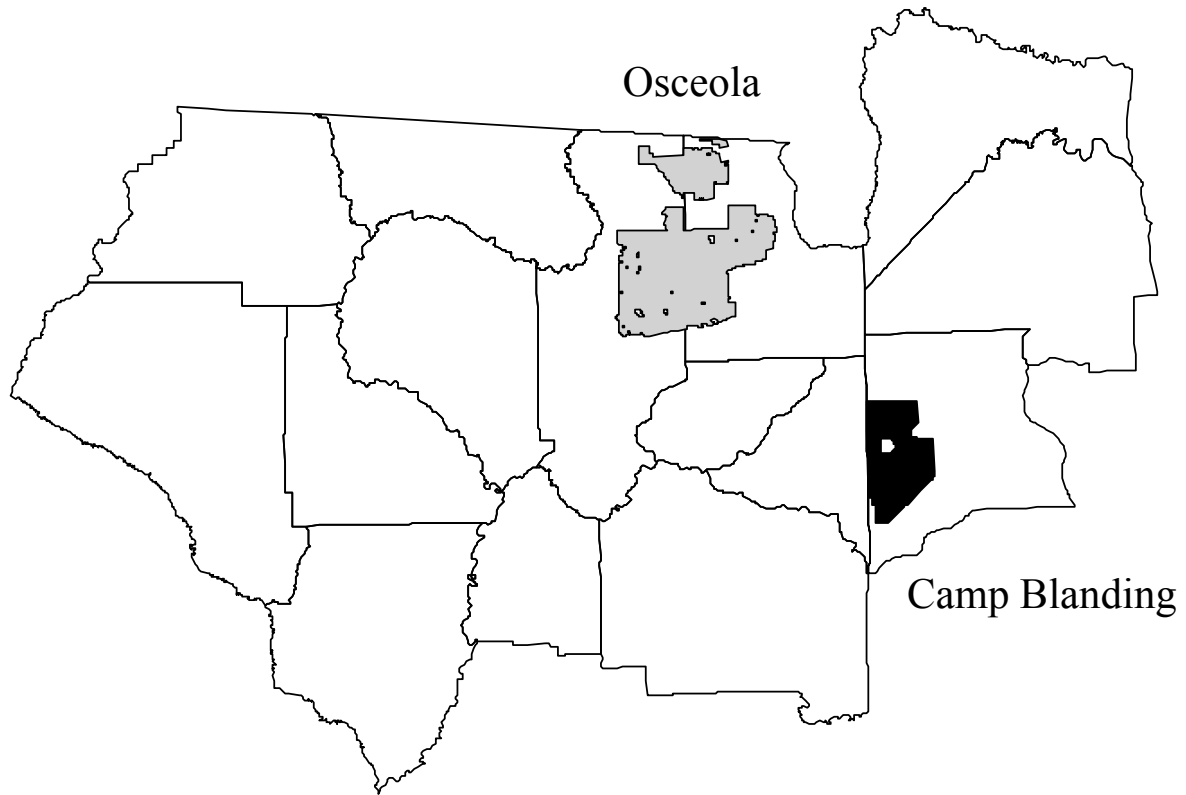


Figure 4. Metapopulations in the Northern Peninsula Management Unit.

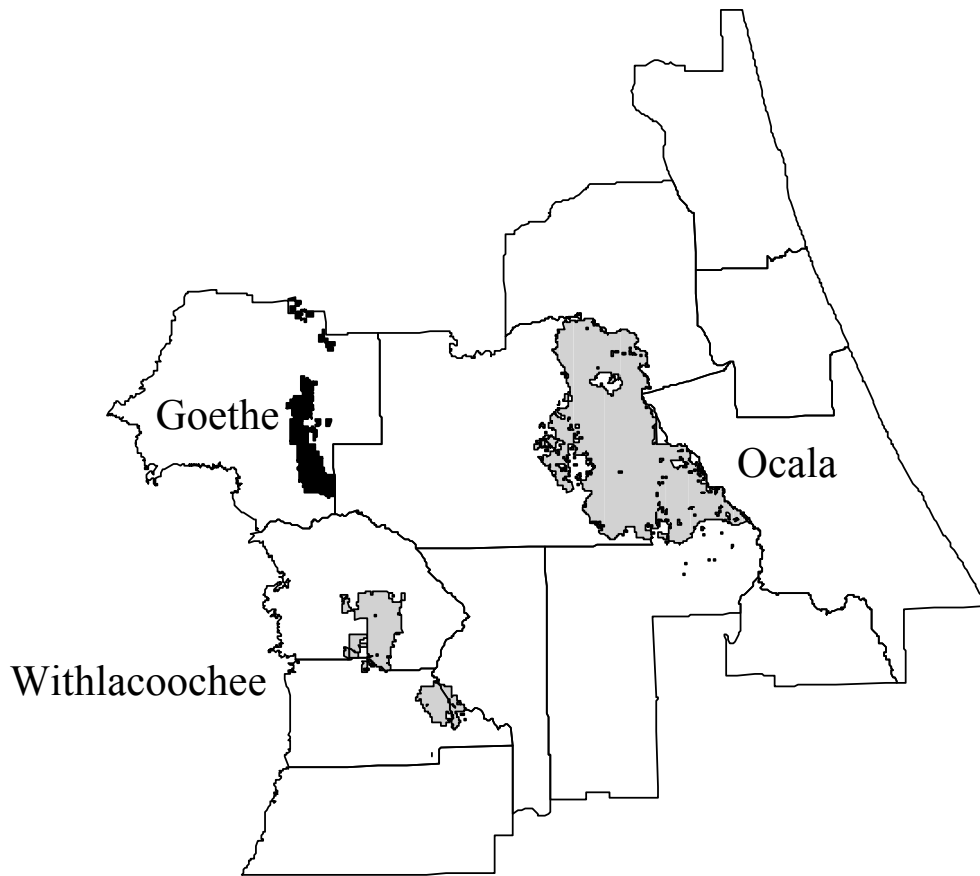


Figure 5. Metapopulations in the North-Central Peninsula Management Unit.

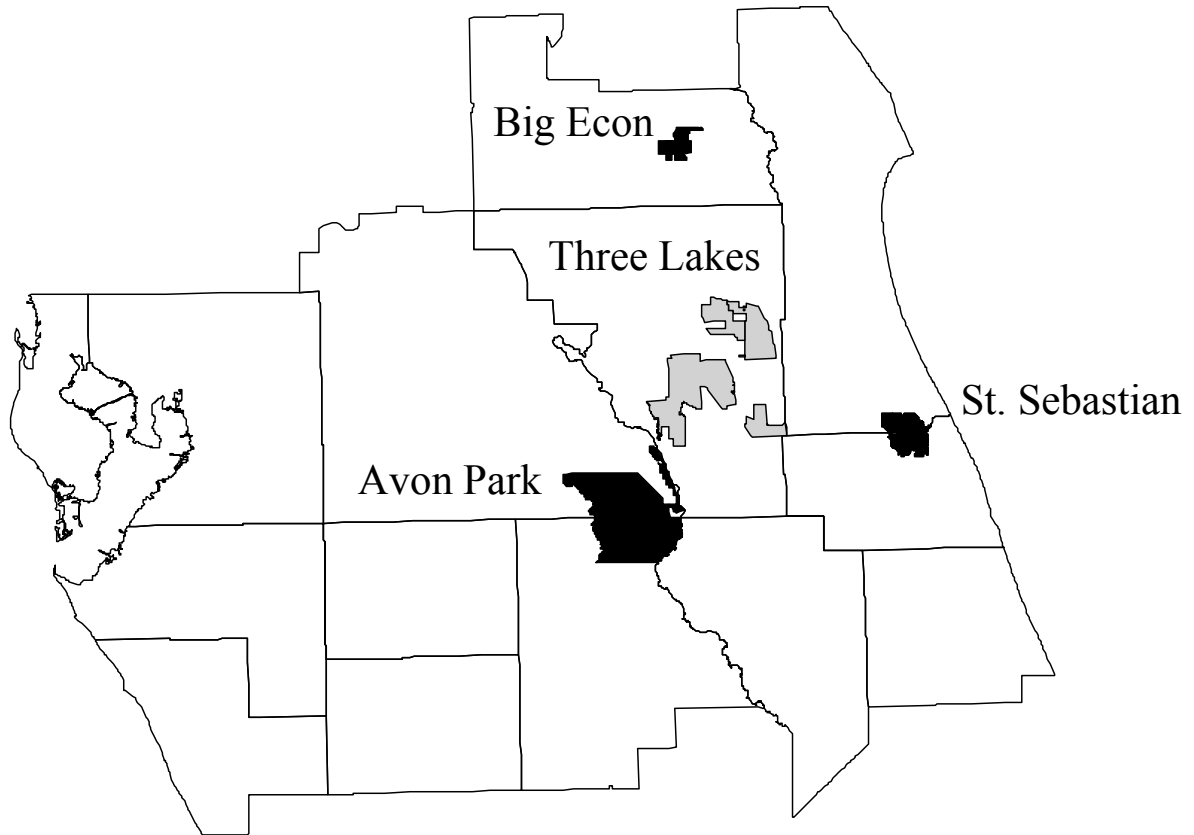


Figure 6. Metapopulations in the South-Central Peninsula Management Unit.

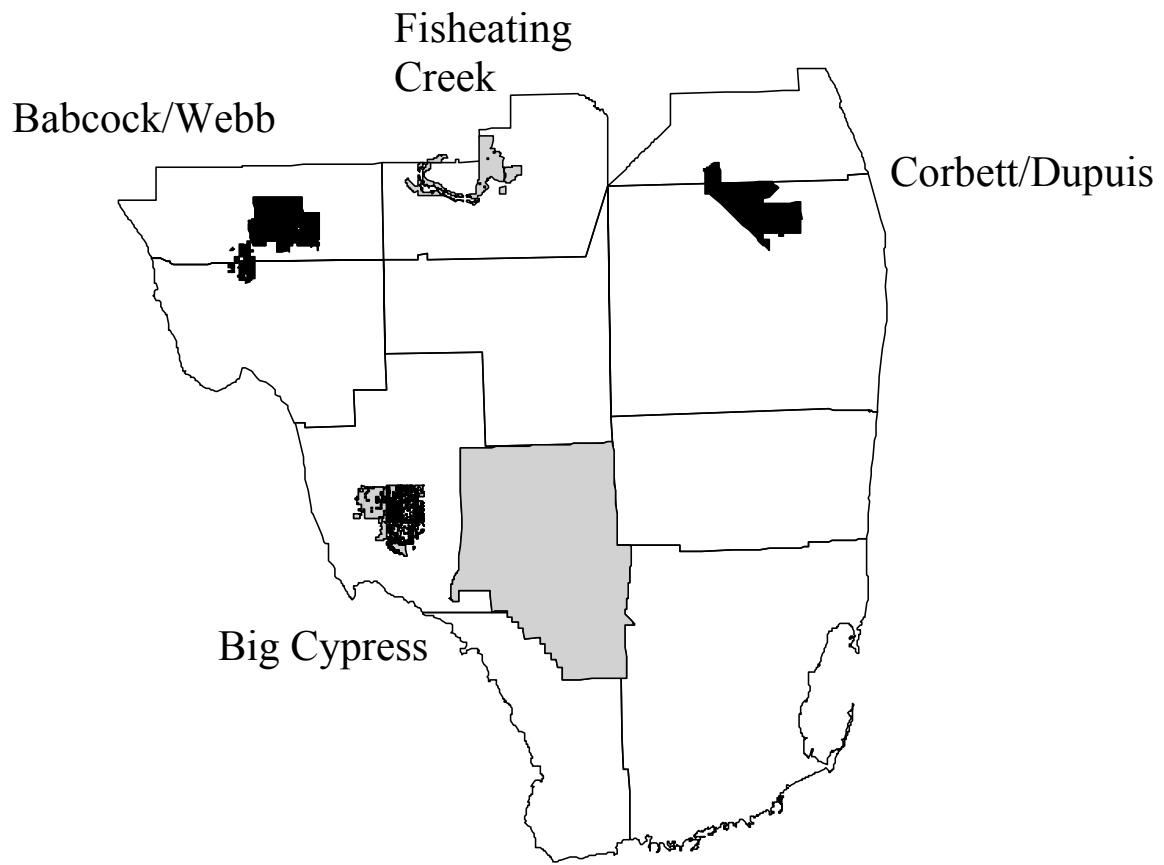


Figure 7. Metapopulations in the Southern Peninsula Management Unit.

APPENDICES

APPENDIX 1. Procedures for listing, delisting and reclassifying Endangered, Threatened and Species of Special Concern.

Rule 68A-27.0012, Florida Administrative Code (F.A.C.)

- (1) Petition to list, delist, or reclassify a species in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C.
 - (a) Persons wishing to add, delete or reclassify species in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., shall submit a written petition to the Commission.
 1. Petitions shall be clearly identified as such, and must contain the following in order to be considered complete:
 - a. The rule to which the species is proposed to be added, removed from or reclassified to,
 - b. The name, address and signature of the petitioner, and
 - c. Sufficient information on the biology and distribution of the species to warrant investigation of its status using the criteria contained in definitions of endangered, threatened or species of special concern in Rule 68A-1.004, F.A.C.
 - (b) Incomplete petitions will be returned to the petitioner with insufficiencies clearly noted in writing. Corrected petitions may be resubmitted for consideration.
 - (c) Complete petitions will be evaluated in accordance with the provisions in subsection (2).
 - (d) If, in the opinion of the Executive Director, immediate inclusion of a species in Rule 68A-27.003(1), F.A.C., is essential to prevent imminent extinction, such listing may be effected on a temporary basis not to exceed 240 days. Such emergency listings shall be approved by the Commission at the next scheduled meeting. The Commission shall conduct the evaluations prescribed in (2) and (3) of this subsection to determine the appropriate final classification of the species.
- (2) Review of petitions to determine biological status; Phase 1.
 - (a) The Commission shall establish a deadline for completion of the biological review of each complete petition.
 - (b) The Commission shall provide notice by mail to parties who request such notification and shall publish in the Florida Administrative Weekly a solicitation of information on the biological status of the petitioned species. Written comments regarding biological status shall be accepted by the Commission for a period of no less than 45 days following public notice.
 - (c) The Commission shall summarize information provided in the petition, information obtained from the public and other available biological data on status of the petitioned species into a preliminary biological status report. The preliminary biological status report shall contain a recommended classification for the petitioned species consistent with the available biological data and based on the criteria established in 68A-1.004, F.A.C.
 - (d) The Commission shall designate a biological review panel with a minimum of three scientists with demonstrated knowledge and expertise pertaining to species conservation and management. This panel shall independently evaluate information compiled on the

- petitioned species' biological status relative to its proposed classification in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C.
- (e) The biological status report and the information referenced in subparagraph (c) shall be provided to members of the panel of scientific experts for the review mandated in (d) of this subsection. Panel members shall have no fewer than 45 days to review the document and provide recommendations to the Commission.
 - (f) The Commission shall consider the final biological status report, biological recommendations from the panel of scientific experts and public testimony regarding biological status in making a final determination whether addition, deletion or reclassification of the petitioned species in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., is warranted.
 - (g) If the petitioned species is determined by the Commission to warrant inclusion in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., the Commission shall:
 - 1. Specify the appropriate listing category for the species based on biological status.
 - 2. Establish a deadline for completion of Phase 2 for the species as described in subsection (3) below, considering the recommendation of Commission employees and other interested parties.
 - 3. If the species is not already listed in Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., it shall be added to the list of candidate species in Rule 68A-27.0021, F.A.C., and the protective provisions therein shall apply to the species.
- (3) Development of management plans, regulations, permit requirements for candidate species; Phase 2.
- (a) Within 45 days following designation of a candidate species, the Commission shall provide notice by mail to parties who request such notification and shall publish in the Florida Administrative Weekly a solicitation of information on the conservation needs of the species, and any economic and social factors that should be considered in its management.
 - (b) The Commission shall use information obtained from the public and other available information to develop a draft management plan for each candidate species that addresses:
 - 1. Biological status as determined in Phase 1,
 - 2. Conservation objectives,
 - 3. Recommended management actions,
 - 4. Recommended Commission regulations and incentives,
 - 5. Anticipated economic and social impacts of implementing or not implementing the recommended conservation actions.
 - (c) The Commission shall provide notice by mail to parties who request such notification and shall publish in the Florida Administrative Weekly a notice of the availability of the draft management plan. Written comments regarding conservation recommendations and expected economic and social impacts of implementation of the management plan shall be accepted by the Commission for a period of no less than 45 days following public notice.
 - (d) Final Commission action on the petition shall include:
 - 1. Deletion of the species from 68A-27.0021 if appropriate, and addition to and/or deletion from Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., in accordance with the determination made in (2) of this subsection.

2. A determination on any proposed regulations in the management plan.

Specific Authority Art. IV, Sec. 9, Fla. Const.

Law Implemented Art. IV, Sec. 9, Fla. Const.

History--New 6-23-99, Formerly 39-27.0012.

APPENDIX 2. Petition to reclassify the red-cockaded woodpecker (*Picoides borealis*) as a Species of Special Concern in Florida.

Introduction

By this petition, the Florida Fish and Wildlife Conservation Commission (FWC) is requested to reclassify the red-cockaded woodpecker (*Picoides borealis*) from a Threatened Species (Rule 68A-27.004, F.A.C.) to a Species of Special Concern (Rule 68A-27.005, F.A.C.) under the provisions established in Rule 68A-27.0012, F.A.C. During the past decade, aggressive management of red-cockaded woodpeckers (RCWs) and their habitat has led to an overall range-wide increase in the species' abundance (James 1995, U.S. Fish and Wildlife Service 2000). An FWC Bureau of Wildlife Diversity Conservation staff evaluation of recent research and survey data indicates that RCWs no longer meet the criteria for listing as a Threatened Species, as defined in Rule 68A-1.004, F.A.C., but may still qualify as a Species of Special Concern. Reclassifying the RCW as a Species of Special Concern will more appropriately reflect the species' status. Continued management and monitoring of RCW populations in Florida will be necessary to prevent the species from reverting to its threatened status.

Biological Information

Under FWC listing criteria in Rule 68A-27.0012, F.A.C. and definitions in Rule 68A-1.004 F.A.C., species are classified on the state list according to their range-wide status. Accordingly, information reported here is gleaned from throughout the range of the RCW.

The habitat requirements of the RCW are both unique and specific: the birds exclusively excavate their nest and roost cavities in old-age (80+ years) live pines within mature, open pine forests with sparse midstory vegetation. Although once the dominant upland vegetation in the southeastern United States (approximately 55 to 92 million acres) (Platt et al. 1988, Ware et al. 1993, U.S. Fish and Wildlife Service 2000), these forests have been reduced to approximately 3% of their former range since European settlement (U.S. Fish and Wildlife Service 2000). Land-use changes related to silviculture, agriculture, and development account for most of this loss. Former or potential RCW habitat also has been degraded or rendered unsuitable in Florida and elsewhere by fire suppression, alteration in frequency or season of burn, excessive thinning, and removal of mature pines. Concomitant with habitat loss and degradation, the distribution of the RCW was substantially altered and populations declined precipitously until the early 1990's. Now found primarily in the coastal plain states of the Southeast, RCWs have been extirpated from New Jersey, Maryland, Pennsylvania, Missouri, Tennessee, and Kentucky (Jackson 1994; R. Costa, U.S. Fish and Wildlife Service, personal communication). The remaining population is highly fragmented and estimated at <3% of the species' pre-settlement abundance (U.S. Fish and Wildlife Service 2000).

The decline in RCW habitat and abundance led the U.S. Fish and Wildlife Service to list the species as endangered in 1970, and in 1974 the RCW was listed as threatened by the State of Florida. Although the amount of RCW habitat has not increased measurably since these listings, the aggressive application of several new management techniques (i.e., artificial cavity construction and translocation of birds) has been quite effective at stabilizing or increasing individual populations in Florida and elsewhere. These management activities, coupled with the

discovery of “new” RCW populations on previously unsurveyed lands, have yielded an overall increase in RCW abundance over the past 10 years (James 1995, U.S. Fish and Wildlife Service 2000). Currently, the range-wide population of RCWs is estimated at 12,500 individuals (U.S. Fish and Wildlife Service 2000), but only the public lands component of that estimate is based on recent and rigorous survey information. Considering public lands only, RCWs occur on 98 federal and state properties, which collectively support an estimated 10,000 birds (2,800 to 3,600 potential breeding groups) (U.S. Fish and Wildlife Service 2000; Ralph Costa, U.S. Fish and Wildlife Service, personal communication). Despite these encouraging numbers, it is important to note that most of these RCW populations are small and isolated, or exist in poor quality habitat; only 13 public properties support >275 birds (100 potential breeding groups) and only 21 support >135 birds (50 potential breeding groups) (U.S. Fish and Wildlife Service 2000; Ralph Costa, U.S. Fish and Wildlife Service, personal communication).

State of Florida listing criteria for Threatened Species require that one of the following general conditions be met: (1) the species has undergone a population decline of 50% over the past three generations, (2) the species is expected to undergo a 50% decline over the next three generations, (3) the extent of occurrence is less than 2,000 square miles, (4) the area occupied is less than 200 square miles, (5) the population numbers less than 2,500 individuals, or (5) a quantitative analysis shows the species has a 20% or higher probability of extinction within five generations. Based on the data summarized above, FWC staff contends the RCW meets none of these criteria, under the assumption current management efforts are continued into the future. FWC staff believe a rigorous analysis of available data during the preparation of the status report for this species will show that it meets one or more of the criteria for listing as a Species of Special Concern, though it is possible the RCW might warrant removal from the state list altogether. However, as this increase is dependent upon continued management of RCWs and their habitat, and because the species’ distribution remains highly fragmented, this reclassification should be accompanied by a comprehensive management plan that outlines how Florida will contribute to the range-wide recovery of the RCW and which safeguards against the species reverting to its former threatened status.

Literature Cited

- Jackson, J.A. 1994. Red-cockaded woodpecker (*Picoides borealis*). The birds of North America No. 85. Academy of Natural Sciences, Philadelphia, Pennsylvania, and the American Ornithologists' Union, Washington, D.C., USA.
- James, F.C. 1995. The status of the red-cockaded woodpecker in 1990 and the prospect for recovery. Pages 439-451 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- Platt, W.J., G.W. Evans, and S.L. Rathbun. 1988. The population dynamics of a long-lived conifer (*Pinus palustris*). American Naturalist 131:491-525.
- U.S. Fish and Wildlife Service. 2000. Technical/agency draft revised recovery plan for the red-cockaded woodpecker (*Picoides borealis*). U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia, USA.

Ware, S., C. Frost, and P.D. Doerr. 1993. Southern mixed hardwood forest: the former longleaf pine forest. Pages 447-493 in W.H. Martin, S.G. Boyce, and A.C. Echternacht, editors. Biodiversity of the southeastern United States. John Wiley and Sons, New York, USA.

Petitioner Information

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Date: 30 July 2001

APPENDIX 3. Definitions of the Florida Fish and Wildlife Conservation Commission relative to listed species.

Rule 68A-1.004, Florida Administrative Code (F.A.C.)

The following definitions are for the purpose of carrying out the provisions of the rules of the Fish and Wildlife Conservation Commission relating to wild animal life and freshwater aquatic life. As used herein, the singular includes the plural. The following shall be construed respectively to mean:

- (18) Candidate species — A species, subspecies, or isolated population of a species or subspecies, which has been determined by the Commission to warrant listing under Rules 68A-27.003, 68A-27.004 or 68A-27.005, F.A.C., but for which actual listing in the aforementioned rules is pending development of a management plan.
- (25) Direct take — Intentionally pursuing, hunting, capturing, killing, or destroying fish or wildlife or the nests, eggs, homes or dens of fish or wildlife.
- (26) Endangered species — As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is so few or depleted in number or so restricted in range or habitat due to any man-made or natural factors that it is in imminent danger of extinction as determined by (a), (b), (c), (d) or (e) below:
 - (a) Population reduction in the form of either:
 - 1. An observed, estimated, inferred or suspected reduction of at least 80% over the previous ten years or three generations, whichever is longer, based on, and specifying, any of the following:
 - a. Direct observation
 - b. An index of abundance appropriate for the species
 - c. A decline in area of occupancy, extent of occurrence or quality of habitat
 - d. Actual or potential levels of exploitation
 - e. The effects of introduced species, hybridization, pathogens, pollutants, competitors or parasites
 - 2. A reduction of at least 80%, projected or suspected to be met within the next ten years or three generations, whichever is longer, based on, and specifying, any of 1.b., 1.c., 1.d. or 1.e. above.
 - (b) Extent of occurrence estimated to be less than 40 square miles or area of occupancy estimated to be less than 4 square miles, and estimates indicating any two of the following:
 - 1. Severity fragmented or known to exist at only a single location.
 - 2. Continuing decline, observed, inferred or projected, in any of the following:
 - a. Extent of occurrence
 - b. Area of occupancy
 - c. Area, extent and/or quality of habitat
 - d. Number of locations or subpopulations
 - e. Number of mature individuals
 - 3. Extreme fluctuations in any of the following:

- a. Extent of occurrence
 - b. Area of occupancy
 - c. Number of locations or subpopulations
 - d. Number of mature individuals
- (c) Population estimated to number fewer than 250 mature individuals and either:
1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, or
 2. A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either:
 - a. Severe fragmentation (that is, no subpopulation estimated to contain more than 50 mature individuals).
 - b. All individuals are in a single subpopulation.
- (d) Population estimated to number less than 50 mature individuals.
- (e) Quantitative analysis showing the probability of extinction in the wild is at least 50% within ten years or three generations, whichever is longer.
- (73) Species of special concern — As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a moderate risk of extinction in the future, as determined by (a), (b), (c), (d) or (e) below:
- (a) Population reduction in the form of either:
1. An observed, estimated, inferred or suspected reduction of at least 20% over the last ten years or three generations, whichever is longer, based on, and specifying, any of the following:
 - a. Direct observation
 - b. An index of abundance appropriate for the species
 - c. A decline in area of occupancy, extent of occurrence and/or quality of habitat
 - d. Actual or potential levels of exploitation
 - e. The effects of introduced species, hybridization, pathogens, pollutants, competitors or parasites
 2. A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is longer, based on, and specifying, any of 1.b., 1.c., 1.d. or 1.e. above.
- (b) Extent of occurrence estimated to be less than 7,700 square miles or area of occupancy estimated to be less than 770 square miles, and estimates indicating any two of the following:
1. Severely fragmented or known to exist at only a single location.
 2. Continuing decline, observed, inferred or projected, in any of the following:
 - a. Extent of occurrence
 - b. Area of occupancy
 - c. Area, extent and/or quality of habitat
 - d. Number of locations or subpopulations
 - e. Number of mature individuals
 3. Extreme fluctuations in any of the following:
 - a. Extent of occurrence
 - b. Area of occupancy
 - c. Number of locations or subpopulations
- d. Number of mature individuals

- (c) Population estimated to number fewer than 10,000 mature individuals and either:
 - 1. An estimated continuing decline of at least 10% within ten years or three generations, whichever is longer; or
 - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
 - a. Severely fragmented (i.e., no subpopulation estimated to contain more than 1,000 mature individuals).
 - b. All individuals are in a single subpopulation.
 - (d) Population very small or restricted in the form of either of the following:
 - 1. Population estimated to number fewer than 1,000 mature individuals
 - 2. Population is characterized by an acute restriction in its area of occupancy (less than 40 square miles) or in the number of locations (fewer than 5)
 - (e) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.
- (77) Threatened species — As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a very high risk of extinction in the future, as determined by (a), (b), (c), (d) or (e) below:
- (a) Population reduction in the form of either of the following:
 - 1. An observed, estimated, inferred, or suspected reduction of at least 50% over the last ten years or three generations, whichever is longer, based on, and specifying, any of the following:
 - a. Direct observation
 - b. An index of abundance appropriate for the species
 - c. A decline in area of occupancy, extent of occurrence and/or quality of habitat
 - d. Actual or potential levels of exploitation
 - e. The effects of introduced species, hybridization, pathogens, pollutants, competitors or parasites
 - 2. A reduction of at least 50%, projected or suspected to be met within the next ten years or three generations, whichever is longer, based on, and specifying, any of 1.b., 1.c., 1.d. or 1.e. above.
 - (b) Extent of occurrence estimated to be less than 2,000 square miles or area of occupancy estimated to be less than 200 square miles, and estimates indicating any two of the following:
 - 1. Severely fragmented or known to exist at no more than five locations
 - 2. Continuing decline, observed, inferred or projected, in any of the following:
 - a. Extent of occurrence
 - b. Area of occupancy
 - c. Area, extent and/or quality of habitat
 - d. Number of locations or subpopulations
 - e. Number of mature individuals
 - 3. Extreme fluctuations in any of the following:
 - a. Extent of occurrence
 - b. Area of occupancy
 - c. Number of locations or subpopulations
 - d. Number of mature individuals

- (c) Population estimated to number fewer than 2,500 mature individuals and either:
 - 1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer; or
 - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
 - a. Severely fragmented (i.e., no subpopulation estimated to contain more than 250 mature individuals)
 - b. All individuals are in a single subpopulation.
- (d) Population estimated to number fewer than 250 mature individuals.
- (e) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is longer.

APPENDIX 4. Final Biological Status Report for the red-cockaded woodpecker.

(Note: Only the body of the biological status report is included here. A complete copy of the report may be obtained from the Florida Fish and Wildlife Conservation Commission, Division of Wildlife, Bureau of wildlife Diversity Conservation, 620 South Meridian St., Tallahassee, Florida 32399-1600 [phone 850-488-3831]).

INTRODUCTION

In June 2001, Florida Fish and Wildlife Conservation Commission (FWC) staff conducted a preliminary status review of the red-cockaded woodpecker (*Picoides borealis*). The review was not based on a perceived change in the status of the red-cockaded woodpecker, but rather was undertaken as a precursor to the development of a species management plan according to the procedural requirements of Florida's 2-phase listing process (Rule 68A-27.0012 Florida Administrative Code [F.A.C.], Appendix 1). The results of the preliminary status review prompted FWC staff to prepare a petition to reclassify the red-cockaded woodpecker as a species of special concern (Rule 68A-27.005 F.A.C.). The species is currently on the state list of threatened species (Rule 68A-27.004 F.A.C.). At their September 2001 meeting, the agency's Commissioners determined the petition was sufficient and directed staff to undertake a comprehensive assessment of the red-cockaded woodpecker's biological status pursuant to the criteria and definitions embodied in Rule 68A-1.004 F.A.C. (Appendix 2). In order to warrant state listing as an endangered species, threatened species, or species of special concern, the red-cockaded woodpecker, on a range-wide scale, must meet at least 1 of the 5 criteria in 68A-1.004 F.A.C. Herein we present information concerning the status of the red-cockaded woodpecker in relation to those criteria.

BIOLOGICAL INFORMATION

Taxonomic Classification

Red-cockaded woodpeckers (*Picoides borealis*) are members of the class Aves, order Piciformes, and family Picidae.

Life History and Habitat

The red-cockaded woodpecker is a small bird about the size of a northern cardinal (*Richmondia cardinalis*, 7.5–8.5 inches in length). The species is identified by its black cap and nape, black and white barred back, white underparts, and large white cheek patches. The red cockade, which is rarely visible and only present on adult males, consists of a small streak of red feathers above each cheek patch.

The red-cockaded woodpecker is a fire-dependent species that inhabits open, mature pine forests with sparse midstory vegetation. The species is unique in its use of old growth, living pines for cavity excavation. Although longleaf pine (*Pinus palustris*) is preferred when available, cavities also are constructed in slash (*P. elliotii*), loblolly (*P. taeda*), shortleaf (*P. echinata*), pond (*P. serotina*), pitch (*P. rigida*), and Virginia (*P. virginiana*) pines. Cavity trees

typically are over 80 years old and often infected with *Phellinus pini*, a fungus that decays the heartwood and facilitates cavity excavation. Cavity construction time varies from several months to several years, but once completed a cavity may be used for several decades (Conner and Rudolph 1995).

Adults are territorial cooperative breeders, and a breeding group consists of the breeding pair and 0-4 adult “helpers” (usually male, and the progeny of 1 or both breeding adults). Typically each group member roosts alone in a cavity, and the aggregate of roost trees and surplus cavity trees inhabited by a group is called an active cluster. Range-wide, group size averages 2.5 adults per active cluster (U.S. Fish and Wildlife Service, unpublished data). The age of first breeding varies between the sexes but is typically 3 years or less (Reed et al. 1993; Bowman et al. 1998; R. DeLotelle, DeLotelle and Gutherie, Inc., personal communication). We calculated generation time (average age of breeders) using Vortex 8.41 (Miller and Lacy 1999) to be 6.5 years for males and 5 years for females. The nesting season extends from April through June and females lay an average of 3-4 eggs in the breeding male’s roost cavity. All birds in a group will assist with egg incubation and the brooding of nestlings during the day. Young fledge on or near day 26 and either remain in the breeding group as helpers or disperse before the next breeding season.

Red-cockaded woodpeckers feed primarily on bark-dwelling arthropods (e.g., beetles, roaches, ants, etc.) in pine-dominated habitats. Although pine plantations and/or younger pines may be used, open pine habitats with an abundance of older, larger trees are preferred (Bowman et al. 1998, U.S. Fish and Wildlife Service 2000). Good quality foraging habitat also has a low density of small and medium pines, few hardwoods, and a groundcover of forbs and bunchgrasses (U.S. Fish and Wildlife Service 2000). Home range size varies considerably and appears to be inversely related to habitat quality. The smallest average home range size reported was 116 acres in southwest Georgia (Engstrom and Sanders 1997) and the largest was 492 acres in south-central Florida (Bowman et al. 1998). Despite this variability, on a range-wide basis, 200 acres generally is designated for public lands as the minimum amount of habitat needed to support a group of red-cockaded woodpeckers on all but the highest quality sites (U.S. Fish and Wildlife Service 2000).

Distribution

The red-cockaded woodpecker occurs in the Piedmont and Coastal Plain of the southeastern United States. In Florida, it is found from the Panhandle throughout the Peninsula to northern Monroe County. Throughout its range, the species’ distribution is highly fragmented and restricted to areas where suitable habitat occurs. Many populations are relatively small (fewer than 100 active clusters) and/or isolated. Given the historical distribution of their habitat, it is likely that red-cockaded woodpeckers were both common and widespread in the southeastern United States prior to European settlement. The species’ life history traits (i.e., a territorial, cooperative breeder with short dispersal distances) and preliminary genetic data (Stangel et al. 1992, Haig et al. 1994, Daniels and Walters 2000) suggest that population health and viability were maintained by a continuous distribution.

BIOLOGICAL STATUS ASSESSMENT

Available data on the range-wide red-cockaded woodpecker population were evaluated relative to each of the 5 criteria for state listing under Rule 68A-1.004 F.A.C. (Appendix 2). Many of these data were derived from assessments and analyses completed by the federal red-cockaded woodpecker recovery team as part of the current recovery plan revision process (U.S. Fish and Wildlife Service 2000; U.S. Fish and Wildlife Service, unpublished data). The criteria reflect various warning signals that indicate whether or not a species is at risk, including range-wide population reductions; a small distribution area combined with a fragmented, declining, or widely fluctuating population; a small population number in combination with a population decline; an extremely small population; or extinction risk levels within specified time frames. In order to qualify for state listing as either endangered, threatened, or species of special concern, the red-cockaded woodpecker must be shown to meet at least 1 of the 5 criteria.

Criterion A: Population Reduction

This criterion requires the assessment of an observed, estimated, inferred, or suspected population reduction exhibited by the range-wide red-cockaded woodpecker population over either the previous or the next 10 years or 3 generations, whichever is longer. To meet this criterion for listing as endangered, threatened, or species of special concern, the population reduction percentage must be at least 80%, 50%, or 20%, respectively. We use 20 years as the relevant time interval for this assessment based on our calculation of 6.5 years as the generation time for male red-cockaded woodpeckers ($6.5 \times 3 = 19.5$, rounded up to 20 years).

Previous Trend.—Although red-cockaded woodpeckers were afforded federal protection as an endangered species in 1970, their numbers have not increased substantially in the ensuing 30 years. The species' decline is directly related to its unique habitat requirements—mature, fire-maintained pine forests with sparse midstory vegetation. Although once the dominant upland vegetation in the southeastern United States (approximately 55 to 92 million acres) (Platt et al. 1988, Ware et al. 1993, U.S. Fish and Wildlife Service 2000), these forests have been reduced to an estimated 3% of their former range (U.S. Fish and Wildlife Service 2000). In Florida alone, approximately 90% (6.8 million acres) of the longleaf pine habitat on commercial forests (i.e., private and public lands capable of industrial timber production) was lost between 1936 and 1995 (Kautz 1998), and approximately 50% of slash pine flatwoods in South Florida were lost by 1970 (B. Hartman, FWC, personal communication). Land use changes related to silviculture, agriculture, and development account for most of this loss. Former or potential red-cockaded woodpecker habitat also has been degraded or rendered unsuitable due to fire suppression, alteration in frequency or season of burn, excessive thinning, and removal of mature pines. Smaller group sizes and lower productivity are other deleterious consequences of fire suppression (James et al. 1997, Hardesty et al. 1997). Concomitant with habitat loss and degradation, habitat fragmentation has contributed to the species' decline. The ensuing isolation, either within or among populations, can lead to declines or extirpations at the local level (Crowder et al. 1998, Letcher et al. 1998, Walters et al. In Press). Thus, even under optimum habitat conditions, some red-cockaded woodpecker populations are at risk.

Unfortunately, the ability to quantify red-cockaded woodpecker population trends during the past 20 years is confounded by the extent and accuracy of available survey data. Preliminary surveys conducted in the 1970s and 1980s were incomplete, inconsistent, and biased toward federal lands, and thus underestimated the total population. Surveys during the past decade have been more thorough and comprehensive and have led to the discovery of existing but unknown populations and/or clusters on previously unsurveyed or more intensively surveyed properties. Consequently, recent population estimates are more accurate, but they cannot be compared with earlier estimates without giving a false impression of a range-wide population increase.

Despite these limitations, some inferences regarding previous population trends are possible. Between 1970 and the early 1980s all monitored populations except 1 declined in size (U.S. Fish and Wildlife Service 2000). The decline continued throughout the 1980s, when there was at least a 23% reduction in the range-wide population (James 1995). Although this estimate was undoubtedly low (James 1995), the decline could not be more precisely quantified due to the aforementioned problems with the survey data. During the 1990s this trend began to slow, and in some cases reverse, due to the aggressive application of several new management techniques, primarily on public lands. Under the proper habitat conditions, artificial cavity construction and translocation of birds have been quite effective at reversing declines and stabilizing or increasing local populations (U.S. Fish and Wildlife Service 2000). However, in the absence of aggressive management, there was no evidence to suggest that red-cockaded woodpecker numbers would have naturally stabilized or increased during the past 10 years. With respect to the relevant time interval considered here, this information, coarse as it is, suggests that the range-wide population of red-cockaded woodpeckers declined by at least 20% during the past 20 years, despite the gains made in the past decade. Although it is generally accepted that the decline actually was greater than 20%, there is no evidence that it exceeded 50%. Therefore, we conservatively conclude that the species meets this criterion for listing as a species of special concern.

Future Trend.— Recent population models based on red-cockaded woodpecker data from North Carolina indicate that under optimum habitat conditions extinction probability is related to both the size and spatial configuration of a population (Letcher et al. 1998, Walters et al. In Press). Using a 100-year simulation model, Letcher et al. (1998) determined that, except when territories were maximally aggregated, smaller populations (100 territories or less) went extinct, whereas larger populations (at least 250 territories) had a relatively high (80%) probability of survival regardless of distribution. Between these 2 extremes, the probability of extinction varied considerably as a factor of the number and distribution of territories. For example, a population with 100 tightly aggregated territories was more stable than a population with 250 widely distributed territories. Walters et al. (In Press) refined the Letcher et al. (1998) model by considering environmental, as well as demographic stochasticity in their analysis. Their model further demonstrated the importance of maximal territory aggregation to the long-term persistence of smaller populations.

Using the results of the Letcher et al. (1998) population model reported above, we projected the likelihood of persistence over the next 100 years for the 121 red-cockaded woodpecker populations that existed on public lands (99 properties) and private lands with formal conservation agreements (22 properties) in 2000 (U.S. Fish and Wildlife Service,

unpublished data). We based our projections on the worst-case scenario tested in their analysis because we believed it best reflected the current preponderance of small, fragmented populations throughout the species' range (U.S. Fish and Wildlife Service, unpublished data). Accordingly, we assumed populations comprised of fewer than 100 clusters would become extirpated over this time interval, that 60% of populations between 100 and 200 clusters would become extirpated, and that all populations larger than 200 clusters would remain at current population levels. We computed the linear regression equation for this projected rate of decline, and then predicted population levels for the time interval relevant to this criterion. Our analysis indicated a high likelihood that 23% of the current range-wide red-cockaded woodpecker population would be extirpated over the next 20 years. When we performed a similar analysis based on the Walters et al. (In Press) model, the predicted decline was 11%.

As evidenced by the reductions that occurred between the early 1980s and 1990, it is conceivable that the range-wide red-cockaded woodpecker population could decline by at least 23% over the next 20 years. Approximately 1,296 active clusters currently occur on private lands (U.S. Fish and Wildlife Service, unpublished data) where the pressure to convert old-growth pine forests to other uses is greatest. Approximately 45% of these clusters are on properties where some type of conservation agreement is in place (U.S. Fish and Wildlife Service, unpublished data); however, because landowner participation is mostly voluntary, the clusters protected by these agreements are not necessarily secure. Furthermore, the decline and local extirpation of numerous populations on private properties have been well documented over the last 20 years (U.S. Fish and Wildlife Service 2000). Given historic and recent rates of habitat loss, it is not unreasonable to expect that most, if not all, mature pine habitat on private lands large enough to support a red-cockaded woodpecker population could disappear within the next 20 years. In addition, if existing management efforts were reduced on public lands, there undoubtedly would be a loss of active clusters and/or populations due to a decline in the species' area of occupancy, extent of occurrence, or quality of habitat. Finally, because both Letcher et al. (1995) and Walters et al. (In Press) assumed optimum habitat conditions in their analyses, the population declines we calculated from their models must be regarded as best-case scenarios given that poor habitat quality is a common problem on many properties where red-cockaded woodpeckers occur. Taking all this into consideration, we believe it is likely that the range-wide population of red-cockaded woodpeckers could undergo a decline of at least 20% over the next 20 years and conclude that the species warrants listing as a species of special concern under this criterion.

Criterion B: Extent of Occurrence and /or Area of Occupancy

This criterion requires an estimate of the red-cockaded woodpecker's extent of occurrence (i.e., total range) and area occupied (i.e., area within the total range where the species actually occurs). These 2 parameters may differ considerably for species that have a fragmented distribution. To meet this criterion for listing as endangered, threatened, or species of special concern, the extent of occurrence must be less than 40 square miles, 2,000 square miles, or 7,700 square miles, respectively, or the area of occupancy must be less than 4 square miles, 200 square miles, or 770 square miles, respectively. The criterion also includes an assessment of the species' distribution (i.e., severely fragmented or a limited number of locations) and a determination of whether or not the species is experiencing declines and/or fluctuations in extent

of occurrence, area occupied, habitat quality, number of locations, or number of mature individuals.

Extent of Occurrence.—The historical range of the red-cockaded woodpecker closely reflected that of the old-growth pine forests in the southeastern United States, which prior to European settlement may have exceeded 200 million acres (U.S. Fish and Wildlife Service 2000). The species has been extirpated from 6 of the 17 states where it previously occurred (Hooper et al. 1980; Jackson 1994; U.S. Fish and Wildlife Service, unpublished data). Notably, all of these states were on the edge of the species' historical range (Missouri, Maryland, New Jersey, Pennsylvania, Tennessee, and Kentucky). Current range size was calculated by using ArcView GIS software to draw a convex polygon around the outer perimeter of the species' known range, which yielded an estimate of 403,990 square miles. Even after considering the potential inaccuracy of this method, it is clear that the red-cockaded woodpecker does not meet this criterion for any of the listing categories.

Area of Occupancy.— An evaluation of area of occupancy must take into account the current distribution of the red-cockaded woodpecker. Individual populations are typically isolated from each other and the range-wide distribution is highly fragmented. The largest remaining populations occur in the Atlantic and Gulf coastal regions, primarily on public lands, but these regions also support numerous smaller populations. Using Florida as an example, 2 of the largest red-cockaded woodpecker populations are located in the Panhandle—the Apalachicola Ranger District of the Apalachicola National Forest (486 active clusters) and Eglin Air Force Base (301 active clusters) (U.S. Fish and Wildlife Service, unpublished data). Both of these properties are large (458 and 724 square miles, respectively) and contain large, contiguous tracts of high-quality habitat. In contrast, only 1 of the 21 other public properties in Florida with red-cockaded woodpeckers supports more than 100 active clusters (U.S. Fish and Wildlife Service, unpublished data). Furthermore, these properties exhibit a considerable amount of variability in the quantity and quality of available habitat regardless of their size. This scenario is not unique to Florida and is a byproduct of the distribution of public lands, property size, and previous land-management practices. Smaller properties obviously are limited in the number of birds they can support regardless of their habitat quality, whereas larger properties may support relatively few birds due to the current condition of the landscape.

Area of occupancy was calculated by multiplying the current estimate of active red-cockaded woodpecker clusters (5,627) by 3 estimates of home range size: the average minimum (116 acres), the minimum standard for public lands (200 acres), and the average maximum (492 acres). Although all 3 calculated values (1,020 square miles, 1,758 square miles, and 4,326 square miles, respectively) exceeded the standard for listing at any level under this criterion, these results must be tempered with the knowledge that the area occupied by red-cockaded woodpeckers has a fragmented distribution wherein habitat quality varies considerably.

Criterion C: Population Size and Trend

This criterion combines an estimate of range-wide population size (in terms of the number of mature individuals) with an estimate of the population trend over the next 10 years, or 3 generations, whichever is longer. We use 20 years as the relevant time interval for this

assessment. To meet this criterion for listing as endangered, threatened, or species of special concern, the number of mature individuals must be less than 250, 2,500, or 10,000, respectively, with an estimated population decline of at least 25%, 20%, or 10%, respectively. This criterion also includes an assessment of the species' distribution (i.e., severely fragmented or limited to a single location).

In 2000, the range-wide population of red-cockaded woodpeckers was estimated at 5,627 active clusters, or 14,068 mature individuals based on an average of 2.5 adults per active cluster (U.S. Fish and Wildlife Service, unpublished data). Although at least a 20% decline is likely over the next 20 years (see Criterion A), the species' range-wide population size precludes it from meeting this criterion for listing at any level.

It is important to note, however, that although the species does not meet this criterion, only the public lands component of this estimate is based on recent and rigorous survey information. Considering public lands only, red-cockaded woodpeckers occur on 99 federal and state properties, which collectively support approximately 4,331 active clusters, or 10,827 mature individuals (U.S. Fish and Wildlife Service, unpublished data). Thus, the number of mature individuals under public domain is only slightly greater than the population size required for listing as a species of special concern. This information, coupled with the species' fragmented distribution and the possibility of a negative population trend in the future, suggests that listing the red-cockaded woodpecker as a species of special concern under this criterion may be warranted.

Criterion D: Number of Mature Individuals

This criterion requires an estimate of the number of mature individuals in the range-wide population to determine if the population is extremely small or restricted. To meet this criterion for listing as endangered, threatened, or species of special concern, the range-wide population estimate for the species must be no more than 50, 250, or 1,000 mature individuals, respectively.

In 2000, the range-wide population of red-cockaded woodpeckers was estimated at 14,068 mature individuals, based on an estimated 5,627 active clusters and a mean group size of 2.5 adults per active cluster (U.S. Fish and Wildlife Service, unpublished data). Therefore, the red-cockaded woodpecker does not meet this criterion for any of the listing categories.

Criterion E: Quantitative Analyses

This criterion requires an estimate of the probability of a species' extinction in the wild within a particular timeframe. In order to be listed as endangered, threatened, or species of special concern, that probability would have to be at least 50% within the next 3 generations (20 years), 20% within the next 5 generations (33 years), or 10% within the next 100 years, respectively.

Although the probability of range-wide extinction has not been calculated for the red-cockaded woodpecker, inferences derived from existing models for individual populations (see Criterion A) provide a means of evaluating the species' status relative to this criterion.

Currently, most red-cockaded woodpecker populations are relatively small and isolated. Of the 99 public properties where the species occurs, only 13 support more than 100 active clusters (U.S. Fish and Wildlife Service, unpublished data). Furthermore, these properties are scattered throughout the southeastern United States, and within each property the distribution of active clusters tends to be more fragmented than clumped. Given the less than optimal habitat conditions on many public properties, these data suggest that at least 87% of all red-cockaded woodpecker populations on public lands may be vulnerable to extirpation over the next 100 years (Letcher et al. 1998, Walters et al. In Press).

These findings, coupled with the potential extirpation of 1,296 active clusters on private lands, suggest that the continual loss of smaller populations could be an important factor in the range-wide extinction of the species. Additionally, recent gains in red-cockaded woodpecker abundance are primarily related to the aggressive management of the species on public lands. If these management activities were to cease or diminish, many smaller and/or isolated populations eventually would be extirpated. However, the likelihood of extinction is buffered by the presence of 4 populations of greater than 250 clusters each on public lands scattered across the range of the species. Existing red-cockaded woodpecker population models suggest these populations, with continued sound management, should be highly resistant to extirpation (Walters et al. In press). Even though these large populations are subject to catastrophic events, the likelihood that all or even most would be affected simultaneously by the same disaster is very slight. Thus, although this criterion cannot be strictly evaluated due to the lack of a range-wide population viability model, available data suggest the species is not at high risk of extinction as long as current large public land populations are secure.

BIOLOGICAL REVIEW PANEL

At its September 2001 meeting, the FWC Commissioners appointed a biological review panel to evaluate the preliminary biological status report, supporting scientific information, and staff recommendation to reclassify the red-cockaded woodpecker as a species of special concern. The panel consisted of 5 members who currently serve as the chairmen and co-chairmen (or their designees if the chair or co-chair were FWC employees) of the Florida Committee on Rare and Endangered Plants and Animals special committees on mammals, fishes, amphibians and reptiles, invertebrates, and birds. Only 1 of the 2 co-chairs of the bird subcommittee was included on the panel. Each of the panel members was asked to independently evaluate the scientific appropriateness of the recommended listing action in light of the classification criteria in Rule 68A-1.004, F.A.C. and the information available for consideration.

Four panel members responded and provided written comments. One panel member endorsed the recommended reclassification of red-cockaded woodpeckers without reservation stating that the preliminary biological status report was, “extremely thorough, well documented, and well written,” and that the justification for the proposed reclassification was based upon sound scientific research. Another panel member stated that although the recommended action was technically supported by available scientific information, a number of other, related concerns led him toward not endorsing the recommended listing action, whereas a third panel member recommended that the listing action be postponed. Collectively, the issues raised by these latter 2 panel members were: (1) the potential inappropriateness of the listing classification

criteria contained in Rule 68A-1.004 F.A.C.; (2) the discrepancy between the federal and proposed state classification of the species; (3) the fear that downlisting would falsely convey an improvement in the species' status and thereby reduce funding and management priorities on state and private lands; (4) the need for additional demographic data specific to individual populations and/or regions in Florida; (5) the necessity for continued intensive management in order to maintain recent population increases; (6) the need for concomitant development of a management plan for red-cockaded woodpeckers; (7) the analysis of population trend over the past 20 years was incorrect because it was based on insufficient and/or biased data; and (8) the need to incorporate the potential for environmental stochasticity and catastrophic events such as hurricanes into population models. A fourth panel member stated that the recommended listing action was not supported by the information available, but rather based upon, "a combination of biased selection of data and semantics." This panel member clearly stated his philosophical opposition to any proposed state listing classification that differs from the federal listing status. None of the biological review panel members provided new or additional biological data for consideration. Copies of the comments from the biological review panel members are included in Appendix 4.

FWC staff carefully reviewed the biological panel comments. Concerns expressed by panel members pertaining to the appropriateness of state listing criteria in Rule 68A-1.004 F.A.C. and philosophic opposition to differing state and federal listing classifications are addressed separately in Appendix 3. Rule 68A-27.0012 F.A.C. requires the completion of a species management plan prior to final listing actions, and issues related to necessary future management actions will be addressed therein and subject to additional public review prior to any change in listing classification for the red-cockaded woodpecker.

We agreed with the comments regarding our assessment of population trends over the past 20 years and re-evaluated the data using a more conservative approach. However, results continued to fall below the 50% decline threshold for threatened species, and thus did not alter the outcome regarding previous population trends under Criterion A.

FWC staff was able to revise the status assessment utilizing a new population model (Walters et al. In Press) provided to us during the comment period that does incorporate environmental stochasticity, but the results did not change the outcome relative to the listing criteria. To our knowledge there are no population models for red-cockaded woodpeckers that factor catastrophic events into the analysis; therefore, the effect that hurricanes might have on our population predictions cannot be determined. However, based on the history of the red-cockaded woodpecker population on the Francis Marion National Forest following Hurricane Hugo, we know that existing management techniques can be quite effective at minimizing losses related to hurricanes within a relatively short period of time (Hooper et al. 1990, Watson et al. 1995). Furthermore, given the distribution of the largest coastal populations of red-cockaded woodpeckers, it is unlikely that they all would be impacted by a major hurricane at the same time.

Therefore, in the absence of new or additional biological information regarding the range-wide population status of the species, FWC staff did not alter the recommendation to reclassify the red-cockaded woodpecker as a species of special concern.

PUBLIC COMMENTS ON BIOLOGICAL STATUS

On September 28, 2001, a request for written comments on the biological status of the red-cockaded woodpecker was published in the Florida Administrative Weekly (Volume 27, Number 39:4564). The deadline for receipt of comments was 5:00 PM on November 13th, 2001. During the specified time period, we received 16 written comments: 7 were from the academic/scientific community, 5 were from government agencies, and 4 were from environmental/conservation groups. All of the comments expressed some level of concern or criticism regarding the appropriateness of the criteria used to evaluate the biological status of the red-cockaded woodpecker. As previously discussed, those comments are addressed in Appendix 3. Copies of the 16 written comments are included in Appendix 5.

Comments relevant to the biological status of the species focused on 3 main points: (1) our analysis of population trend over the past 20 years was incorrect because it was based on insufficient and/or biased data, (2) the model we used to predict future population trends was inadequate because it did not include catastrophic events such as hurricanes, and (3) our assessment did not adequately emphasize the dependent relationship between the red-cockaded woodpecker and the southern pine ecosystem.

The first 2 points also were raised by members of the biological review panel, and our responses are provided in the Biological Review Panel section. With respect to the third point, we believe that the importance of the southern pine forests to the red-cockaded woodpecker was appropriately addressed relative to the state listing criteria. A more thorough description of optimum habitat and its maintenance was not applicable to this assessment, but will be included in the species' management plan.

CONCLUSIONS

Assessment of the range-wide red-cockaded woodpecker population relative to Florida's listing criteria indicates that the species meets Criterion A as a species of special concern based on a population decline of at least 20% over the past 20 years, and a projected population decline of at least 20% over the next 20 years. The potential for a future negative population trend, combined with the more conservative yet accurate population estimate of 10,827 mature individuals on public lands, further suggests that the species nearly meets the species of special concern threshold under Criterion C. Consequently, FWC staff recommends that the red-cockaded woodpecker be reclassified as a species of special concern in Florida (Appendix 6).

LITERATURE CITED

Bowman, R., D.L. Leonard, Jr., L.K. Backus, P.M. Barber, A.M. Mains, L.M. Richman, and D. Swan. 1998. Demography and habitat characteristics of the red-cockaded woodpecker (*Picoides borealis*) at the Avon Park Air Force Range: final report, 1994-1998. Department of Defense, Avon Park, Florida, USA.

- Conner, R.N., and D.C. Rudolph. 1995. Excavation dynamics and use patterns of red-cockaded woodpecker cavities: relationships with cooperative breeding. Pages 343-352 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- Crowder, L.B., J.A. Priddy, and J.R. Walters. 1998. Demographic isolation of red-cockaded woodpecker groups: a model analysis. Project Final Report, Duke University Marine Laboratory, Beaufort, North Carolina, and Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA.
- Daniels, S.J., and J.R. Walters. 2000. Inbreeding depression and its effects on the natal dispersal of red-cockaded woodpeckers. *Condor* 102:482-491.
- Engstrom, R.T., and F.J. Sanders. 1997. Red-cockaded woodpecker foraging ecology in an old-growth longleaf pine forest. *Wilson Bulletin* 109:203-217.
- Haig, S.M., J.M. Rhumer, and D.G. Heckel. 1994. Population differentiation in randomly amplified polymorphic DNA of red-cockaded woodpeckers *Picoides borealis*. *Molecular Ecology* 3:581-595.
- Hardesty, J.L., K.E. Gault, and H.F. Percival. 1997. Ecological correlates of red-cockaded woodpecker (*Picoides borealis*) foraging preference, habitat use and home range size in northwest Florida (Eglin Air Force Base). Final Report Research Work Order 99, Florida Cooperative Fish and Wildlife Research Unit, University of Florida, Gainesville, Florida, USA.
- Hooper, R.G., A.F. Robinson, Jr., and J.A. Jackson. 1980. The red-cockaded woodpecker: notes on life history and management. U.S. Forest Service General Report SA-GR-9.
- _____, J.C. Watson, and R.E.F. Escano. 1990. Hurricane Hugo's initial effects on red-cockaded woodpeckers in the Francis Marion National Forest. *Transactions of the North American Wildlife and Natural Resources Conference* 55:220-224.
- Jackson, J.A. 1994. Red-cockaded woodpecker (*Picoides borealis*). The birds of North America No. 85. Academy of Natural Sciences, Philadelphia, Pennsylvania, and the American Ornithologists' Union, Washington, D.C., USA.
- James, F.C. 1995. The status of the red-cockaded woodpecker in 1990 and the prospect for recovery. Pages 439-451 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.
- _____, C.A. Hess, and D. Kufirin. 1997. Species-centered environmental analysis: indirect effects of fire history on red-cockaded woodpeckers. *Ecological Applications* 7:118-129.

- Kautz, R.S. 1998. Land use and land cover trends in Florida 1936-1995. *Florida Scientist* 61:171-187.
- Letcher, B.H., J.A. Priddy, J.R. Walters, and L.B. Crowder. 1998. An individual-based, spatially-explicit simulation model of the population dynamics of the endangered red-cockaded woodpecker. *Biological Conservation* 86:1-14.
- Miller, P. S., and R. C. Lacy. 1999. VORTEX: A stochastic simulation of the extinction process. Version 8 user's manual. Conservation Breeding Specialist Group, Apple Valley, Minnesota.
- Platt, W.J., G.W. Evans, and S.L. Rathbun. 1988. The population dynamics of a long-lived conifer (*Pinus palustris*). *American Naturalist* 131:491-525.
- Reed, J.M., J.R. Walters, T.E. Emigh, and D.E. Seaman. 1993. Effective population size in red-cockaded woodpeckers: population and model differences. *Conservation Biology* 7:302-308.
- Stangel, P.W., M.R. Lennartz, and M.H. Smith. 1992. Genetic variation and population structure of red-cockaded woodpeckers. *Conservation Biology* 6:283-292.
- U.S. Fish and Wildlife Service. 2000. Technical/agency draft revised recovery plan for the red-cockaded woodpecker (*Picoides borealis*). U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia, USA.
- Ware, S., C. Frost, and P.D. Doerr. 1993. Southern mixed hardwood forest: the former longleaf pine forest. Pages 447-493 in W.H. Martin, S.G. Boyce, and A.C. Echternacht, editors. *Biodiversity of the southeastern United States*. John Wiley and Sons, New York, New York, USA.
- Walters, J.R., L. B. Crowder, and J.A. Priddy. In Press. Population viability analysis for red-cockaded woodpeckers using an individual-based model. *Ecological Applications*.
- Watson, J.C., R.G. Hooper, D.L. Carlson, W.E. Taylor, and T.E. Milling. 1995. Restoration of the red-cockaded woodpecker population on the Francis Marion National Forest: three years post Hugo. Pages 172-182 in D.L. Kulhavy, R.G. Hooper, and R. Costa, editors. *Red-cockaded woodpecker: recovery, ecology, and management*. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, Texas, USA.

APPENDIX 5. Reviewers of the red-cockaded woodpecker Biological Status Report and Draft Management Plan.

PRELIMINARY BIOLOGICAL STATUS REPORT

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APPENDIX 6. Derivation of the conservation objective for the red-cockaded woodpecker.

The conservation objective proposed in this management plan is **to secure and maintain at least 1,349 potential breeding groups (1,686 active clusters) of red-cockaded woodpeckers in Florida by the year 2020 and beyond.** FWC staff arrived at this objective after carefully considering 2 main factors: (1) the distribution and status of the Florida population in 2000 and (2) the FWC listing criteria for a Species of Special Concern. These factors and the process used to develop the conservation objective are discussed in detail below.

1. **Florida Distribution and Status.** In 2000, the Florida range of the red-cockaded woodpecker was approximately 46,100 square miles. (This number was calculated by using Arcview GIS software to draw a convex polygon around the outer perimeter of the species' known range in Florida). The species occurred in the Panhandle and throughout the Peninsula to northern Monroe County, but its distribution was highly fragmented and restricted to areas where suitable habitat remained (Figure 1). Thirty-four properties were known to support at least 1,404 active clusters (1,123 potential breeding groups) (Table 1). The number of active clusters per property ranged from 1 to 486 (1 to 389 potential breeding groups), but only 4 properties (12%) supported more than 50 active clusters (40 potential breeding groups). Although property ownership favored state lands (53%), federal lands supported the most active clusters (77%) (Table 1). In 2000, 4 federal properties in northern Florida accounted for 70% of the Florida population -- the Osceola National Forest, Eglin Air Force Base, and the Apalachicola and Wakulla Ranger Districts of the Apalachicola National Forest (Table 1). Thus, despite the species' widespread distribution in Florida, numerically the population was biased towards a few, federal properties in the northern part of the state.
2. **FWC Listing Criteria.** To be designated a Species of Special Concern, a species only needs to qualify for listing under 1 of the 5 designated criteria (Appendix 3). However, to be removed from the Species of Special Concern list, a species must meet the requirements for delisting under all 5 criteria. In 2000, the range-wide population of red-cockaded woodpeckers was estimated at 5,627 active clusters (4,502 potential breeding groups) and 14,068 adults (based on an average of 2.5 adults per active cluster, U.S. Fish and Wildlife Service 2003). Florida represented 25% of the range-wide population, with an estimated 1,404 active clusters (1,123 potential breeding groups) and 3,510 adults (Tables 1-2). Based on the premise that Florida will continue to represent at least 25% of the range-wide population, FWC staff reviewed the 2000 population data for Florida relative to the listing criteria for a Species of Special Concern. The purpose of this exercise was to determine Florida's minimum population requirements for delisting under each criterion (Table 2). (Generation time under Criteria A and C was based on 6.5 years, which is the estimated generation time for male red-cockaded woodpeckers [FWC, unpublished data].)
 - a. **Criterion A: A range-wide population reduction of less than 20% over the next 20 years (i.e., 3 generations).** To qualify for delisting under this criterion, Florida would need to maintain at least 81% of the 2000 population through the year 2020 and beyond. This equates to 1,137 active clusters (910 potential

- breeding groups) or a maximum rate of decline of 13 active clusters (11 potential breeding groups) per year.
- b. **Criterion B: A range-wide extent of occurrence and range-wide area of occupancy of at least 7,700 and 770 square miles, respectively.** To qualify for delisting under this criterion, the range of the Florida population would need to be 1,925 square miles or larger (25% of 7,700 square miles). Florida also would need to maintain at least 1,072 active clusters (858 potential breeding groups). (This number was derived by dividing 193 square miles [25% of 770 square miles] by the average minimum home range size reported for the red-cockaded woodpecker [0.18 square miles, Engstrom and Sanders 1997]).
 - c. **Criterion C: At least 10,000 mature individuals in the range-wide population and less than a 10% decline over the next 20 years (i.e., 3 generations).** In 2000, there were an estimated 14,068 adults in the range-wide population. Assuming that the range-wide population will remain above 10,000 adults, Florida would need to maintain at least 91% of its 2000 population through the year 2020 to qualify for delisting under this criterion. This equates to 1,277 active clusters (1,022 potential breeding groups) or a maximum rate of decline of 6 active clusters (5 potential breeding groups) per year.
 - d. **Criterion D: At least 1,000 mature individuals in the range-wide population.** To qualify for delisting under this criterion, there would need to be at least 250 adult red-cockaded woodpeckers (25% of 1,000) in the Florida population.
 - e. **Criterion E: A less than 10% probability of extinction in the wild within 100 years.** Although the probability of range-wide extinction has not been calculated for the red-cockaded woodpecker, recent 100-year simulation models for individual populations have revealed the importance of population size and spatial configuration to long-term viability (Letcher et al. 1998, Walters et al. 2002). Collectively, these models predict that under optimum habitat conditions populations with at least 40 and possibly as few as 25 territories can persist when territories are tightly aggregated in space, whereas populations with 250 or more territories can persist regardless of territory configuration. Between these 2 extremes, persistence varies considerably as a factor of the number, density, and distribution of territories. For example, a population with 50 tightly clumped territories will be more stable than a population with 100 widely distributed territories. Long-term viability also is affected by immigration. In general, an immigration rate of 1 to 10 migrants per generation is considered sufficient to protect against genetic drift (Mills and Allendorf 1996). Based on an estimated generation time of 6.5 years for male red-cockaded woodpeckers (FWC, unpublished data), this equates to a rate of 0.15 to 1.5 migrants per year. Furthermore, a rate of at least 2 migrants per year is considered necessary to protect against inbreeding depression, especially in populations with less than 50 potential breeding groups (Daniels et al. 2000, U.S. Fish and Wildlife Service 2003).

From a numerical standpoint, if the Florida population remained stable for the next 20 years, the minimum delisting requirements for a Species of Special Concern would be met under Criteria A through D. In fact, theoretically, the Florida population could decline by 9% to 1,277

active clusters (1,022 potential breeding groups) and still meet the minimum requirements for delisting under Criterion C (Table 2). However, the long-term viability models for individual populations strongly suggest that maintaining the Florida population at or below the 2000 level would be problematic given the species' fragmented distribution and the preponderance of properties with less than 50 active clusters (40 potential breeding groups). Moreover, a stable or declining Florida population would not provide a buffer against losses that might occur elsewhere in the species' range.

Upon consideration of these factors, FWC staff concluded that setting the conservation objective at the 2000 status level or at the minimum delisting size for a Species of Special Concern would not insure achievement of the stated conservation goal for the red-cockaded woodpecker. Instead, FWC staff determined that it would be more appropriate to use a geographic approach to derive the numerical component of the conservation objective. To this end, FWC staff established 6 discrete management units in Florida (Table 1) and identified 17 metapopulations therein (Table 3, Figures 2-7). Management unit boundaries were determined somewhat arbitrarily and designed to ensure a geographically balanced approach to conservation efforts and the continued representation of habitat types and genetic resources. Individual properties and/or populations within management units were assigned to metapopulations based on geographic proximity, existing or previous red-cockaded woodpecker status, and known immigration rates (or lack thereof). FWC staff then developed and applied the guidelines listed below to the targeted management units and metapopulations. The guidelines attempted to address both the numerical and spatial components of long-term viability, and included 2 important assumptions. First, all metapopulations and populations would be managed to achieve optimal habitat conditions and spatial configuration of active clusters, and second, periodic exchange of genetic material would occur within and among metapopulations either through immigration or translocation.

1. **By the year 2020, achieve at least a 20% increase in the Florida population.** This increase is considered necessary to secure a stable or increasing Florida population of red-cockaded woodpeckers and to offset declines that might occur elsewhere in the species' range.
2. **By the year 2020, secure and maintain (a) at least 100 potential breeding groups per management unit, (b) at least 2 metapopulations per management unit, and (c) 40 or more potential breeding groups in at least 1 of the metapopulations in each management unit.** This distribution is necessary to maintain existing habitat types and genetic resources, and to buffer losses related to hurricanes or other catastrophic events. It also will facilitate a statewide approach to conservation efforts and insure that each management unit contains at least 1 metapopulation large enough to persist for 100 years.
3. **By the year 2020, increase metapopulations within management units (a) to at least 10 potential breeding groups if below 10 potential breeding groups in 2000, (b) to at least 25 potential breeding groups or 15% growth (whichever is higher) if above 9 but below 25 potential breeding groups in 2000, (c) to at least 40 potential breeding groups or 15% growth (whichever is higher) if above 24 but below 40 potential breeding groups in 2000, (d) by at least 15% or a net increase of 10 potential**

breeding groups if above 39 but less than 100 potential breeding groups in 2000, and (e) by at least 10% if above 99 potential breeding groups in 2000. These increases are necessary to achieve a 20% increase in the Florida population and to maximize the number of metapopulations capable of long-term persistence.

The application of these guidelines to the targeted management units and metapopulations yielded the conservation objective proposed by FWC staff (Table 3).

APPENDIX 7. Preliminary list of Florida properties from which the red-cockaded woodpecker had been extirpated as of the year 2000.

Property	Ownership	Management Unit	County
Austin Cary Memorial Forest	State	Northern Peninsula	Alachua
Beef Research Unit	State	Northern Peninsula	Alachua
Chinsegut Nature Center Wildlife and Environmental Area	State	North-Central Peninsula	Hernando
Disney Wilderness Preserve	Private	South-Central Peninsula	Osceola, Polk
Dupuis Environmental Area	State	Southern Peninsula	Martin, Palm Beach
Gainesville Municipal Airport	City	Northern Peninsula	Alachua
Jonathan Dickinson State Park	State	Southern Peninsula	Martin, Palm Beach
Morningside Nature Center	City	Northern Peninsula	Alachua
Point Washington State Forest	State	Western Panhandle	Walton
Split Oak Forest Mitigation Park	County	South-Central Peninsula	Orange, Osceola
Sunland Training Center	State	Northern Peninsula	Alachua
Tall Timbers Research Station	Private	Eastern Panhandle	Leon
Topsail Hill Preserve State Park	State	Western Panhandle	Walton
Tosahatchee State Preserve	State	South-Central Peninsula	Brevard, Orange
Venus Flatwoods Preserve	Private	South-Central Peninsula	Highlands

APPENDIX 8. Preliminary list of Florida properties where red-cockaded woodpeckers are known to occur but a baseline survey of potential breeding groups had not been completed or recently conducted as of the year 2000.

Property	Ownership	Management Unit	Metapopulation
Apalachicola Ranger District, Apalachicola National Forest	Federal	Eastern Panhandle	Apalachicola
Bull Creek Wildlife Management Area	State	South-Central Peninsula	Three Lakes
Central Florida Reception Center, South Unit	State	South-Central Peninsula	Big Econ
Citrus Tract, Withlacoochee State Forest	State	North-Central Peninsula	Withlacoochee
Escape Ranch	Private	South-Central Peninsula	Three Lakes
Lathrop Bayou	Federal, Private	Western Panhandle	None
Private Lands (Collier Co.)	Private	Southern Peninsula	Big Cypress
Private Lands (Glades Co.)	Private	South-Central Peninsula	Fisheating Creek
Private Lands (Osceola Co.)	Private	South-Central Peninsula	Three Lakes
Triple N Ranch Wildlife Management Area	State	South-Central Peninsula	Three Lakes
Wakulla Ranger District, Apalachicola National Forest	Federal	Eastern Panhandle	Apalachicola

APPENDIX 9. Preliminary list of Florida properties where red-cockaded woodpeckers are not known to occur but suitable habitat may have existed as of the year 2000.

Property	Ownership	Management Unit	County
Cary State Forest	State	Northern Peninsula	Duval, Nassau
Pine Log State Forest	State	Western Panhandle	Bay, Washington
Raiford Wildlife Management Area	State	Northern Peninsula	Bradford, Union
Seminole State Forest	State	North-Central Peninsula	Lake
Twin Rivers State Forest	State	Northern Peninsula	Hamilton, Madison, Suwannee
Yucca Pens Unit, Babcock/Webb Wildlife Management Area	State	Southern Peninsula	Charlotte, Lee

APPENDIX 10. Federal recovery standard for managing red-cockaded woodpecker foraging habitat on public lands (U.S. Fish and Wildlife Service 2003).

1. Area Provided by Site Productivity.
 - a. In systems of medium to high site productivity (site index 60 or more, for the dominant pine species), provide each group of woodpeckers 49 ha (120 ac) of good quality habitat as defined below. A specific exception to this area requirement is made for longleaf and shortleaf (*Pinus echinata*) habitat types under group selection silviculture. [See the federal recovery plan (U.S. Fish and Wildlife Service 2003) for details.]
 - b. In systems of low site productivity (site index below 60, for the dominant pine species), provide each group of woodpeckers 80 to 120 ha (200 to 300 ac) of good quality habitat as defined below. [Note: The federal recovery plan recognizes that some aspects of the following definition of good quality habitat may not be achievable on extremely dry or wet sites and encourages the development of site-specific guidelines when appropriate.]
2. Definition of Good Quality Foraging Habitat. Good quality foraging habitat has some large old pines, low densities of small and medium pines, sparse or no hardwood midstory, and a bunchgrass and forb groundcover. Good quality habitat has all of the following characteristics:
 - a. There are 45 or more stems/ha (18 or more stems/acre) of pines that are ≥ 60 years in age *and* ≥ 35 cm (14 in) dbh. Minimum basal area for these pines is $4.6 \text{ m}^2/\text{ha}$ ($20 \text{ ft}^2/\text{acre}$). Recommended minimum rotation ages apply to all land managed as foraging habitat [i.e., 120 years for longleaf and shortleaf pine and 100 years for loblolly (*P. taeda*), slash (*P. elliotti*), and pond (*P. serotina*) pine].
 - b. Basal area of pines 25.4-35 cm (10-14 in) dbh is between 0 and $9.2 \text{ m}^2/\text{ha}$ (0 and $40 \text{ ft}^2/\text{acre}$).
 - c. Basal area of pines < 25.4 cm (10 in) dbh is below $2.3 \text{ m}^2/\text{ha}$ ($10 \text{ ft}^2/\text{acre}$) *and* below 50 stems/ha (20 stems/acre).
 - d. Basal area of all pines ≥ 25.4 cm (10 in) dbh is at least $9.2 \text{ m}^2/\text{ha}$ ($40 \text{ ft}^2/\text{acre}$). That is, the minimum basal area for pines in categories (a) and (b) above is $9.2 \text{ m}^2/\text{ha}$ ($40 \text{ ft}^2/\text{acre}$).
 - e. Groundcovers of native bunchgrasses and/or other native, fire-tolerant, fire-dependent herbs total 40 percent or more of ground and midstory plants and are dense enough to carry growing season fire at least once every 5 years.
 - f. No hardwood midstory exists, or if a hardwood midstory is present it is sparse and less than 2.1 m (7 ft) in height.
 - g. Canopy hardwoods are absent or less than 10 percent of the number of canopy trees in longleaf forests and less than 30 percent of the number of canopy trees in loblolly and shortleaf forests. Xeric and sub-xeric oak inclusions that are naturally existing and likely to have been present prior to fire suppression may be retained but are not counted in the total area dedicated to foraging habitat.

- h. All of this habitat is within 0.8 km (0.5 mi) of the center of the cluster, and preferably, 50 percent or more is within 0.4 km (0.25 mi) of the cluster center.
- i. Foraging habitat may not be separated by more than 61 m (200 ft) of non-foraging areas. Non-foraging areas include (1) any predominately hardwood forest, (2) pine stands less than 30 years in age, (3) cleared land such as agricultural lands or recently clearcut areas, (4) paved roadways, (5) utility rights of way, and (6) bodies of water.

APPENDIX 11. Federal stability standard for managing red-cockaded woodpecker foraging habitat on private lands (U.S. Fish and Wildlife Service 2003).

1. Provide each group of red-cockaded woodpeckers a minimum of 689 m² (3000 ft²) of pine basal area, including only pines ≥25.4 cm (10 in) dbh.
2. Provide the above pine basal area on a minimum of 30.4 ha (75 ac).
3. Count only those pine stands in suitable habitat that, for this standard only, has each of the following characteristics:
 - a. Stands that are at least 30 years old and older.
 - b. An average pine basal area of pines ≥25.4 cm (10 in) between 9.2 and 16.1 m²/ha (40 and 70 ft²/ac).
 - c. An average pine basal area of pines <25.4 cm (10 in) less than 4.6 m²/ha (20 ft²/ac).
 - d. No hardwood midstory or if a hardwood midstory is present, it is sparse and less than 2.1 m (7 ft) in height.
 - e. Total stand basal area, including overstory hardwoods, less than 23.0 m²/ha (80 ft²/ac).
 - f. Recommend that all land counted as foraging habitat be within 0.4 km (0.25 mi) of the cluster, and that any stand counted as foraging habitat be within 61 m (200 ft) of another foraging stand or the cluster itself.
 - g. Frequent prescribed burning of foraging habitat, especially during the growing season, is strongly recommended. Development and protection of herbaceous groundcovers facilitates prescribed burning and benefits red-cockaded woodpeckers.

APPENDIX 12. Recommended sample sizes for monitoring active clusters and potential breeding groups (U.S. Fish and Wildlife Service 2003).

Parameter ^a	Metapopulation Size (PBG)				
	<30	30-99	100-249	250-349	≥350
AC	100% per year	100% per year	100% per year	100% every 2 years	Consult with USFWS and FWC
PBG	100% per year	100% per year	50% per year	33% per year	Consult with USFWS and FWC

^aAC = active cluster, PBG = potential breeding group.