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FLORIDA'S NEW METHOD OF EVALUATING RARE SPECIES: A REPORT BY THE CONSERVATION COMMITTEE OF THE FLORIDA ORNITHOLOGICAL SOCIETY WITH EMPHASIS ON A PROPOSED RECLASSIFICATION OF THE RED-COCKADED WOODPECKER

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Use of quantitative variables to classify and rank rare species has been a low-profile area of research in the U.S. Quantitative measures of rarity have been used as part of several planning efforts (Niemi 1984; Masters 1991; Millsap et al. 1990; Sparrowe and Wight 1978), and while Millsap et al. (1990) warn such measures are "ever imperfect" and "incapable of replacing human judgment," quantitative procedures have proven useful to organizations making important decisions on the allocation of limited staff time and money.

Regulations adopted recently by the Florida Fish and Wildlife Conservation Commission (FFWCC) have moved quantitative approaches outside the theoretical realm of planning into the controversial realm of law. In 1999, FFWCC established new criteria for evaluating rare species (Florida Administrative Code Rule 68A-27.0012) based on specific measures of population size, range extent, population decline, and other variables (Appendix 1). This was the first case in the U.S. where quantitative measures were incorporated into laws affecting rare species, and the new criteria are now important in issues ranging from management of state-owned lands to the review of permits for large-scale developments. FFWCC's new regulations also have important implications if responsibilities for rare species shift from federal to state governments (George et al. 1998).

Recent applications of the new FFWCC criteria to Red-cockaded Woodpecker (*Picoides borealis*) and Florida manatee (*Trichechus manatus laterostris*) have drawn criticisms from conservation and scientific organizations. In both cases, FFWCC proposed reclassification to a lower category of endangerment, and critics argued the change could lower protection offered these species. This report reviews the new FFWCC procedures (FFWCC 2001) with special attention to the proposed reclassification of Red-cockaded Woodpecker. Because FFWCC criteria were adopted from procedures used by World Conservation Union (IUCN) to develop the Red List of imperiled species (IUCN 2001), some of the criticisms we discuss apply to this process as well.

As detailed below, FFWCC's approach could be an important improvement to the management of rare species in Florida, but the new quantitative criteria are flawed because they fail to (1) gauge extinction risks adequately among species with diverse life-history traits, (2) consider variables thought to be important to the conservation of rare populations and habitats (e.g., Carrol et al. 1996; Kautz and Cox 2001), and (3) give appropriate weighting to Florida populations because the quantitative criteria are based on global statistics (Gärdenfors et al. 2001). The Conservation Committee of the Florida Ornithological Society urges FFWCC to suspend its consideration of all reclassifications until these problems are addressed.

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The New Process

Impetus for a new process emerged in the early 1990s. At the time, definitions for imperiled species (Table 1) contained three qualitative categories: *endangered* (highest category), *threatened*, and *species of special concern* (lowest category). A proposal to reclassify the White Ibis (*Eudocimus albus*) as a *species of special concern* in 1993 drew criticism from development and agricultural interests. These groups lobbied the state legislature, which soon threatened to ". . . slash the agency's budget and warned that classifying the White Ibis would decimate the state's economy" (*St. Petersburg Times*, Dec. 9, 2001). The proposed classification proceeded, but a virtual freeze on the listing process occurred for several years.

FFWCC evaluated their legal definitions during this interim and concluded the categories of endangerment could not be distinguished (B. Millsap, pers. comm.). The agency created an 11-member working group to evaluate the existing process and recommend improvements. This group, which included representatives from timber, agriculture, and development industries as well as conservation organizations and state agencies, drafted new procedures adopted by FFWCC in June 1999. Although information on the new procedures was distributed prior to adoption, many biologists learned of the criteria only after the criteria had become law (i.e., as the biologists were asked to comment on reclassifications proposed under the new law; FFWCC 2002).

The new two-stage process (FFWCC 2001) begins with a petition for a change in status. If a petition is deemed sufficient, FFWCC prepares an assessment to determine if any criteria (Appendix 1) are satisfied. All data used in the assessment are based on global population statistics, not statistics for Florida. If a single criterion in Appendix 1 is satisfied, FFWCC develops a management plan to address the conservation needs of the species. The key procedural elements (assessment and management plan) undergo internal and external reviews, and both elements must be approved before a reclassification takes place. Three categories of endangerment still exist (*species of special concern*, *threatened*, and *endangered*), but FFWCC essentially has modified IUCN criteria for *critically endangered*, *endangered*, and *vulnerable* (IUCN 2001) and changed the names to *endangered*, *threatened,* and *species of special concern*, respectively (Table 1).

Species on the old list (n = 117) are maintained at their positions until a petition initiates a status review. As of May 2002, four species had entered the new process: Panama City crayfish (*Procambarus econfinae*), flatwoods salamander (*Ambystoma cingulatum*), Red-cockaded Woodpecker, and Florida manatee. A draft petition to list gopher tortoise (*Gopherus polyphemus*) as *threatened* was undergoing review (B. Millsap, pers. comm.).

RECLASSIFICATION OF THE RED-COCKADED WOODPECKER

FFWCC (Gruver 2001) submitted a petition to reclassify Red-cockaded Woodpecker from *threatened* to *species of special concern* in July 2001. The Red-cockaded Woodpecker requires mature, open pinewoods (Hooper et al. 1980) and has undergone an estimated 97% reduction in range during the past two centuries (U.S. Fish and Wildlife Service 2000). The global population consists of approximately 14,000 adults (U.S. Fish and Wildlife Service 2000), and Florida supports the largest population among states (>4,000 individuals; U.S. Fish and Wildlife Service 2000).

Gruver (2001) suggested Red-cockaded Woodpeckers met none of the new criteria under the *threatened* category and went on to contend (Gruver 2001: page 3) the species ". . . might warrant removal from the state list altogether." This statement was based on an analysis suggesting the population had declined only by 3% over the past 20 years (equivalent to 3 generation lengths in this species; see Appendix 1). As reviewers pointed out (FFWCC 2002), Gruver (2001) had not calculated trends correctly. However,

Table 1. Categories of endangerment as defined by older Florida Statutes (left column), the new Florida Fish and Wildlife Conservation Commission procedures (1999), and the World Conservation Union (IUCN 2001).

Definitions in Florida Statutes and a Former Definition for Species of Special Concern	Definitions Provided in New Florida Fish and Wildlife Conservation Commission Procedures	IUCN Definitions
Endangered: any species...whose prospects of survival are in jeopardy due to modification or loss of habitat (and other factors).	*Endangered:* 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.	*Critically Endangered:* a taxon that is facing an extremely high risk of extinction in the wild in the immediate future.
Threatened: any species . . . which may not be in immediate danger of extinction, but which exists in such small populations as to become endangered if it is subjected to increased stress. . . .	*Threatened:* a species, subspecies, or isolated population of a species or subspecies which is facing a very high risk of extinction in the future.	*Endangered:* a taxon that is facing a very high risk of extinction in the wild in the near future.
Species of Special Concern: includes species that (1) have significant vulnerability, (2) may meet criteria for *threatened* but data are lacking; (3) if they decline could affect other species; (4) have not recovered from past declines; or (5) have been introduced for specific objectives.	*Species of Special Concern:* a species, subspecies, or isolated population of a species or subspecies which is facing a moderate risk of extinction in the future.	*Vulnerable:* a taxon that is not *Critically Endangered* or *Endangered* but is facing a high risk of extinction in the wild in the medium-term future.
		Lower Risk: a taxon that does not satisfy above criteria; separated into three subcategories of (1) *Conservation Dependent* (could qualify for *Vulnerable*), (2) *Near Threatened* (does not qualify for *Conservation Dependent* but close to *Vulnerable*), and (3) *Least Concern* (does not qualify for above categories).

the final biological assessment (FFWCC 2002) concluded the species warranted listing because it *might* undergo a population decline of at least 20% over the next 20 years (satisfying criterion 76(a) for listing as a *species of special concern*). Quoting from the final assessment:

> *. . . 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). . . . 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. . . .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. (1998) 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.*

The justification for maintaining the Red-cockaded Woodpecker on Florida's list of imperiled species was not overwhelming. In fact, groups opposed to the listing of this species could use FFWCC's new criteria and the biological assessment to make a strong claim to remove the species from the state list altogether, as Gruver (2001) originally suggested. FFWCC described its confidence in the projected declines only as "moderate" (FFWCC 2002: page 99) because the projections were based on population models sensitive to the environmental and spatial considerations (Cox and Engstrom 2001, Letcher et al. 1998). For example, when FFWCC (2002) used results from one population model (Letcher et al. 1998), projected declines were >20% over 20 years; however, when another model was used (Walters et al., in press), projected declines were <12% over 20 years. The justification also suggested pronounced losses will occur on private lands even though a recent survey of the largest population on private lands (Cox et al. 2001) did not find it declining precipitously; meanwhile, two private properties have successfully reintroduced woodpeckers (G. Hagen and J. Stober, pers. comm.). Furthermore, although there have been declines on many public lands (James et al. 1995), increases also have occurred in response to intensive management efforts (e.g., artificial cavity construction and translocation). Some of these increases will likely continue into the near future (U.S. Fish and Wildlife Service 2001).

An implicit statement in FFWCC's justification is that the Red-cockaded Woodpecker will warrant listing only as long as population declines continue. More specifically, losses must average about 140 individuals per year (>55 active clusters) over the next 20 years, and the species must eventually decline to just over 11,000 individuals by 2022 to satisfy the criterion for listing as a *species of special concern*. If population estimates obtained five years hence show declines to be less severe than predicted, the species could be removed from Florida's list through the submission of a new petition (FFWCC 2002: page 30). In fact, the new criteria make it possible for this species to con-

tinue to decline slowly (<20% over 20 years) and potentially not be eligible for listing until only 1,000 individuals remain rangewide (Appendix 1).

In contrast, the draft federal recovery plan (U.S. Fish and Wildlife Service 2001) established specific population goals based on a more detailed assessment of population viability. The federal plan considers the species eligible for reclassification once there are (a) 10 populations with 350 potential breeding groups distributed among 13 core populations; (b) 10 populations with 250 potential breeding groups distributed among 12 secondary populations; and (c) several small populations conserved at peripheral locations in south and central Florida, northeastern North Carolina, and southeastern Virginia (U.S. Fish and Wildlife Service 2001). The federal plan strives for a higher standard to ensure population viability over meaningful periods of time (Shaffer 1981, U.S. Fish and Wildlife Service 2001) and envisions a total population of approximately 17,000 individuals distributed among >7,000 territorial groups.

Population declines are only one of the criteria considered in FFWCC's new process, but the Red-cockaded Woodpecker generally cannot satisfy other FFWCC criteria for *endangered* or *threatened* until the total population is much smaller than a *single* recovery population (400-500 active territories) as envisioned under the federal recovery plan (U.S. Fish and Wildlife Service 2001). For example, to qualify as an *endangered* species under criterion 26b where occupied area is <4 mi^2, the range-wide population of woodpeckers would be only 10-20 groups (using estimated territory sizes of 50-100 ha). FFWCC criterion 26c is not satisfied until the total global population becomes less than half the size of a single federal recovery population (i.e., 250 individuals versus 350 potential breeding groups) and the population is declining (25% over 3 years). FFWCC criteria 26e and 77e consider extinction probabilities (20-50% chance of extinction within 20 years) that will not be met until the species consists of a single population with <50 territorial groups (Letcher et al. 1998).

FFWCC's criteria for population declines are meant to assess the global extinction risk (FFWCC 2001), but population trends for several birds suggest the criteria do not provide appropriate measures of extinction risks across all species. Breeding Bird Survey data (Sauer et al. 2002) show 31 species (Table 2) with average annual declines exceeding 2.5% (i.e., >20% decline over 10 years, the minimum needed for listing). The list includes species such as the Red-headed Woodpecker (*Melanerpes erythrocephalus*) and Yellow-billed Cuckoo (*Coccyzus americanus*) whose populations are orders of magnitude larger than those of the Red-cockaded Woodpecker. However, if the criteria are dutifully applied, these and other common species (Table 2) should be listed at the same level of endangerment as Red-cockaded Woodpecker. A key feature missing from the FFWCC criteria is consideration for historic losses. Species like Red-cockaded Woodpecker that have experienced >97% declines (U.S. Fish and Wildlife Service 2001) and still are declining slowly should be listed at a higher level of endangerment than common species experiencing declines.

FFWCC methods for computing population declines also may fail to assess extinction risks accurately in another manner. Criterion A (Appendix 1) states population declines shall be considered over ". . . 10 years or 3 generations, whichever is greater. . . ." This criterion is influenced by the estimated generation length, which can be calculated using several different procedures (Tanner 1978). For Red-cockaded Woodpeckers, FFWCC equated three generations to 20 years (Gruver 2001), but in the case of the gopher tortoise, which has an estimated generation length of 18 (Cox et al. 1987) to 33 years (P. Moler, pers. comm.), three generations equate to 55-100 years (variation attributable to different methods of calculation). Gopher tortoises thus may decline at an average annual rate of only 0.02% and satisfy the criterion for *species of special concern*, but the Red-cockaded Woodpecker must decline at an average annual rate of approximately 1.2%, which is 60-times higher. The gopher tortoise almost qualifies for the *endangered* category if it declines at an average annual rate of 1.2%.

Table 2. Species exhibiting average annual declines >2.5% (i.e., >20% decline over 10 years) on Breeding Bird Survey routes in North America (Sauer et al. 2002). This annual decline is the minimum needed to satisfy FFWCC criteria for listing as *species of special concern*. FFWCC estimates declines over 3 generation lengths or 10 years, whichever is greater, so other species with longer life spans could qualify.

Common Name	Scientific Name	Trend 1980-2000	Routes (N)
Horned Grebe	*Podiceps auritus*	-4.6	67
Least Bittern	*Ixobrychus exilis*	-3.9	24
Red-breasted Merganser	*Mergus serrator*	-5.6	14
Northern Bobwhite	*Colinus virginianus*	-3.8	1359
King Rail	*Rallus elegans*	-7.8	28
Purple Gallinule	*Poryphyrula martinica*	-4.8	14
Lesser Yellowlegs	*Tringa flavipes*	-18.3	26
Solitary Sandpiper	*Tringa solitaria*	-7.3	8
Herring Gull	*Larus argentatus*	-3.1	288
Gull-billed Tern	*Sterna nilotica*	-6.5	13
Common Tern	*Sterna hirundo*	-3.9	73
Black-billed Cuckoo	*Coccyzus erythropthalamus*	-3.6	949
Yellow-billed Cuckoo	*Coccyzus americanus*	-2.9	1591
Groove-billed Ani	*Crotophaga sulcirostris*	-5.7	15
Barn Owl	*Tyto alba*	-14.9	27
Eastern Screech-Owl	*Otus asio*	-3.7	67
Common Nighthawk	*Chordeiles minor*	-3.3	1321
Vaux's Swift	*Chaetura vauxi*	-3.6	133
Red-headed Woodpecker	*Melanerpes erythrocephalus*	-4.6	1064
Sprague's Pipit	*Anthus spragueii*	-3.6	112
Tennessee Warbler	*Vermivora peregrina*	-5.5	257
Bay-breasted Warbler	*Dendroica castanea*	-7	148
Blackpoll Warbler	*Dendroica striata*	-10.9	49
Connecticut Warbler	*Oporornis agilis*	-3.1	71
Canada Warbler	*Wilsonia canadensis*	-3.2	394
Henslow's Sparrow	*Ammodramus henslowii*	-6.9	88
Bobolink	*Dolichonyx oryzivorus*	-3.2	1101
Eastern Meadowlark	*Sturnella magna*	-3.1	1872
Rusty Blackbird	*Euphagus carolinus*	-9.1	54
Pine Siskin	*Carduelis pinus*	-2.8	740
House Sparrow	*Passer domesticus*	-3.9	2820

FFWCC's range criteria (e.g., occupied area < 4 mi^2; Appendix 1) are most applicable to invertebrates (FFWCC does not regulate plants) as seen in the petition submitted for Panama City crayfish (Keppner 2001). This crayfish will likely be listed as *threatened* or *endangered* (P. Moler, pers. comm.) because the range encompasses 10,400 ha (40 $miles^2$), only 22 populations are known, and each population occupies <0.75 ha. Populations are associated with roadside swales, power line rights-of-way, railroad ditches, and thinned commercial timber stands (Keppner 2001).

Although species with restricted ranges must receive attention, many conservationists consider also the important ecological roles that certain species play. The *Ecological Society of America* (Carrol et al. 1996) proposed that species chosen for listing should (1)

benefit a number of other species, (2) provide important ecological roles, (3) have the capacity for recovery, and (4) be taxonomically distinct. The Red-cockaded Woodpecker would likely rank much higher than the Panama City crayfish if quantitative measures for these variables were developed. The Red-cockaded Woodpecker inhabits mature, open pinewoods that rank as some of the most imperiled communities in North America (Noss et al. 1999); the species has large area requirements such that a single territory encompasses the area used by dozens of rare species; and the species has low dispersal capabilities, meaning that issues of habitat fragmentation and population dispersion need to be considered carefully. Interestingly, the definition of *species of special concern* used formerly by FFWCC (Table 1) included recognition for species that played important ecological roles.

Another area of concern lies in the treatment of taxonomic divisions and sub-populations. The FFWCC (2001) procedures state that units

> ". . . considered for listing actions are full species and certain subspecies and geographically distinct populations. Generally, subspecies will be considered for listing actions only if they can be easily identified in the field using a combination of morphological characteristics and geographic location. Geographically distinct populations must be clearly isolated from the main body of the species' range (i.e., allopatric), and such isolation must have occurred sufficiently long ago for genetic or morphological differentiation to be expected."

This differs from the federal perspective, which allows consideration of isolated populations that have not differentiated to a similar degree.

Florida's remaining woodpecker populations have become fragmented to the point that natural exchange is uncommon (Cox et al. 1995), however isolation has not been sufficient for substantial genetic differentiation to occur among populations (Haig et al. 1994). Still, the draft federal recovery plan (U.S. Fish and Wildlife Service 2001) emphasized conservation of woodpecker populations in south and central Florida in part because special genetic, ecological, and phenotypic differences existed (Delotelle et al. 1987; Mengel and Jackson 1977; Stangel et al. 1992).

Arguments based on the special qualities of isolated populations of woodpeckers may seem subjective, but FFWCC's working definitions for allopatric populations and subspecies also are subjective to some degree because they are influenced by prevailing philosophies in taxonomy (e.g., Frost and Hillis 1990; Haffer 1997). Florida currently contains proportionately fewer subspecies of birds than reptiles, amphibians, and mammals (Millsap et al. 1990) in part because a trend in avian taxonomy has been to lump subspecies in situations where clinal variation exists (American Ornithologists' Union 1983). Florida currently contains proportionately fewer subspecies of birds than reptiles, amphibians, and mammals (Millsap et al. 1990) in part because a trend in avian taxonomy has been to lump subspecies in situations where clinal variation exists (American Ornithologists' Union 1983). some subspecies of amphibians, reptiles, and mammals have been lumped in recent years, but the broad consolidations made by the American Ornithologists' Union (1983) have not taken place in other classes, and this may have an important bearing on FFWCC's new system. For example, the diamondback terrapin (*Malaclemys terrapin*) exhibits extensive morphological variation throughout its range and has been subdivided into seven recognized subspecies (Collins 1997). Three subspecies occur in Florida along the Atlantic coast (*M. t. tequesta*), in the Florida Keys (*M. t. rhizophoraruum*), and along the Gulf coast (*M. t. macrospilota*). All three subspecies scored as high as the Red-cockaded Woodpecker in a quantitative assessment of rarity performed by Millsap et al. (1990) because statistics were computed for each subspecies, not the global population. Similar to the new FFWCC regulations, Millsap et al. (1990) considered subspecies that could ". . . be easily identified in the field using a combination of morphological characteristics and geographic location." Recent analyses of terra-

pin genetics (Lamb and Avise 1992) and morphology (Hartsell 2001) raise questions about some subspecific designations, and, at the least, it seems possible that variation among terrapins is no more substantial than variation found among some birds once represented by two or more subspecies in Florida. For example, subspecies of Eastern Towhee (*Pipilo erythrophthalmus*) in Florida have distinctive bill shapes and iris colors (Dickinson 1952) that would allow separation in the field.

More significantly, FFWCC's treatment of isolated populations is inconsistent with recent IUCN recommendations (Gärdenfors et al. 2001) because FFWCC scores are based on global population statistics, not population statistics for Florida. IUCN (Gärdenfors et al. 2001) defined regional populations as "geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant . . . per year)." Florida's regional woodpecker populations satisfy this definition even with various translocation efforts that are underway. IUCN then recommended that, when its criteria were applied to isolated populations within a regional political boundary such as Florida, ". . . all data used . . .—such as the number of individuals and variables relating to area, reduction, decline, fluctuations, sub-populations, locations, and fragmentation—should be from the regional population, not the global population." To conform with IUCN, FFWCC should be using Florida population statistics, not global population statistics, in cases where isolation is evident.

FFWCC's method for dealing with isolated populations also could affect listing status of another important isolated population: the Florida panther (*Puma concolor coryii*). O'Brien et al. (1990) contended there was no genetic differentiation among subspecies of cougar in North America, and cougars from Texas *(P. c. stanleyana)* have been introduced to Florida during the past five years to counter the effects of inbreeding (Land et al. 2001). Genetic introgression has been extensive with at least 36 progeny now derived from Texas cougars and their subsequent offspring (Land et al. 2001). The south Florida population of cougar is no longer clearly isolated, and some fear a strong case can be made to remove Florida panther from FFWCC's list (D. Maehr, pers. comm.).

Finally, FFWCC's new procedures do not consider inequalities in the habitat that conservation lands provide for rare species. A recent FFWCC analysis of Landsat imagery (Kautz and Cox 2001) suggested public lands in Florida contained sufficient habitat to ensure the long-term survival of gopher tortoise, but not enough to ensure survival of Red-cockaded Woodpecker. Gopher tortoises occur in many disturbed habitats (Cox et al. 1987, Diemer 1984), have home ranges a small fraction that of a single territorial group of woodpeckers, and are capable of persisting on public lands <200 ha (Cox et al. 1987). If gopher tortoise is classified as *threatened* while Red-cockaded Woodpecker is classified only as *species of special concern*, FFWCC's list will distort the amount of habitat and population security that public lands provide these species.

Does Reclassification Matter?

FFWCC (2001) notes an important aspect of its new process is the separation of regulatory and management actions from the position a taxon holds on the state's list. The decoupling allows FFWCC to tailor regulations and conservation efforts to each species. Stated another way, reclassification of Red-cockaded Woodpecker could be unimportant as long as an effective management plan is developed. Such a management plan must be in place prior to reclassification to *species of special concern*, but a management plan is not explicitly required once a species moves off the Florida list (i.e., the species is no longer defined as a *candidate species*; see FFWCC 1999). Thus, Florida's management plan for Red-cockaded Woodpecker may be in effect only as long as the species declines, not necessarily until it has recovered using the federal criteria.

Distinguishing between the position a species holds on the list and the conservation attention it receives follows IUCN recommendations (IUCN 2001), but the position held

on FFWCC's previous list did not influence regulations or management significantly. Similar prohibitions were assigned to all categories of endangerment, and there was little direct relationship between the position a species held and management efforts. The gopher tortoise was listed as *species of special concern* previously, yet, because tortoise populations occurred frequently on proposed development sites, FFWCC developed special habitat conservation guidelines (Cox et al. 1987) and a system of habitat mitigation banks (M. Allen, pers. comm.) to conserve tortoise habitat. The agency also undertook special research projects concerning tortoises (e.g., Diemer 1984). In contrast, efforts undertaken for indigo snake (*Drymarchon corais couperi*), Red-cockaded Woodpecker, and several *threatened* species were much less extensive.

The emphasis placed on management plans should benefit many rare species, but it also begs a question of why establish different categories of endangerment? If the details lie in the management plans, all reclassifications are unimportant so long as a single criterion under *species of special concern* is satisfied. Furthermore, because some of the more controversial issues FFWCC has faced recently arose from proposed reclassifications (e.g., Red-cockaded Woodpecker and Florida manatee), a one-tiered program could save staff time otherwise spent formulating and defending controversial reclassifications.

The relative risk of endangerment of course needs to be considered when deciding how to spend limited management funds, and a one-tiered system that lumped species close to extinction with those that were less imperiled might not be efficient. As the list of management plans grows, competition for limited management funds will also increase and relative endangerment will need to be considered in deciding where to focus efforts. The general public also might have difficulties understanding the esoteric logic of a one-tiered system. The terms "endangered," "threatened," and "species of special concern" convey clear meanings to some Floridians or else controversy over the proposed reclassification of Red-cockaded Woodpecker would not have occurred. Many biologists do not want the perceived statuses of Red-cockaded Woodpecker and Florida manatee to be lowered until Federal recovery goals are achieved.

Unfortunately, public perceptions on the status of Red-cockaded Woodpeckers may already have changed. A lead sentence in a recent newspaper story (*Tallahassee Democrat*, 14 January 2002) read: "Red-cockaded Woodpeckers on the Apalachicola National Forest may not know it yet, but the State of Florida no longer considers them threatened." Another story (*St. Petersburg Times*, 9 December 2001) stated ". . . the Fish and Wildlife Conservation Commission has agreed to consider lowering the protected status of . . . the Red-cockaded Woodpecker. . . ."

The perception of lowered protection (or improved status) is not limited to public press. Personnel with the Florida Department of Forestry, Georgia Department of Natural Resources, Treasure Coast Regional Planning Council (comprising three Florida counties), South Florida Water Management District, and U.S. Fish and Wildlife Service expressed concerns that a reclassification of Red-cockaded Woodpecker implied the status had improved and this might affect their abilities to conserve or manage habitat for this species (FFWCC 2002). Concerns of other agencies need to be considered more fully by FFWCC since the cooperation of these agencies is required for effective management.

Finally, although concerns over perceptions and definitions may seem semantic, the specific definitions that FFWCC elected to adopt from IUCN represents a special question of semantics with important consequences for the whole process. IUCN (2001) provided definitions for several categories of endangerment (*critically endangered*, *endangered*, *vulnerable*, and *lower risk*, which has three subcategories; Table 1), not just the three definitions used by FFWCC. FFWCC chose the IUCN definition of *critically endangered* to serve as its category of *endangered*, but FFWCC might instead have adopted the IUCN definition for *endangered* as its definition of *endangered* (rather than equating this category with *threatened*) since there was no clear connection between ex-

isting Florida law and the definitions used by IUCN (Table 1). Had FFWCC chosen the IUCN category of *endangered* as its own definition of *endangered*, clear distinctions among categories would still exist, criteria would still be quantitative, and language suggesting an "endangered" species must face a 50:50 risk of extinction within 10 years would be avoided (Appendix 1).

Summary.—For the Red-cockaded Woodpecker to remain on Florida's list of imperiled species, it must continue to decline at a high rate. If it stabilizes or declines slowly, FFWCC's new criteria could allow a species that is critically important to conservation of mature southern pine forests (Jackson 1995) to be de-listed well before it is considered "recovered" by the federal government. Moreover, a de-listing in Florida might occur at the same time common species like Red-headed Woodpecker, Northern Bobwhite (*Colinus virginianus*), and Yellow-billed Cuckoo are added to the list (Table 2). FFWCC's new system may soon rank the gopher tortoise at a higher level of endangerment than Red-cockaded Woodpecker even though tortoise populations are probably an order of magnitude larger than woodpecker populations, tortoise population declines have not been as extensive, habitat for tortoises is well represented within Florida's conservation lands, and FFWCC already expends considerable effort to manage this species. The new FFWCC system can be applied to recognized subspecies that exchange genes across a broad geographic area, but it can not be applied to recently isolated populations within Florida that exhibit ecological differences (not to mention important educational value). Finally, other governmental agencies warn a reclassification of this important species could hamper their abilities to conserve and manage woodpecker habitat.

Use of quantitative measures in the legal classification of rare species represents a new and potentially valuable approach, but no one should expect such an approach to be error free during the early going. To help improve the process, FFWCC should reconvene the original 11-member group to consider some of the problems outlined here. The 11-member group and FFWCC should consider recommendations of Carrol et al. (1996), which consider the important ecological roles some species provide, Gärdenfors et al. (2001), which discuss application of IUCN criteria to regional populations, and Kautz and Cox (2001), which consider the protection offered rare species by public conservation lands. Proposed changes to the law should be subjected to extensive peer review, and it would be especially helpful if FFWCC prepared a publication showing which categories various species might be placed in by the new process. These procedures could help to create a system that estimated relative endangerment fairly and quantitatively and, as important, with much less controversy.

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Appendix 1.

Section A. New criteria used to define *endangered*, *threatened* and *species of special concern* in Florida (FFWCC 1999). Older definitions are listed in Section B below.

(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.
   Population estimated to number fewer than 250 mature individuals.
   Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is longer.

Section B. Definitions in the Endangered Species Act in Florida (Florida Statutes 372.072).

(3)(b) "Endangered species" means any species of fish and wildlife naturally occurring in Florida, whose prospects of survival are in jeopardy due to modification or loss of habitat; overutilization for commercial, sporting, scientific, or educational purposes; disease; predation; inadequacy of regulatory mechanisms; or other natural or man-made factors affecting its continued existence.

(3)(c) "Threatened species" means any species of fish and wildlife naturally occurring in Florida which may not be in immediate danger of extinction, but which exists in such small populations as to become endangered if it is subjected to increased stress as a result of further modification of its environment.

A list of Species of Special Concern was established that included species with one or more of these characteristics.

(1) Has a significant vulnerability to habitat modification, environmental alteration, human disturbance, or human exploitation which, in the foreseeable future, may result in its becoming a threatened species unless appropriate protective or management techniques are initiated or maintained.

(2) May already meet certain criteria for designation as a threatened species but for which conclusive data are limited or lacking.

(3) May occupy such an unusually vital or essential ecological niche that should it decline significantly in numbers or distribution other species would be adversely affected to a significant degree.

(4) Has not sufficiently recovered from past population depletion.

(5) Occurs as a population either intentionally introduced or being experimentally managed to attain specific objectives. The species of special concern prohibitions in rule Florida Administrative Code 39-27.002(4) shall not apply to species so designated, provided that the intentional killing, attempting to kill, possession or sale of such species is prohibited.