PRELIMINARY BIOLOGICAL STATUS REPORT
FLATWOODS SALAMANDER

INTRODUCTION

The U.S. Fish and Wildlife Service ([USFWS] 1999) listed the flatwoods salamander (*Ambystoma cingulatum*) as threatened effective May 3, 1999, under provisions of the Endangered Species Act of 1973, as amended. This listing prompted Fish and Wildlife Conservation Commission (FWC) staff to develop a petition to list the flatwoods salamander as a threatened species in Florida under rule 68A-27.004, Florida Administrative Code (F.A.C.). The following assessment is intended to evaluate the status of the flatwoods salamander in Florida under the criteria embodied in rule 68A-1.004 F.A.C. In order to warrant inclusion on a state list as an endangered species, threatened species, or species of special concern, the flatwoods salamander, on a rangewide scale, must meet at least one of the criteria in 68A-1.004 F.A.C. for one of the listing categories. Because the vast majority of the flatwoods salamander's extant range and populations are in Florida (USFWS 1999), status considerations are not greatly affected by data from other portions of the range. Accordingly, herein we focus on the species' status in Florida.

BIOLOGICAL INFORMATION

Population reduction

No data exist to evaluate numerical population change during the recent 10-year period. However, Palis (1997a) revisited 31 (70.5%) of 44 Florida sites from which flatwoods salamanders had been collected over a period of approximately 50 years prior to 1990. The 13 sites he did not include in his survey were either inaccessible or could not be located based on the available locality data. Palis was able to confirm occurrence at only 11 (35.5%) of these historic collection localities. These data suggest a possible occurrence decline of 64.5% during the 50-year period.

Means et al. (1996) and Palis (1997a) have suggested that flatwoods salamanders may be adversely affected by intensive silvicultural activities. Means et al. (1996) reported an estimated 98% decline in a resident flatwoods salamander metapopulation on private lands adjacent to Apalachicola National Forest following bedding and conversion of the area to slash pine plantation. The USFWS (1999) indicated that more than 80% of the original pine flatwoods habitat within the range of the flatwoods salamander has been lost due to agriculture, urbanization, and silvicultural practices, but no figures were provided specifically for Florida. A similar 60-80% decline in flatwoods habitat in Florida could infer a similar 60-80% long-term reduction in flatwoods salamander populations. Data from a forest industry survey suggest that this inference is not unreasonable. Wigley et al. (1998) sampled 444 ponds on industrial forest

lands in south Alabama, south Georgia, and north Florida but found flatwoods salamanders at only 3 ponds (all in Florida).

Ongoing habitat conversion and degradation would have been anticipated to result in a minimum 20% reduction within the next 10 years in area of occupancy, habitat availability, and habitat quality prior to federal threatened listing (USFWS 1999) of the flatwoods salamander. It is difficult to assess the effect that federal listing will have on reducing rates of habitat conversion and degradation. Conversion of flatwoods to pine plantation may be slowed, but habitat degradation due to fire suppression will likely continue.

Conversion of mesic pine flatwoods to slash pine plantations on private lands has occurred steadily during recent decades, as has the reduction in the use of prescribed fire on these lands. It is likely that the flatwoods salamander has sustained a decline in habitat availability or quality in the last 10 years at least as great as the 20% required for listing as a species of special concern. It is not likely that the flatwoods salamander has sustained a decline as great as the 50% required for listing as threatened. Therefore, under this criterion listing the species as a species of special concern is supported.

Distribution

Palis (1997a) reported the occurrence of 33 known breeding populations of flatwoods salamanders in Florida. Twenty-four (73%) of these were thought to be restricted to single breeding ponds isolated by at least 3.2 km (2 mi) from any other breeding site. Only Liberty County (Apalachicola Ranger District, Apalachicola National Forest [NF]) and southern Okaloosa County (Eglin Air Force Base [AFB]) are known to support populations with more than 3 available breeding sites. Overall, populations are severely fragmented in Florida, although large metapopulations occur on Apalachicola NF and Eglin AFB.

The Florida distribution of the flatwoods salamander includes 2 separate regions, a northeastern and a western (Palis 1997a, Petranka 1998). The northeastern region includes Alachua, Baker, Bradford, Duval, and Marion counties. Flatwoods salamanders were historically known (prior to 1990) from 10 identifiable localities in this northeastern region, but Palis (1997a) was unable to confirm occurrence at any of these 10 sites. Palis did identify a single population with three breeding sites in Osceola NF, Baker County. This is the only known, remaining population in the northeast Florida region and it likely occupies no more than 5 square miles.

The western region includes the Panhandle from southern Jefferson County west to Escambia County (Palis 1997a, Means 1998). Flatwoods salamanders have been reported from 13 counties within this region. Palis (1997a) was unable to confirm the occurrence of flatwoods salamanders in Escambia County, but the species is known to still occur at at least one locality in each of the remaining western counties from which the species has been reported. This western region covers a total area greater than 2000 square miles but less than 5000 square miles. Thus, the flatwoods salamander=s extent of occurrence exceeds the threshold for threatened

classification (<2000 square miles) but falls within the criteria for listing as a species of special concern (2000-7700 square miles).

The flatwoods salamander appears to have been extirpated from most of its former range in northeast Florida. The species also appears to have been extirpated from Escambia County in the Panhandle, and many historic sites in Calhoun and Jackson counties are thought to no longer support flatwoods salamanders. Continuing declines in habitat availability and quality will likely continue to reduce the area of occupancy, the number of occupied locations, and the number of mature individuals throughout the current range.

Mobility of flatwoods salamanders is low, and they have little capacity for naturally recolonizing sites from which they have been extirpated. Trends in extent of occurrence, area of occupancy, habitat quality, and number of subpopulations are likely to continue downward. Numbers of mature individuals likely fluctuate greatly, but this is normal for amphibian populations.

The flatwoods salamander=s current extent of occurrence, fragmented occurrences, and declining extent of occurrence, area of occupancy, habitat availability, and habitat quality meet the criteria to list the salamander as a species of special concern.

Population size and trend

It is very difficult to estimate the total Florida population of the flatwoods salamander. Palis (1997a) estimated that Florida supports a minimum of 33 breeding populations, with a minimum total of 82 breeding ponds. Palis also estimated that 24 (73%) of the 33 populations were restricted to single breeding ponds. Numbers at many of these sites are likely small. One population on Eglin AFB, on the other hand, utilized 21 breeding ponds, and 2 populations on Apalachicola NF each utilized 10 breeding ponds. Each of these 3 populations likely includes at least 1000 mature individuals.

Most amphibian populations are thought to fluctuate greatly over time as a function of fluctuations in volume and timing of rainfall and the associated effects on reproductive success, although no specific information is available for flatwoods salamanders. Palis (1997b) sampled one pond for 2 years and caught 198 salamanders the first year but only 59 the second.

It is reasonable to conclude by extrapolation from the available quantitative data that the total population of mature individuals for known sites certainly exceeds 2500 individuals and, therefore, does not support listing the salamander as threatened. However, the available data indicate that the total population of mature individuals is likely less than the 10,000 individuals required for listing as a species of special concern. Additionally, populations in Florida have likely declined, based on considerations discussed in the previous section, by at least the 10% over the last 10 years that also is required for listing as a species of special concern. Therefore, the population size criterion for listing the species as a species of special concern appears to be met .

Quantitative analyses

Available data are not sufficient to permit estimation or modeling of the probability of extinction of flatwoods salamanders in the wild.

CONCLUSIONS

The flatwoods salamander was listed federally as threatened in May 1999. As a result, the FWC initiated a petition to list the salamander as threatened in Florida under state rule 68A-27.004 F.A.C.. In order to warrant listing, the flatwoods salamander must meet at least one of the listing criteria in rule 68A-1.004 F.A.C. for a listing category. The flatwoods salamander does not meet any of the criteria established by the FWC for being listed as threatened. However, it does meet several of the criteria for listing as a species of special concern. Therefore, staff recommend that the FWC list the flatwoods salamander as a species of special concern under rule 68A-27.005 F.A.C.

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APPENDICES

Copies of information cited or used.

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