

THE STATUS OF THE CADDO MOUNTAIN AND FOURCHE MOUNTAIN SALAMANDERS
(PLETHODON CADDOENSIS, P. FOURCHENSIS) IN ARKANSAS

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INTRODUCTION

In 1951 Pope and Pope described Plethodon caddoensis, a new species of plethodontid salamander from the P. ouachitae group. In 1979 Duncan and Highton described another new species from the ouachitae group, P. fourchensis, which was previously known as the "Buck Knob Variant" of P. ouachitae (Blair and Lindsey, 1965). Both of these recently described species are endemic to Arkansas and have highly restricted ranges within the Ouachita Mountains of the state. These salamanders should be of great potential interest to Arkansans as a unique part of their natural heritage.

The purposes of this study are to determine whether previously located populations of P. caddoensis and P. fourchensis still exist and to more accurately delimit their ranges by searching additional localities. Also an assessment of relative abundance is attempted by comparison of collecting effort and success.

STUDY SITES AND METHODS

Thirty-two study sites were sampled during the periods 2-4 Apr, 9-11 Apr and 8-11 May 1982. Sites at or very near each of the localities listed by Pope and Pope (1951), Blair (1957), Dowling (1957), Blair and Lindsay (1965), Duncan and Highton (1979) and the Arkansas Natural Heritage Commission (ANHC) were visited. In addition 13 new localities were searched. A map and descriptions of each locality are presented in Fig. 1 and Table 1. At each locality I worked for a predetermined period with an experienced field assistant. Rocks, logs and other

debris were overturned in areas thought to be good plethodontid habitat. The numbers of plethodontid salamanders were recorded and some specimens were collected for deposition in a museum collection (Table 2).

RESULTS AND DISCUSSION

I found both P. caddoensis and P. fourchensis to be abundant and widespread within their range, an observation consistent with that of previous workers (Blair and Lindsay, 1965; Duncan and Highton, 1979; Highton, in litt). The same is true with the closely allied P. ouachitae (Pope and Pope, 1951).

Plethodon caddoensis was found at 10 of 12 previously known localities and at 1 (loc. 17) of 5 new areas searched. With one exception (loc. 18) it appears that P. caddoensis is limited to the Caddo and Cossatot Mountains of the Novaculite Uplift (Fig. 1). My search in the nearby Crystal Mountains, an area with a geological history different from that of the Caddo and Cossatot Mountains (Pope and Pope, 1951), failed to yield P. caddoensis. However, P. glutinosus were abundant in 2 of 3 Crystal Mountain localities. Duncan and Highton (1979) demonstrated that members of the P. ouachitae group were generally much more abundant than sympatric P. glutinosus. The abundance of P. glutinosus and the failure to find P. caddoensis in the Crystal Mountains suggest that, in fact, P. caddoensis is absent from this area. Likewise, search of the mountains in the vicinity of Mt. Ida as suggested by Pope and Pope (1951) yielded only P. glutinosus (loc. 32). The new locality for P. caddoensis (loc. 17) simply fills

a gap between known localities and does not extend the range. ANHC nos. 14 and 15, listed as localities for P. caddoensis, are in error. These localities are on Rich Mountain within the range of P. ouachitae but not P. caddoensis.

Plethodon fourchensis was found at 6 of 9 previously known localities and at 2 of 6 new areas searched. It appears that P. fourchensis is limited to the Fourche Mountains and to the extreme east end of Irons Fork Mountain (Fig. 1). I failed to find P. fourchensis in the central and western end of Irons Fork Mountain (locs. 13-15). At locality 15, but not 13 and 14, P. glutinosus was abundant. Search of 2 localities (locs. 1, 2) on Mill Creek Mountain (Fig. 1) yielded only P. glutinosus. The new localities for P. fourchensis (loc. 6, 8) simply fills a gap between known localities and does not extend the range.

Some caution should be extended in concluding that P. caddoensis/fourchensis are absent from an area based on search within a relatively small amount of time within a restricted period. Pope and Pope (1951) pointed out that in the P. ouachitae group activity near the surface is extremely sensitive to surface moisture. When local surface conditions are dry one might not find any salamanders with the methods I used. The conclusion would be that the salamanders are absent when, in fact, they could be very abundant deeper in the talus which was characteristic of most of the localities. For example, on 10 April P. fourchensis was abundant at locality 11, a southwest and west facing slope (Table 4). Ten adult salamanders were found under rocks in 45 minutes. However, on 11 May the same locality was searched for 30 minutes and no adults were found under rocks. Surface conditions were noticeably drier.

Only 2 small juveniles were found within rotten logs. Locality 9 which was searched on the same dates yielded 20 salamanders in 1 hour on 10 April and 10 salamanders in 30 minutes on 11 May. Locality 9, a north slope about 5 miles north of locality 11, had no noticeable difference in surface moisture between the two dates. It appears that microhabitat conditions (particularly moisture) influence activity near the surface to a large degree. It is also apparent in these mountains with well-drained, rocky soils that local moisture conditions vary to a large degree both temporally and spatially.

With the above caution in mind relative abundances of P. caddoensis/fourchensis are presented in Table 3. It probably is best not to compare abundances determined 2-11 April with those determined 8-11 May. Based on these data and my subjective evaluation of each locality my recommendations for sites which would provide the greatest protection for these species are as follows:

Plethodon caddoensis

1. Locality 16 or 17 — moderate abundance of salamanders; well isolated from possible human disturbance, save for logging; entire north slope excellent habitat
2. Locality 27 — moderate abundance of salamanders; possible drawback is proximity of heavily used road at national forest boundary; entire north slope excellent habitat
3. Locality 26 — great abundance of salamanders; entire north slope paralleling river excellent habitat; major drawback is location in a highly commercialized, heavily used recreation area

Plethodon fourchensis

1. Locality 9 — great abundance of salamanders; well isolated from human disturbance, save for logging; entire north slope excellent habitat
2. Locality 7 — moderate abundance of salamanders; well isolated from human disturbance, save for logging (tower road apparently has been permanently closed); entire peak excellent habitat; type locality for species

Table 4 lists associated plethodontids found at localities.

Desmognathus brimleyorum and Eurycea multiplicata are characteristically stream or streamside salamanders which are only occasionally found away from such habitats. Plethodon glutinosus and P. serratus have habitat preferences similar to those of P. caddoensis/fourchensis but are more widely distributed. They were found at 16 of 32 and 18 of 32 localities, respectively.

ACKNOWLEDGMENTS

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TABLE 1. Description of localities searched for *Plethodon fourchensis* and *P. caddoensis*.

LOCALITY	COUNTY	USGS QUAD	SECTION, TOWN-SHIP, RANGE	ELEVATION (feet)	DESCRIPTION	*SOURCE	HABITAT
1	Scott	Parks 15'	SW $\frac{1}{4}$, SE $\frac{1}{4}$, S12, T1N, R28W	1000	Mill Creek Mtn, off NFM road	7	N slope, mixed deciduous pine, scattered surface rocks
2	Scott	Y-City 15'	SW $\frac{1}{4}$, SW $\frac{1}{4}$, S15, T1N, R29W	750-850	Mill Creek Mtn, vic Y-City at Hwy 71 and Mill Creek	7	S and W slopes, mixed deciduous-pine, scatter surface rocks
3	Polk	Acorn 7.5'	SW $\frac{1}{4}$, SW $\frac{1}{4}$, S7, T1S, R30W	1600-1800	Fourche Mtn, 4 mi E Eagleton, off logging road	1, 3, 6	E slope, deciduous, tal
4	Polk	Acorn 7.5'	SW $\frac{1}{4}$, NE $\frac{1}{4}$, S10, T1S, R30W	1400	Foran Gap Rec. Area Fourche Mtn	1, 3, 6	N slope, mixed deciduous pine, scattered surface rocks
5	Polk	Acorn 7.5'	NE $\frac{1}{4}$, NE $\frac{1}{4}$, S9, T1S, R30W	1200	.8 mi NW Foran Gap Rec. Area Fourche Mtn	3	N slope, mixed deciduous pine, talus
6	Polk	Acorn 7.5'	NW $\frac{1}{4}$, NE $\frac{1}{4}$, S11, T1S, R30W	1800	2.5 mi W Wolf Pinnacle Fourche Mtn off NFR road	7	N and S slopes; mixed deciduous-pine, scatter surface rocks
7	Polk	Acorn 7.5'	NW $\frac{1}{4}$, SW $\frac{1}{4}$, S6, T1S, R29W	2200	1 mi W Wolf Pinnacle Fourche Mtn, off NFR road	1, 3, 6	S slope, mixed deciduous pine, scattered surface rocks, type locality
8	Scott	Y-City 7.5'	NW $\frac{1}{4}$, SW $\frac{1}{4}$, S35, T1N, R28W	1200-1400	Fourche Mtn, ca 2.5 mi SSE Y-City, off logging road	7	N slope, mixed deciduous pine, scattered surface rocks, recently logged
9	Scott	Oden 15'	SW & SE $\frac{1}{4}$, SE $\frac{1}{4}$, S35, T1N, R28W	2200	Fourche Mtn, Buck Knob Tower, off NFR road	1, 3	N slope, mixed deciduous pine, scattered surface rocks and talus
10	Montgomery	Oden 15'	NE $\frac{1}{4}$, SE $\frac{1}{4}$, S6, T1S, R26W	1000	Brushy Creek Rec. Area Brushy Creek Mtn	7	N and E slopes, mixed deciduous-pine, scatter surface rocks and talus
11	Polk	Oden 15'	SE $\frac{1}{4}$, NE $\frac{1}{4}$, S14, T1S, R28W	1850	Irons Fork Mtn, off NFM road	1, 3, 6	SW and W slopes, mixed deciduous-pine, scatter surface rocks
12	Polk	Oden 15'	SE $\frac{1}{4}$, NE $\frac{1}{4}$, S23, T1S, R28W	1500	Irons Fork Mtn, off NFM road	1, 3	S slope, mixed deciduous pine, scattered surface rocks and talus
13	Polk	Y-City 7.5'	SW $\frac{1}{4}$, SE $\frac{1}{4}$, S13, T1S, R29W	1300	Irons Fork Mtn, off NFM road	7	S slope, mixed deciduous pine, few rocks
14	Polk	Y-City 7.5'	SE $\frac{1}{4}$, NW $\frac{1}{4}$, S23, T1S, R29W	1200	Irons Form Mtn S of Posey Hollow, off recently constructed NFM road	7	N, W and S slopes, mixed deciduous-pine, talus
15	Polk	Acorn 7.5'	SW $\frac{1}{4}$, SE $\frac{1}{4}$, S19, T1S, R29W	1150	Irons Fork Mtn, vic Irons Fork Lake Dam	7	NE slope, mixed deciduous pine, talus
16	Polk	Cove 15'	NW $\frac{1}{4}$, SE $\frac{1}{4}$, S13, T3S, R31W	2000	Bee Mtn Tower off NFR road	1, 3, 6	N slope, deciduous, tal
17	Polk	Umpire 15'	SW $\frac{1}{4}$, SW $\frac{1}{4}$, S30, T3S, R29W	2200	Eagle Mtn Tower, off NFR road	7	N slope, deciduous, sha talus, spotty moist see
18	Howard	Umpire 15'	NE $\frac{1}{4}$, NW $\frac{1}{4}$, S26, T5S, R30W	750	Hwy 4 at Cossatot R. W side of bridge	1	N slope, deciduous talu very moist
19	Polk	Umpire 15'	NE $\frac{1}{4}$, NE $\frac{1}{4}$, S31, T4S, R28W	1200	Shady Lake Rec. Area, N and E of Rec. Area	1	Gentle slopes, mixed deciduous-pine scattere surface rocks
20	Polk	Umpire 15'	NW $\frac{1}{4}$, NE $\frac{1}{4}$, S20, T4S, R28W	1300	Bard Springs Rec. Area	1, 3	N, S, E, W slopes, mixed deciduous-pine talus, scattered surface rocks

Table 1. Continued

LOCALITY	COUNTY	USGS QUAD	SECTION, TOWN-SHIP, RANGE	ELEVATION (feet)	DESCRIPTION	*SOURCE	HABITAT
21	Polk	Oden 15'	NW $\frac{1}{4}$, SW $\frac{1}{4}$, S3, T3S, R28W	1050-1100	1.5 mi N Big Fork	1, 4	Hilly area, N, S, W slopes, mixed deciduous-pine, scattered surface rocks
22	Montgomery	Athens 15'	SE $\frac{1}{4}$, SE $\frac{1}{4}$, S6, T4S, R27W	1200-1300	Little Missouri Falls Rec. Area	1	N, S, E, W slopes, mixed deciduous-pine, talus and scattered rock areas
23	Montgomery	Athens 15'	NW $\frac{1}{4}$, NW $\frac{1}{4}$, S4, T4S, R27W	1800-2200	Slatington Tower off NFR road	1, 3, 6 (?)	N slope, deciduous, talus, scattered small seeps
24	Montgomery	Athens 15'	NE & SE $\frac{1}{4}$, NE $\frac{1}{4}$, S36, T3S, R27W	950-1200	Big Mtn, N side, off hwy 8	1, 3	N slope, mostly deciduous, scattered surface rocks
25	Montgomery	Athens 15'	NE $\frac{1}{4}$, SE $\frac{1}{4}$, S12, T4S, R27W	1300-1400	Pass between SE spur Statehouse Mtn and Polk Creek Mtn	2	N slope, mixed deciduous-pine, talus and scattered surface rocks, type locality
26	Montgomery	Athens 15'	NW $\frac{1}{4}$, NW $\frac{1}{4}$, S27, T4S, R27W	900-1000	Albert Pike Rec. Area	1, 5	N slope paralleling Little Missouri R., deciduous, talus
27	Montgomery	Athens 15'	SW $\frac{1}{4}$, NE $\frac{1}{4}$, S19, T4S, R26W	950-1100	6 mi N and E of Albert Pike Rec. Area on NFM road	1	N slope, deciduous, talus
28	Montgomery	Glenwood 15'	SW $\frac{1}{4}$, SE $\frac{1}{4}$, S18, T4S, R25W	700-800	Caddo Gap on E side of hwy	1, 2	N slope, mixed deciduous-pine, scattered surface rocks
29	Montgomery	Glenwood 15'	NE $\frac{1}{4}$, SE $\frac{1}{4}$, S14, T3S, R25W	1000	Crystal Rec. Area	7	S slope, mixed deciduous-pine, talus and scattered surface rocks
30	Montgomery	Glenwood 15'	SE $\frac{1}{4}$, NW $\frac{1}{4}$, S17, T3S, R24W	1300	Collier Springs Rec. Area	7	NE slope, deciduous, talus
31	Montgomery	Glenwood 15'	NW $\frac{1}{4}$, NW $\frac{1}{4}$, S8, T3S, R24W	1500	1 mi N Collier Springs, off NFM road	7	N slope, deciduous, talus
32	Montgomery	Mount Ida 15'	NW $\frac{1}{4}$, SW $\frac{1}{4}$, S3, T2S, R25W	1000	Mauldin Mtn, ca 3.5 mi NW Mount Ida	7	N slope, mixed deciduous-pine, scattered surface rocks

*Source

- 1 Arkansas Natural Heritage Commission
- 2 Pope and Pope (1951)
- 3 Blair and Lindsay (1965)
- 4 Dowling (1957)
- 5 Blair (1957)
- 6 Duncan and Highton (1979)
- 7 New locality

Table 2. Disposition of collected specimens

Species	Locality	*Nos.
<i>Plethodon caddoensis</i>	24	HUHC 2189-2192
	19	HUHC 2202-2205
	26	HUHC 2206-2224
	22	HUHC 2228-2229
	27	HUHC 2230-2238
<i>Plethodon fourchensis</i>	5	HUHC 2248-2249
	6	HUHC 2252-2255
	9	HUHC 2265-2269
	8	HUHC 2282-2283

*Harding University Herpetological Collection

Table 3. Collecting effort and success for *P. caddoensis* and *P. fourchensis*.

LOCALITY	Date (1982)	No. Man-hours Search	No. collected		No. <i>P. caddoensis</i> / <i>fourchensis</i> per man-hour search
			<i>P. caddoensis</i>	<i>P. fourchensis</i>	
1	8 May	1.0			0
2	8 May	1.0			0
3	8 May	3.0			0
4	10 Apr	1.0			0
5	10 Apr	1.5		2	1.3
6	10 Apr	1.0		5	5.0
7	10 Apr	1.0		1	1.0
8	11 Apr	1.0		2	2.0
9	10 Apr	2.0		20	10.0
9	11 May	0.5		5	10.0
10	8 May	1.5			0
11	10 Apr	1.5		10	6.7
11	11 May	1.0		2	2.0
12	10 Apr	1.5		2	1.3
13	10 Apr	1.0			0
14	10 Apr	2.0			0
15	10 Apr	1.5			0
16	9 May	1.5	6		4.0
17	9 May	1.0	3		3.0
18	9 May	1.0	2		2.0
19	3 Apr	2.0	4		2.0
20	3 Apr	2.0			0
21	3 Apr	2.0			0
22	3 Apr	2.0	2		1.0
23	10 May	1.0	1		1.0
24	3 Apr	2.0	3		1.5
25	10 May	2.0	2		1.0
26	4 Apr	2.0	19		9.5
27	4 Apr	2.0	9		4.5
28	10 May	1.5	2		1.3
29	3 Apr	1.0			0
30	10 May	1.0			0
31	10 May	1.5			0
32	10 May	1.5			0

Table 4. Plethodontid salamanders found at localities.

LOCALITY	<i>Plethodon caddoensis</i>	<i>Plethodon fourchensis</i>	<i>Plethodon glutinosus</i>	<i>Plethodon serratus</i>	<i>Desmognathus brimleyorum</i>	<i>Eurycea multiplicata</i>
1			X			
2			X			
3			X		X	
4			X	X		X
5		X	X	X	X	X
6		X	X			
7		X				
8		X	X			
9		X	X	X		
10						
11		X		X		
12		X	X			
13						X
14				X		
15			X	X		
16	X			X		
17	X			X		
18	X			X		
19	X		X	X		
20			X	X		
21			X	X		
22	X			X		
23	X					
24	X			X		X
25	X				X	X
26	X			X	X	
27	X			X		X
28	X			X		X
29			X	X		
30			X			
31						
32			X			

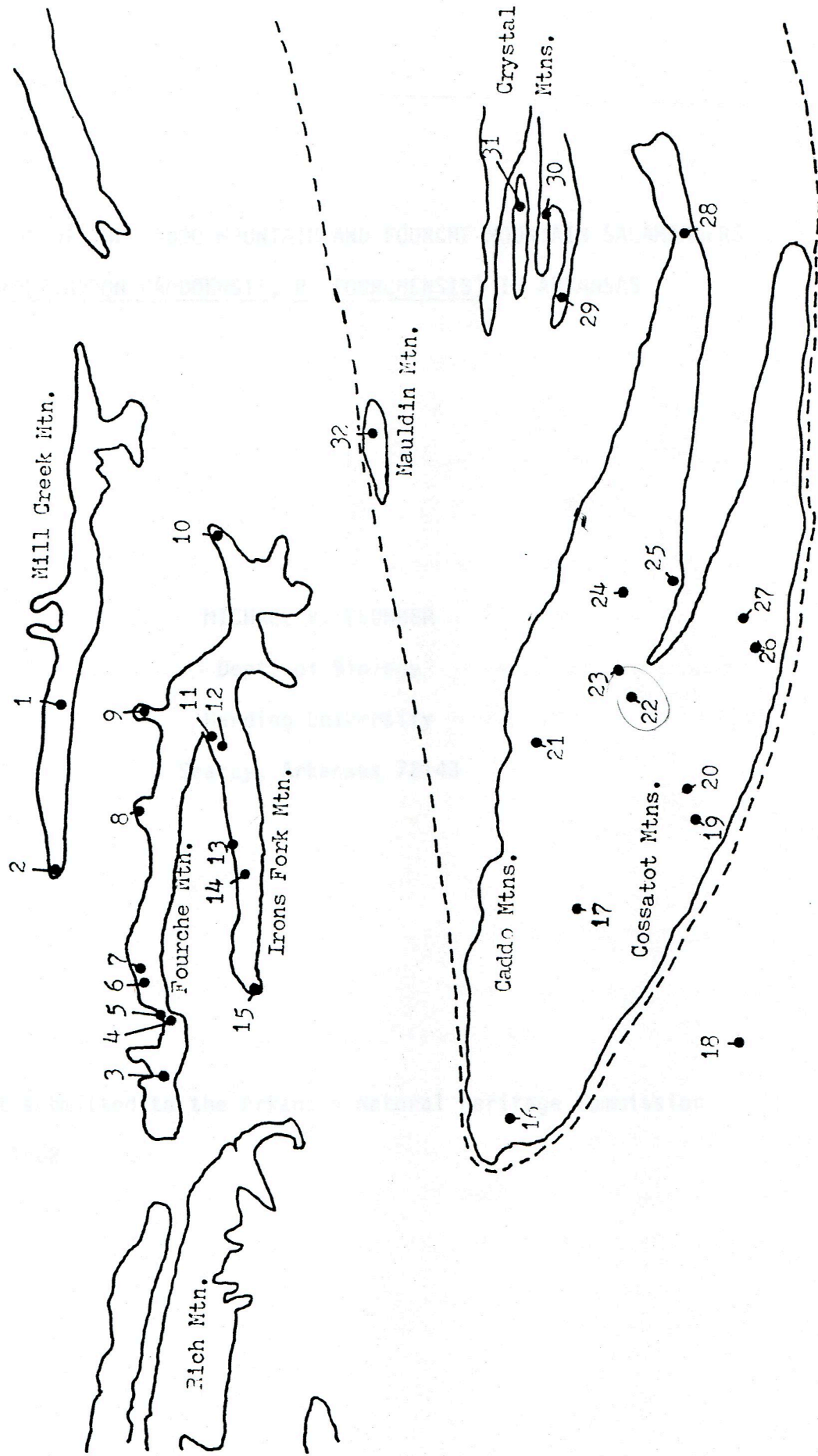


Fig. 1. Map of localities searched for *Plethodon fourchensis* and *P. caddoensis*. Approximate boundaries of the Novaculite Uplift are indicated by dashed lines. Map redrawn and modified from Blair and Lindsay (1965).