

WATER SHREW (*Sorex palustris*) SURVEY

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RECOMMENDED CITATION

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INTRODUCTION

The water shrew (*Sorex palustris*) is included on the Arizona Game and Fish Department's (AGFD) list of **Threatened Native Wildlife in Arizona** (AGFD 1988) as endangered. It occurs as a geographically isolated population in the White Mountains of Arizona (Fig. 1). The nearest populations are 200 miles to the northeast in New Mexico and 360 miles to the north in Utah. Prior to 1992, only five specimens had been collected in the White Mountains, with the most recent specimen collected in 1987 (Smith pers. comm.) (Table 1). The primary objective of this survey was to determine the water shrew's current range in Arizona.

METHODS

Historical collection sites were mapped to determine the survey area (Fig. 2), which was divided into northern and southern portions due to logistics (Figs. 3 and 4). Trapping efforts were initiated at historical sites, then expanded into adjacent drainages. We used three gallon (11.4 liter) plastic buckets as pitfalls, Sherman live traps (7.6 x 8.9 x 22.9 cm), and snap traps (Victor mouse traps). Traps and pitfalls were set in and along streams. Metal flashing 30 cm wide was installed on edge as a drift fence leading to pitfalls. Traps and pitfalls were checked twice daily to reduce mortality or decomposition.

RESULTS

Trapping began on June 16, 1992 and was completed on October 15, 1992. Four water shrews were collected during 689 pitfall trap nights (see Tables 2 and 3). None were collected during 103 trap nights using Sherman live traps or snap traps. Water shrews were collected only in the northern part of the study area, in three of nine areas sampled (Fig. 3). Other species captured included 15 dusky shrews (*Sorex monticolus*), 41 montane voles (*Microtus montanus*), six deer mice (*Peromyscus maniculatus*), five tiger salamanders (*Ambystoma tigrinum*), and one northern grasshopper mouse (*Onychomys leucogaster*).

DISCUSSION

While evaluating historical locations, I identified discrepancies between two water shrew specimens plotted in Hoffmeister's Mammals of Arizona (1986) and water shrew specimen tags. The Horseshoe Cienega specimen, listed as occurring along the White River but plotted near

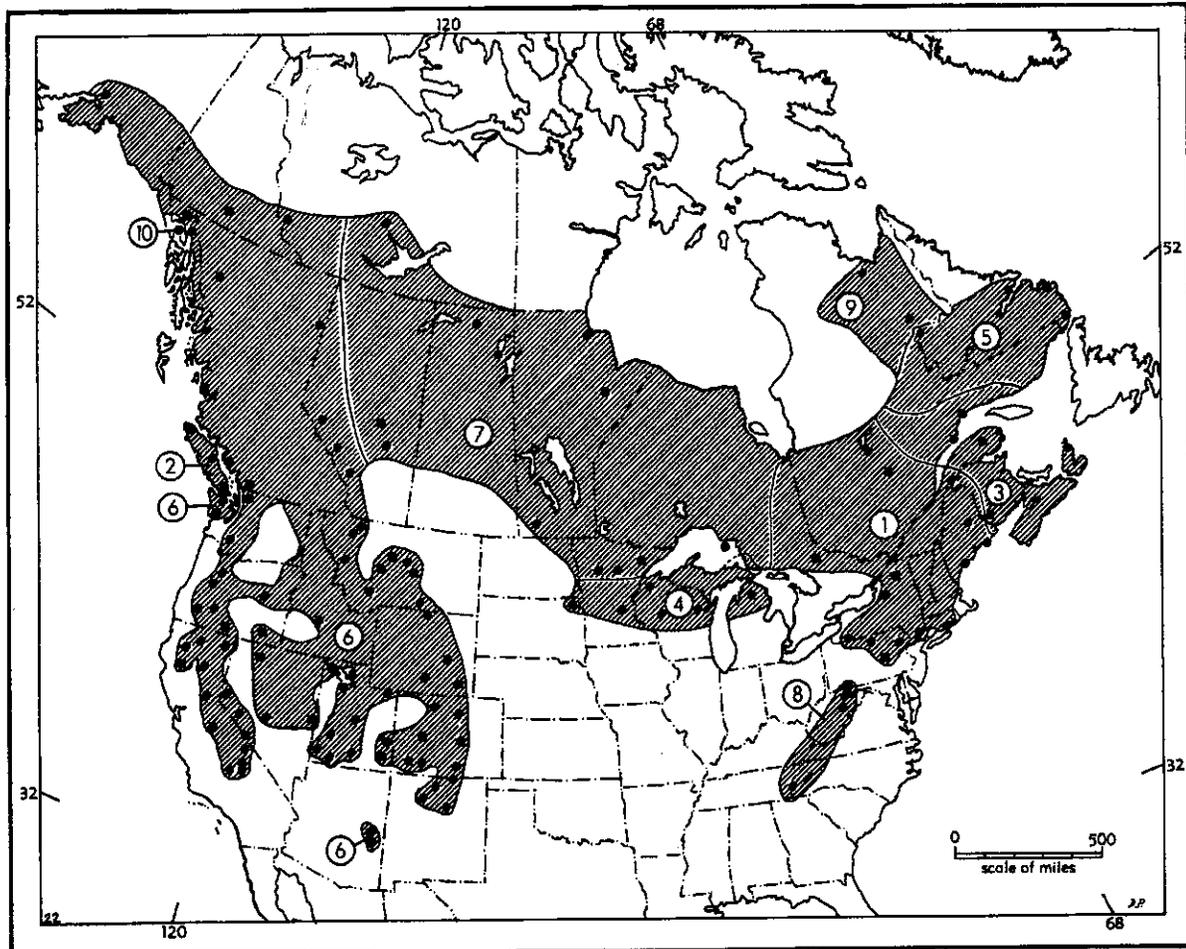


Figure 1. Geographical distribution of the Arizona water shrew (*Sorex palustris navigator*) (Adapted from Hall, 1981). Other subspecies are: 1) *S. p. albibarbis*, 2) *S. p. brooksi* 3) *S. p. gloveralleni*, 4) *S. p. hydrobadistes*, 5) *S. p. labradorensis*, 6) *S. p. navigator*, 7) *S. p. palustris*, 8) *S. p. punctulatus*, 9) *S. p. turneri*, 10) *S. alakanus*.

Table 1. Historical <i>Sorex palustris</i> locations in the White Mountains, Arizona.				
LOCATION	LEGAL DESCRIPTION	DATE COLLECTED	ELEVATION (m)	NUMBER OF SPECIMENS
Horseshoe Cienega (Lake)	[REDACTED]	1915	2530	1
KP Cienega	[REDACTED]	1914	2743	1
West Fork Little Colorado/ Sheep's Crossing	[REDACTED]	Unknown	2804	1
Fish Creek/ Sunnyside Reservoir	[REDACTED]	1985	2774	1
		1987	2774	1

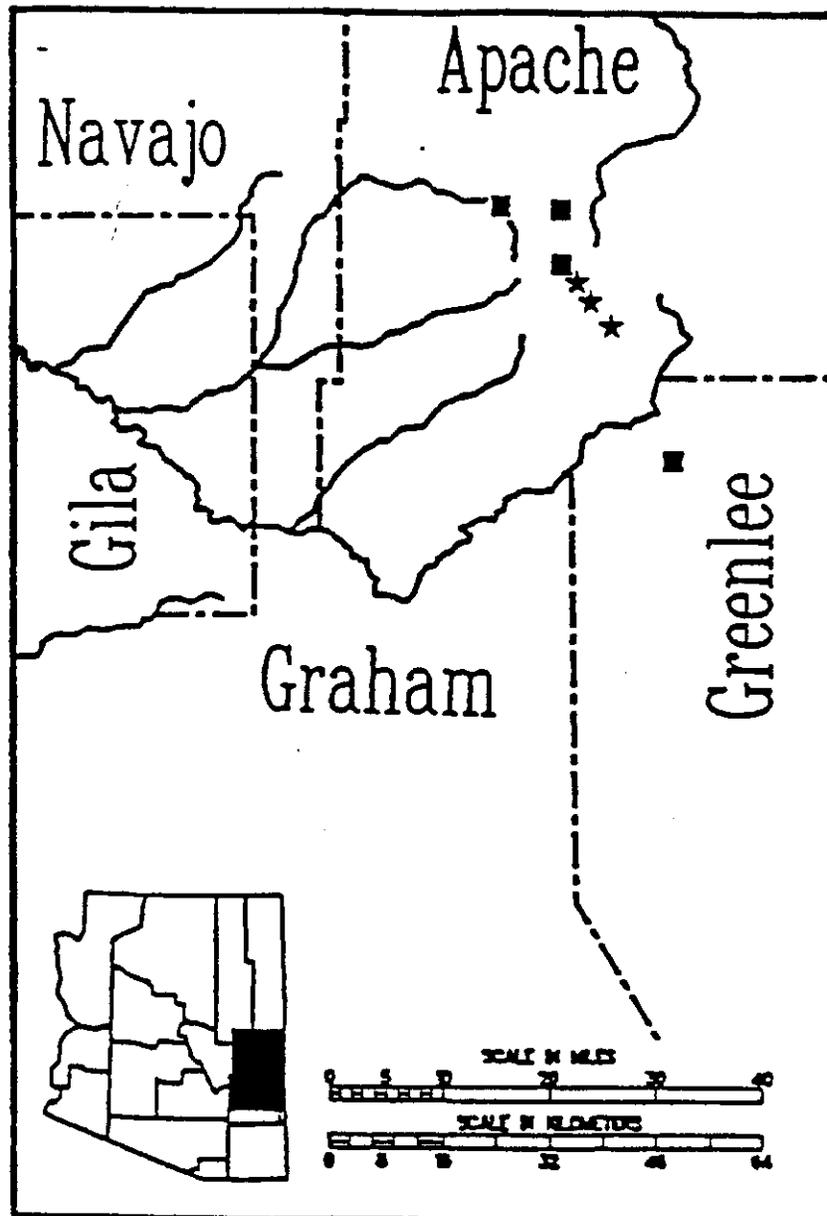


Figure 2. Historical (■) and 1992 (★) *Sorex palustris* locations in the White Mountains, Arizona.

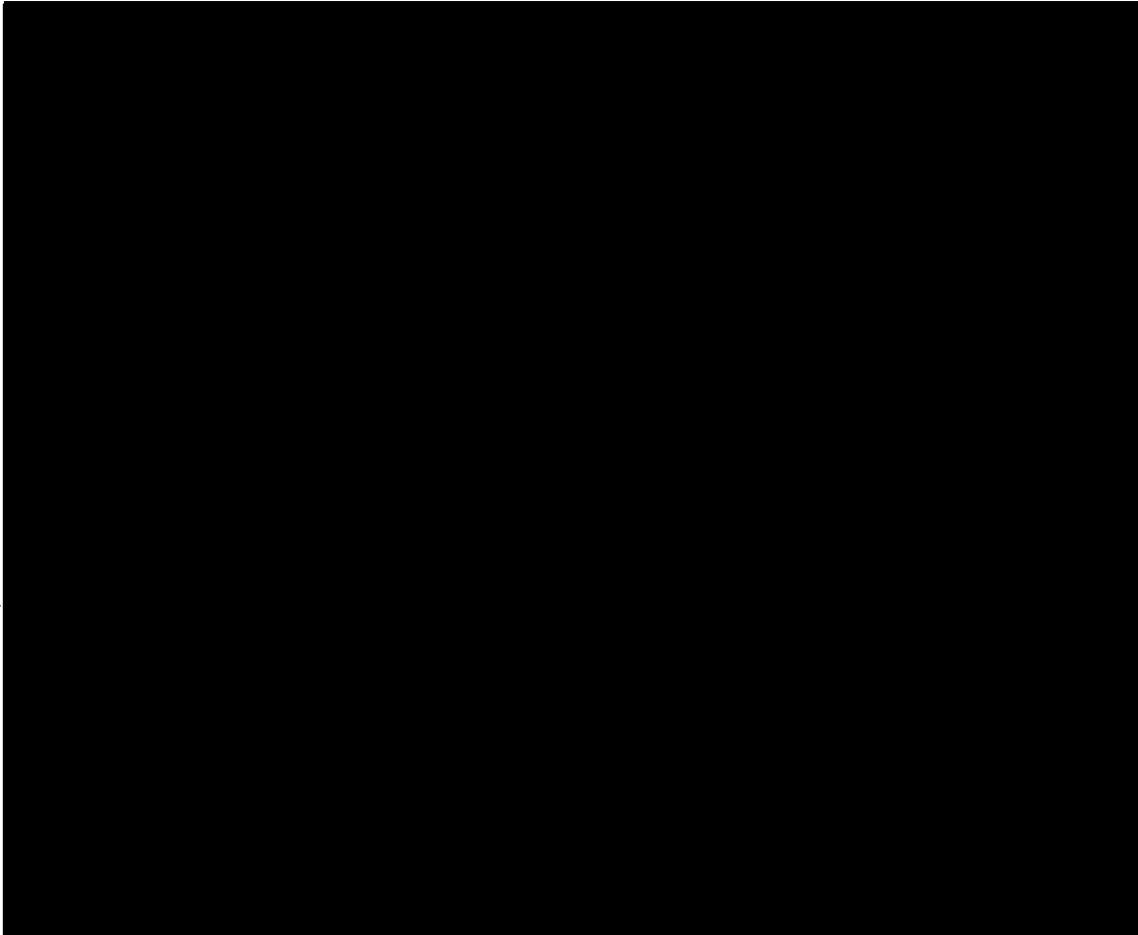


Figure 3. Northern trap sites (●), historical (■), and 1992 (★) *Sorex palustris* locations in the White Mountains, Arizona.

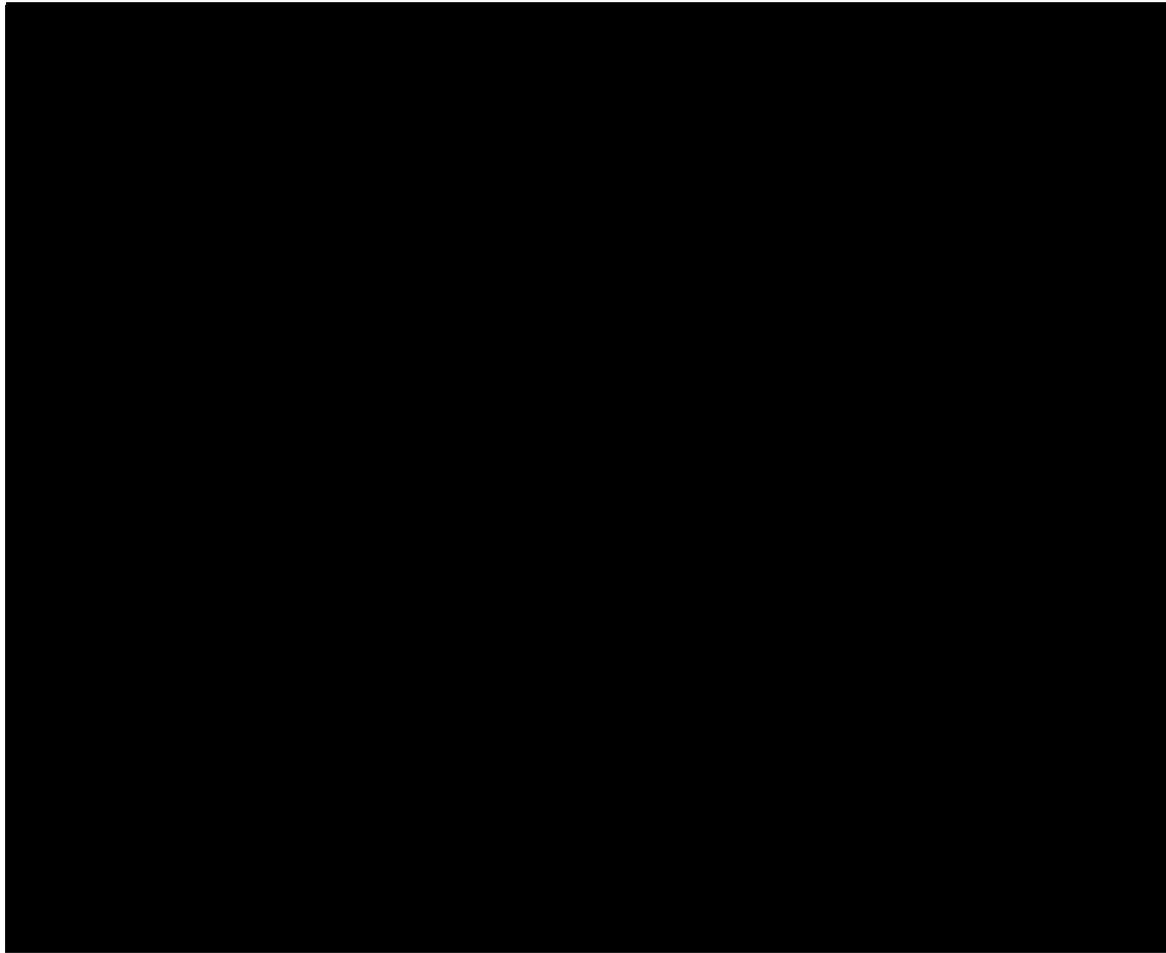


Figure 4. Southern trap sites (●) and 1914 (■) *Sorex palustris* location in the White Mountains, Arizona.

Table 2. Northern trap locations and dates for <i>Sorex palustris</i> in the White Mountains, Arizona, 1992.				
LOCATION/UTM	DATE	TRAP NIGHTS (pitfall)	ELEVATION (m)	NUMBER OF SPECIMENS
Burro Creek [REDACTED]	07/11-07/13 08/04-08/07 08/12-08/14	20 6 4	2707	0 0 0
Sunnyside Reservoir-Fish Creek [REDACTED]	06/16-06/19 07/08-07/13 08/03-08/07 08/12-08/14 08/26-08/28 09/01-09/04	110 88 22 12 11 35	2774	0 0 0 0 0 0
Hall Creek [REDACTED]	08/13-08/14 08/27-09/04	4 18	2710	0 0
White Mountain Reservoir [REDACTED]	08/27-08/28 09/01-09/04	2 6	2792	0 0
Lee Valley Reservoir [REDACTED]	08/07-08/08 08/12-08/14 09/18-09/19	8 8 2	2877	1 0 1
Phelps Cabin [REDACTED]	06/17-06/19 07/08-07/13 08/12-08/14 08/27-08/28	30 62 17 12	2850	0 0 0 1
West Fork Black River [REDACTED]	07/09-07/13 08/04-08/07 08/12-08/14 08/27-08/28	45 13 8 3	2694	0 0 0 1
West Fork Little Colorado River-Greer [REDACTED]	08/06-08/07	3	2591	0
West Fork Little Colorado River [REDACTED]	09/01-09/04	8	2737	0

Table 3. Southern trap locations and dates for <i>Sorex palustris</i> in the White Mountains, Arizona, 1992.				
LOCATION/UTM	DATE	TRAP NIGHTS (pitfall)	ELEVATION (m)	NUMBER OF SPECIMENS
Ackre Lake-Fish Creek [REDACTED]	09/16-09/18	8	2633	0
Black River [REDACTED]	10/14-10/15	6	2088	0
Boggy Creek [REDACTED]	09/30-10/02 10/12-10/15	11 24	2390	0 0
Centerfire Creek [REDACTED]	09/29-10/02 10/12-10/15	20 24	2368	0 0
Corduroy Creek [REDACTED]	09/17-09/18	4	2670	0
KP Cienega [REDACTED]	09/15-09/18	9	2719	0
PS Ranch-Home Creek [REDACTED]	09/29-10/02 10/13-10/15	15 11	2310	0 0

Hannagan Meadow, should be plotted at Horseshoe Lake along the White River on the Fort Apache Reservation (Hoffmeister pers. comm.). The other specimen, listed as being taken from near Prieto Plateau, at 2743 m on the south end of the Blue Range, was likely from near KP Cienega. Prieto Plateau is 24 miles south of the Blue Range, at an elevation of 2134 m. Prieto Plateau may have been considered synonymous with the Mogollon Plateau (Hoffmeister pers. comm.). Descriptions of habitat from these locations mention willow and alder thickets, overtopped by spruce (from E.A. Goldman's notes, as referenced in Hoffmeister 1986).

Trap sites were in riparian corridors of subalpine grasslands containing varying densities of willow (*Salix* sp.) and/or alder (*Alnus* sp.). Some trap sites were totally devoid of shrubs, while

others contained dense shrub cover. All water shrews were collected along streams associated with willow cover. Quantitative and qualitative data on vegetation and stream characteristics were not collected during this phase of the survey. Emphasis was placed on determining if water shrews still occurred in Arizona.

A study to evaluate riparian habitat conditions necessary to sustain the water shrew population was conducted by the University of Arizona during the summer of 1993, through a Heritage grant from the Department (Smith 1993). Twelve drainages were sampled for stream characteristics and occurrence of water shrews. Water shrews were captured from only the West Fork of the Little Colorado River at Sheep's Crossing in 1993. No water shrews were collected from the 1985 and 1987 Fish Creek site.

No water shrews were collected in 1992 from the three historical collection sites or from the Fish Creek site where specimens were collected in 1985 and 1987. The Horseshoe Cienega (Lake) site on the Fort Apache Reservation was not sampled and three buckets used at Sheep's Crossing were stolen within 24 hours. However, trapping efforts in 1993 captured two water shrews from sheep crossings.

Of the 28 drainages sampled in 1992 and 1993, water shrews were limited to the upper reaches of only three: West Fork Black River; East Fork Little Colorado River; West Fork Little Colorado River. Field observations indicate that bank stabilization and willow regeneration within the shrew's historic range are declining due to unrestricted use of streams by livestock.

Water shrew specimens captured during 1992 are archived at the Nongame Branch in Phoenix.

RECOMMENDATIONS

Only 11 water shrew specimens have been collected in Arizona. Recent attempts by Hoffmeister (1986) and the Nongame Branch in 1991 to collect water shrews were unsuccessful. An unpublished contract report to the U.S. Forest Service by G.S. Mills in the early 1980s expressed concerns of no verified records of this species in Arizona for more than 20 years. Hoffmeister (1986) suggests that heavy grazing along mountain streams and meadows may have removed some suitable habitat for these shrews. Field observations in 1992 indicate that bank stabilization and willow regeneration are regressing throughout the study area due to unrestricted use by livestock. Smith (1993) also points out that the most significant current threat to the Arizona water shrew population may be livestock grazing. These effects include change in vegetation communities, soil compaction and loss of cover through grazing, trampling and destruction of overhanging banks (Kauffman and Krueger 1984).

Current distribution of the water shrew has been reduced to the upper reaches of three drainages in the White Mountains. All specimens were associated with riparian willow habitat. Because

of the tenuous future of the water shrew and continued reduction of suitable habitat along streams in the White Mountains, the following recommendations should be considered.

1. Develop fencing exclosures with the U.S. Forest Service within riparian corridors where water shrews currently occur.
2. Pursue the possibility of listing the Arizona water shrew as a federally listed endangered population.
3. Collect quantitative and qualitative data on vegetation and stream characteristics where water shrews occur.
4. Acquire permission from the Fort Apache Indian Reservation to survey the Horseshoe Cienega (Lake) historic site.

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