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Small Mammal Sampling in Sandia Canyon, 2007

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Small Mammal Sampling in Sandia Canyon, 2007

Kathy Bennett

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Small Mammal Sampling in Sandia Canyon, 2007

by

Kathy Bennett and Rhonda Robinson

ABSTRACT

As part of ongoing biota investigations at the Los Alamos National Laboratory, a study was conducted to address the potential for ecological effects of metals and polychlorinated biphenyls on small mammal communities and the potential for exposure through the food chain in Sandia Canyon. Sandia Canyon and its tributary canyons have received contaminants from several waste management units, including discharges of cooling water from a power plant, operation of a small-charge implosion and initiator experiment site, operation of a security-force firing range, waste storage, and effluent discharges. Treated effluents from the Technical Area 46 Sanitary Wastewater Systems Consolidation plant are also discharged into Sandia Canyon. The study included three reaches of Sandia Canyon (S-5E, S-4E, and S-2). The study sites were sampled for small mammals during November 5–8, 2007. Species diversity and evenness were the highest for the S-2 reach and the lowest for the S-4E reach. However, the mean percent daily capture rate was the highest for S-4E (very high captures of one species) and the lowest from S-5E. There were some differences seen in species composition among the three reaches. Differences in species composition and diversity were most likely due to differences in habitat. Sex ratios, body weights, and reproductive status of small mammals were also evaluated. However, small sample sizes of some species within some sites affected the analysis. Deviation of ratios of males to females from 1:1 by species (if n = 5) was tested using a Chi-square analysis. No differences were detected in sex ratios of deer mice at any site. However, deviations were detected for sex ratios of harvest mice captured from S-4E and montane voles captured from S-2. In both cases, there were a greater number of females than males. Where there was sufficient sample size, body weights of adults were compared among sites. No differences in body weights were found. Reproductive status of species appears to be fairly similar across sites with a large proportion of non-reproductive females and non-scrotal males. Of the 172 small mammals screened for Hantavirus, 2.9% had detectable antibodies: three montane voles, one harvest mouse, and one deer mouse.

INTRODUCTION

A small mammal study was conducted in Sandia Canyon to assess potential adverse effects in biota due to the presence of contaminants (designated as contaminants of potential ecological concern), including polychlorinated biphenyls in the terrestrial media (LANL 2007). The objectives of the small mammal investigation were to to evaluate risks to the species themselves and to higher trophic level predators, such as the Mexican spotted owl (*Strix occidentalis lucida*), a federally protected species with potential habitat in a portion of Sandia Canyon (Keller 2007). Tissue samples from captured small mammals will be submitted to measure contaminant concentrations. We also obtained population parameters such as relative abundance and sex ratios.

Small mammals historically captured in the reaches of Sandia Canyon include the following: deer mouse (*Peromyscus maniculatus* [PEMA]), brush mouse (*Peromyscus boylii* [PEBO]), pinyon mouse (*Peromyscus truei* [PETR]), long-tailed vole (*Microtus longicaudus* [MILO]), montane vole (*Microtus montanus* [MIMO]), western harvest mouse (*Reithrodontomys megalotis* [REME]), and vagrant shrew (*Sorex vagrans* [SOVA]). The life spans of these species are short (less than one year) and they occupy small home ranges (~100 m^2). They are easy to capture and, depending on habitat and environmental conditions, are usually abundant (Talmage 1989). All of these species are potential prey for the Mexican spotted owl.

METHODOLOGY

Site Descriptions

Los Alamos National Laboratory (LANL) is situated in northern New Mexico on the Pajarito Plateau, a series of finger-like mesas separated by east-to-west-oriented canyons. The mesa tops slope from approximately 2377 m (7800 ft) to 1890 m (6200 ft). The surrounding land is largely undeveloped, including large tracts held by the Santa Fe National Forest, Bureau of Land Management, Bandelier National Monument, and San Ildefonso Pueblo. Well-developed ecosystems that include habitat for federally protected species exist within undeveloped areas of LANL. This is particularly true of the canyon bottoms, some of which contain either intermittent or perennial reaches of surface water.

Sandia Canyon begins on the Pajarito Plateau within Technical Area (TA) 03 and drains a total area of approximately 1424 ha (5.5 mi^2). The canyon extends east-southeast from TA-03 to the Rio Grande for a distance of approximately 16 km (10 mi). The upper canyon contains a perennial stream supplied from effluent discharges from the Sanitary Wastewater Systems Consolidation plant and from cooling tower discharges and a large wetland in the upper canyon. The stream in the middle and lower parts of the canyon is intermittent, flowing in response to precipitation events. The area around the head of Sandia Canyon is highly developed and includes large areas of pavement and buildings, enhancing storm water runoff.

Small Mammal Population Trapping and Characterization

Trapping grids were set up in Sandia Canyon in three reaches: S-2, S-4E, and S-5E (Figures 1, 2, and 3). Five lines of 20 Sherman® live traps were laid out with spacing of 10 m per trap and 10 m between each line in each reach. Figures 1 through 3 show the locations of the trapping sites within each reach. The three reaches sampled form an elevational and moisture gradient down the canyon with S-2 near the canyon's headwaters, S-4E near mid canyon, and S-5E in the lower canyon. The habitat characteristics of these reaches vary greatly. S-2 is dominated by a large wetland and has perennial water, S-4E is an open ponderosa pine (*Pinus ponderosa*) and piñon pine (*Pinus edulis*) shrubland/grassland with intermittent water, and S-5E is piñon-juniper (*Juniperus* spp.) woodland with a few scattered ponderosa pine and even more intermittent water.

Sherman® live traps were selected because of their suitability for capturing most of the target species. Trap lines followed the contours of the land, with the stream channel as the reference point. Trapping took place over four consecutive nights (November 5 through November 8, 2007). Traps were baited in the late afternoon with a molasses-coated horse feed and checked early the next morning. Animals were collected and taken to a central location for processing. Two pitfall trap lines were also placed parallel to the wetland in S-2, one on each side of the wetland to capture vagrant shrews. Pitfall traps consisted of buckets 24 cm in diameter and 20 cm deep, sunken flush with

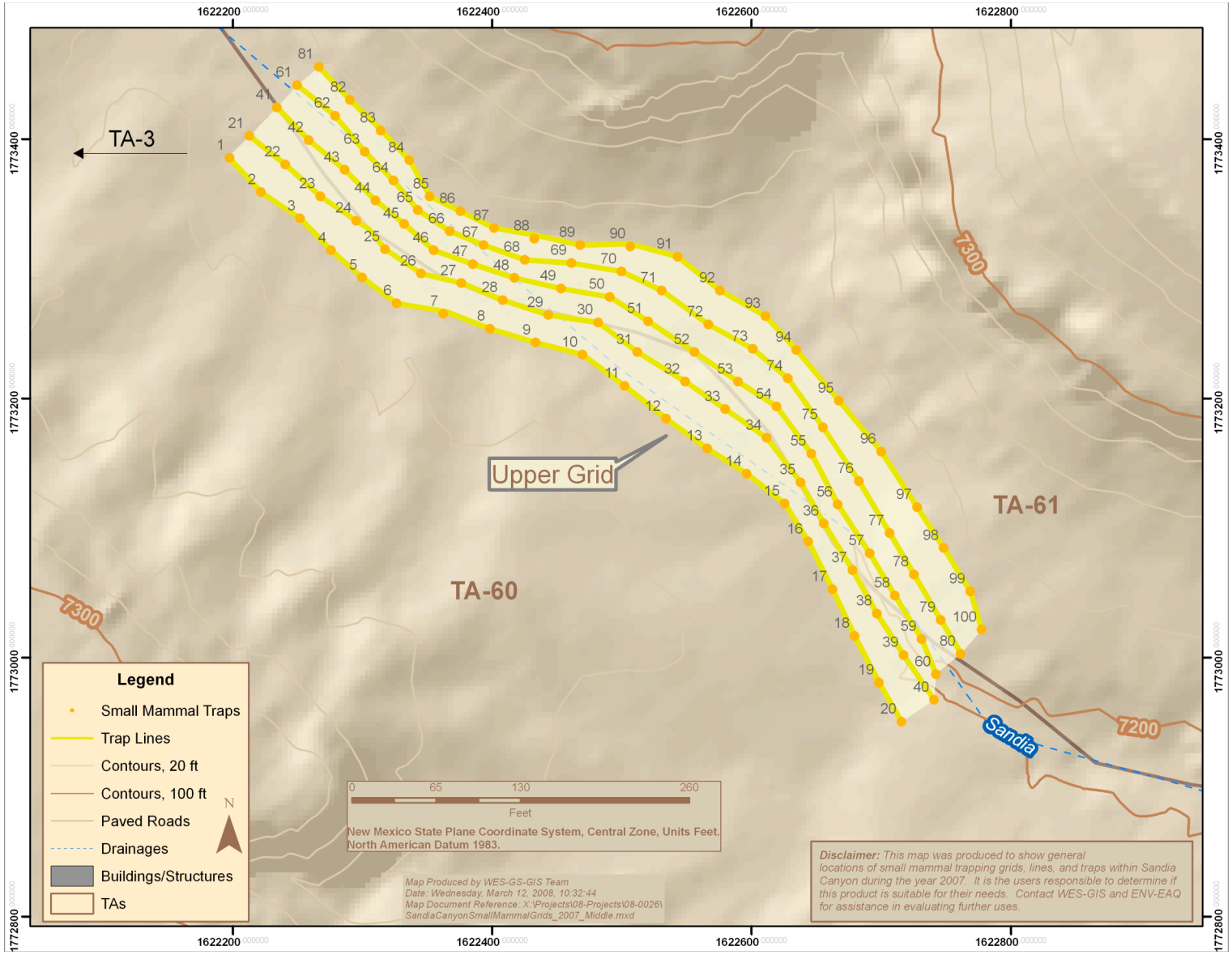


Figure 1. Location of the S-2 trapping site.

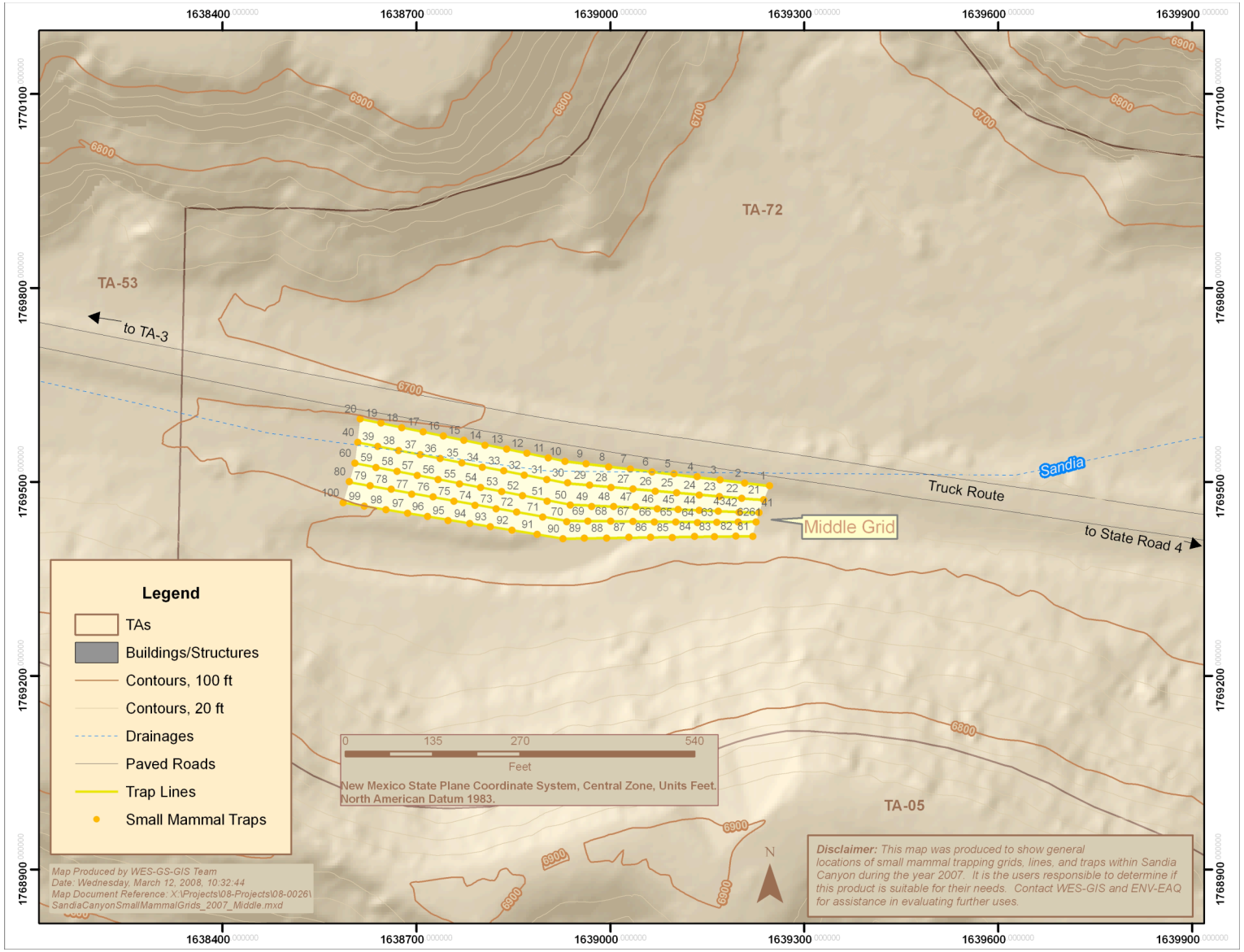


Figure 2. Location of the S-4E trapping site.

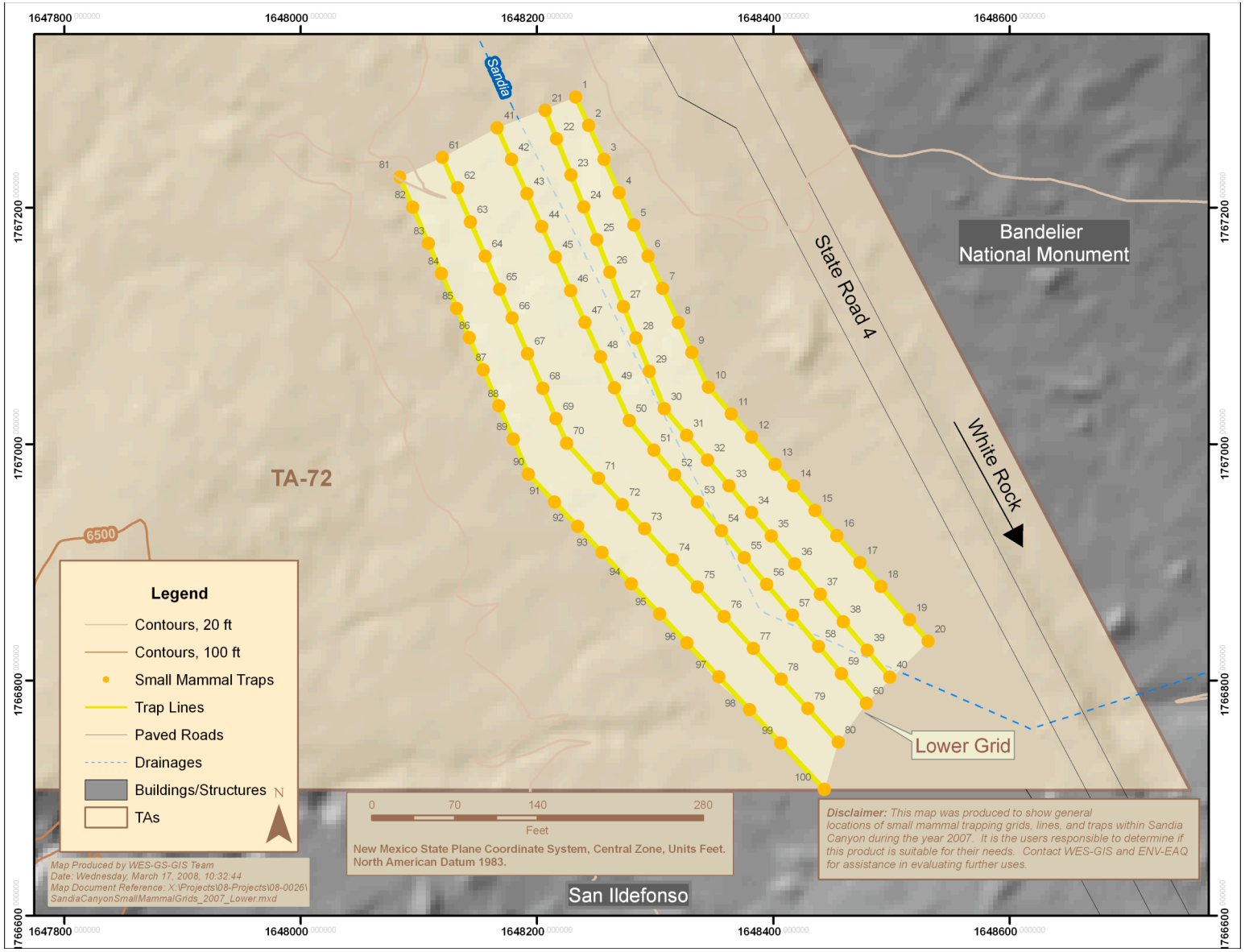


Figure 3. Location of the S-5E trapping site.

the soil, with 10 traps per line. At the processing location animals were indentified to species, sexed, weighed, and measured (total body, tail, hind foot, and ear length) and blood was drawn. Reproductive status and trap number were recorded as well. Animals were then euthanized and placed in double zip lock bags and placed in the freezer.

Blood samples were taken from the interorbital region of all species, except shrews, and were sent to the University of New Mexico Medical School for Hantavirus screening. Animals that tested negative for Hantavirus were then sent off for contaminant analyses. Results of these analyses will be presented in a separate report.

Mean Percent Daily Capture Rates and Captures per 100 Trap Nights

Population density estimates were not calculated for this study because of design requirements. However, mean percent daily capture rates were calculated. The mean percent daily capture rates were derived from the total number of available trap stations at each location, the number of nights trapped, and the number of animals captured.

Mean Percent Daily Capture Rate = $(1/n(dc_1 + dc_2 + \ldots dc_n) / t) * 100$ where n = number of nights trapped, dc = number of captures each day, and t = number of traps per location. Mean Percent Daily Capture Rate can also be expressed as the numbers of captures per 100 trap nights where 100 trap nights equals one night trapped with 100 set traps or 100 nights trapped with one trap set.

Species Composition and Species Diversity and Evenness

Species composition and species diversity and evenness were determined for each site. Species composition is species captured at each site. Species diversity and evenness are measures of species' variety and their relative abundances. Species diversity and species evenness were calculated for each site. Information theory was used to calculate first-order diversity using the method of Shannon-Weaver (Ryan 2001) and was based on captures of the seven different species (deer mouse, brush mouse, pinyon mouse, harvest mouse, montane vole, long-tail vole, and vagrant shrew) we encountered in this study.

Other Analyses

Additional analyses were conducted to compare population characteristics of the sites. Differences in sex ratios, reproductive stages, and mean body weights within species were evaluated.

A Chi-square analysis was used to look at differences between sex ratios of species in each study site (Zar 1984; SAS 1988). An assumption of equal proportional distribution of males to females was made for the Chi-square analysis. In order to utilize a Chi-square analysis, sufficient sample size of five or more samples in each group were needed. An alpha level of 0.05 was used.

A parametric analysis of variance (ANOVA) was used to look at differences (alpha = 0.05) in adult weights by study site. Because the sample sizes were not balanced among the study sites, general linear model (GLM) was used to conduct the ANOVA (SAS 1988; Zar 1984; Beitinger 1988). A Tukey Multiple Range Test (MRT) was used to detect where the differences occurred and was selected because of its ability to handle an uneven design and the likelihood of less Type 1 errors compared to other MRTs (Zar 1984).

RESULTS

A combined total of 203 small mammals were captured at sites S-2, S-4E, and S-5E. Appendix A provides summary data. Appendix B contains all the compiled field data of the captured animals.

Hantavirus Screening

Hantavirus screening was conducted for each animal where a sufficient blood sample could be obtained. We sent 172 blood samples to the University of New Mexico Medical School for screening. Five samples were positive for Hantavirus. Three positives were montane voles from S-2 (two males and one female). The other two positives were from S-5E, one harvest mouse and one deer mouse (both males) (Appendix C).

Mean Percent Daily Capture Rates/Captures per 100 Trap Nights

Mean percent daily capture rates were calculated for all of the Sandia Canyon trapping reaches (Figure 4). S-4E had the highest mean capture rate of 32.3%, and S-5E had the lowest capture rate of 4.8%.

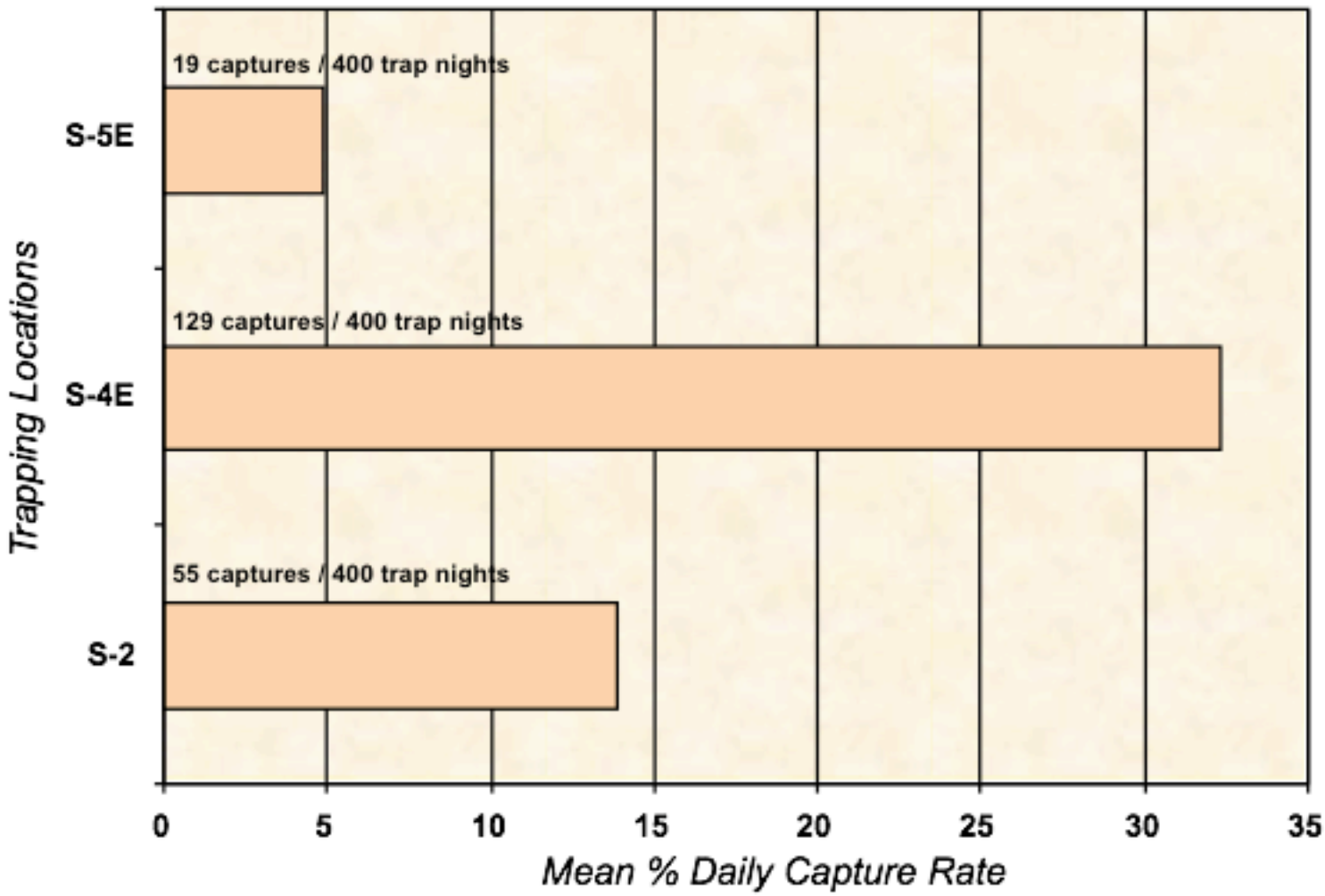
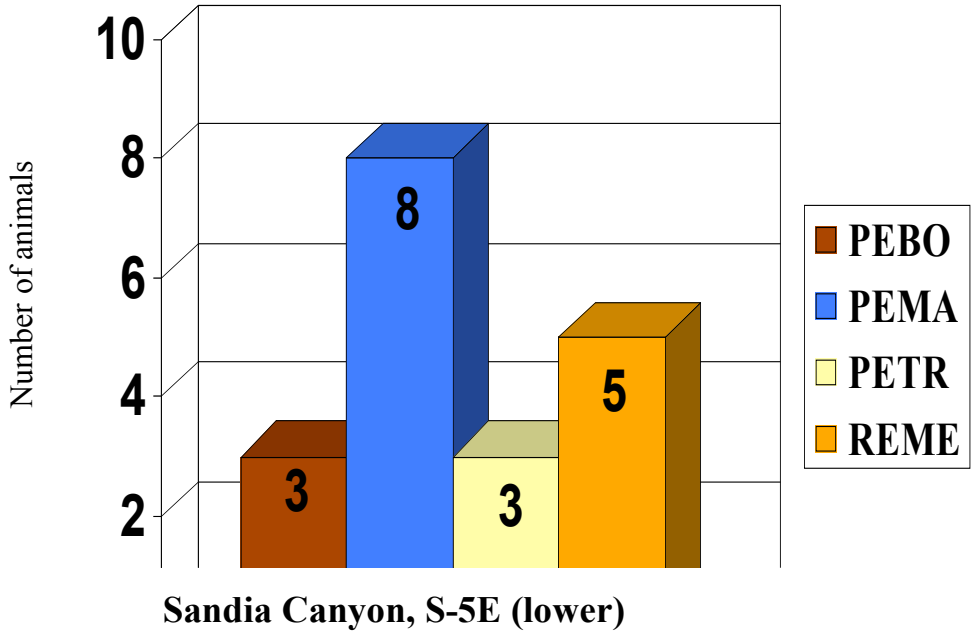


Figure 4. Mean percent daily capture rates and animals/100 trap nights for Sandia Canyon during the fall of 2007.

Species Composition

A total of seven different species were captured in this study. Six species were captured at S-2, four at S-4E, and four at S-5E (Figures 5 and 6). Deer mice were captured at all



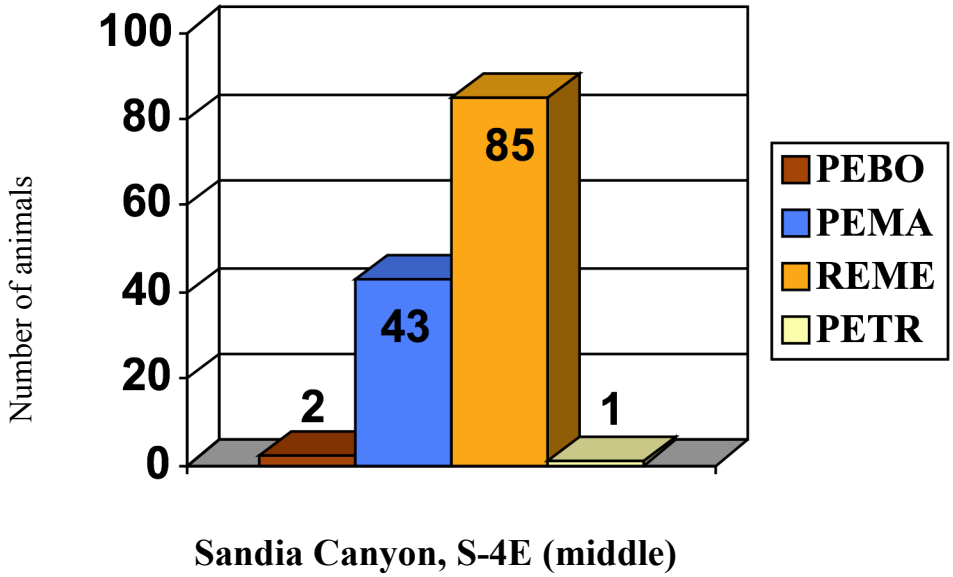


Figure 5. The number of species captured in Sandia Canyon reaches S-5E and S-4E.

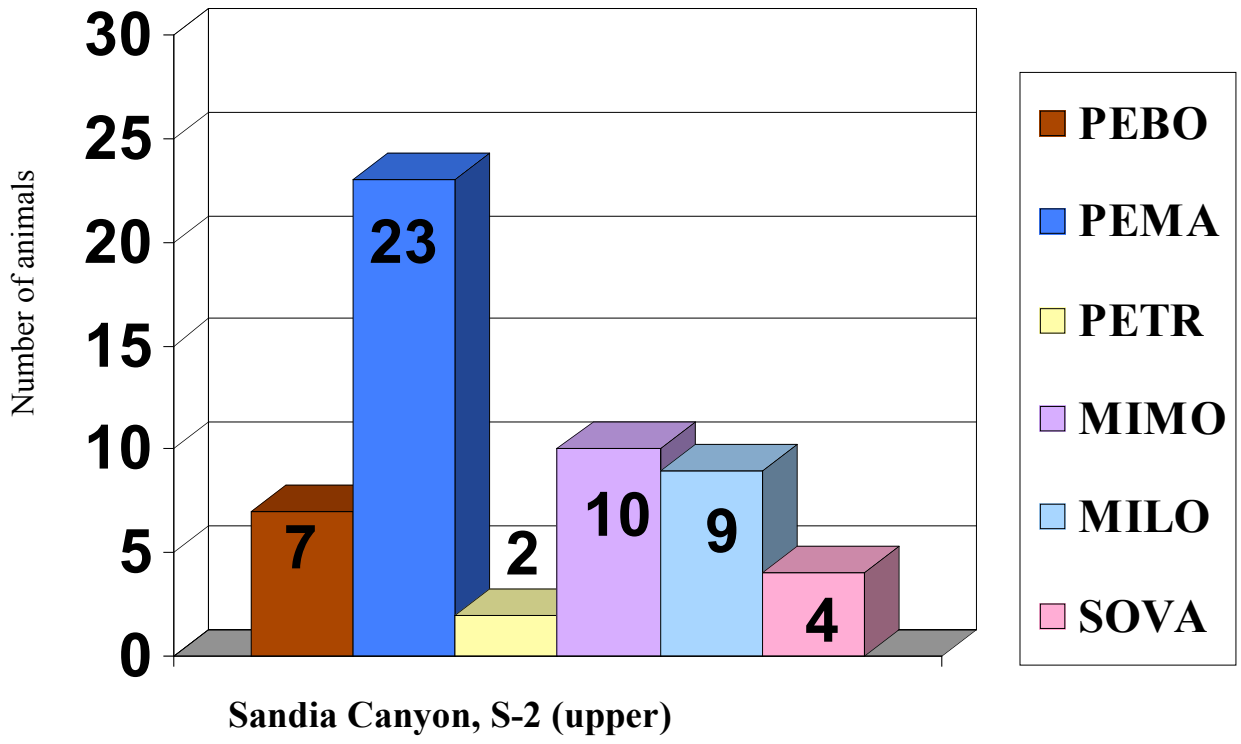
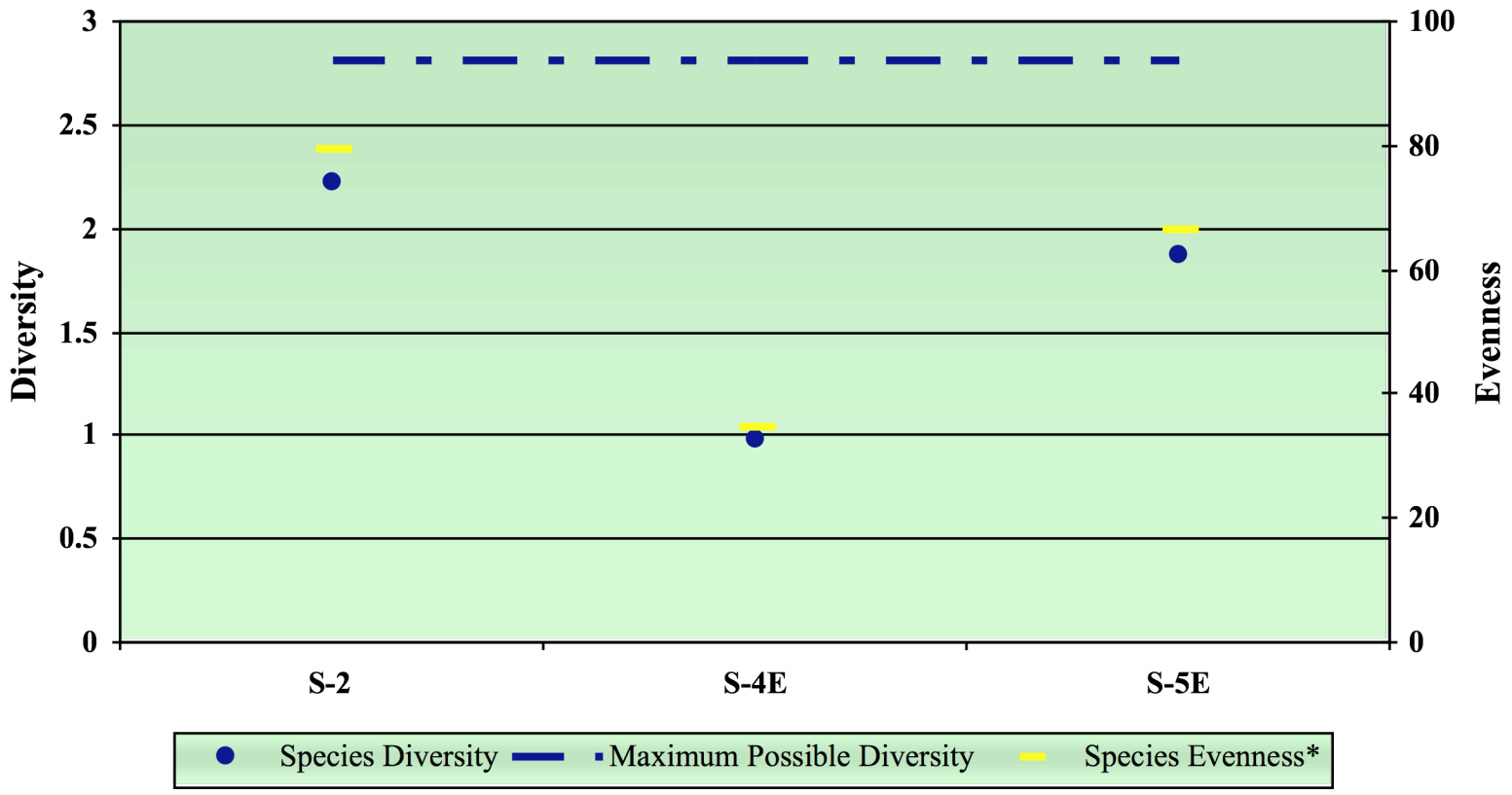


Figure 6. The number of species captured in Sandia Canyon reach S-2.

three of the sites with eight deer mice captured from S-5E, 43 deer mice from S-4E, and 23 deer mice from S-2. Three brush mice were captured in S-5E, two brush mice in S-4E, and seven in S-2. A very small number of pinyon mice were captured in each reach, three from S-5E, one from S-4E, and two from S-2. A very large amount of harvest mice were captured in S-4E (n = 85), but only five were captured at S-5E and none were captured at S-2. Water-associated species such as montane vole, long-tailed vole, and vagrant shrew were only captured in S-2, as that part of the canyon contains a perennial stream and wetland. Ten montane voles, nine long-tailed voles, and four vagrant shrews were captured.

Species Diversity and Evenness

Species diversity index and species evenness were calculated for each trapping site (Figure 7). Species diversity includes both species richness and evenness and allows for



** Maximum possible evenness is 100.*

Figure 7. Species diversity indices for each site.

a site and temporal comparison. Higher species diversity indicates a healthier, or more stable, ecosystem that is more resilient to impacts. S-2 had the highest diversity and evenness indices (2.2 and 79.3, respectively) and S-4E had the lowest diversity and evenness indices (1.0 and 34.9, respectively). Based on capturing seven different species per canyon, the maximum theoretical species diversity index was 2.8. Species diversity includes both species richness and evenness.

Sex Ratios

Sex ratios of adult males to females trapped within the same reach and of the same species were compared using a Chi-square (χ^2) analysis with an assumption of an equal distribution between the two sexes (Table 1). Only species with sufficient sample size ($n \geq 5$ in each group) were evaluated. Deer mouse was evaluated for sites S-2 and S-4E, harvest mouse was evaluated for S-4E, and montane vole was evaluated for site S-2. There were no statistical differences found between the sex ratios of deer mice. Within the S-4E site, 76 female harvest mice were captured and only seven males. This sex ratio was found to be highly significantly different from 1:1 ($\chi^2 = 57.361$, $p<0.00001$). Statistical difference from 1:1 was also detected in the sex ratio between male and female montane voles ($\chi^2 = 9.9998$, $p = 0.0016$) within the S-2 site. Ten female montane voles were captured, but no males. The number of males and females of each species are shown in Figures 8, 9, and 10.

Reproductive Status

Female brush mice

A total of six female brush mice were captured during this study. Five were captured from S-2 and one from S-5E. Of the possible reproductive categories (juvenile, lactating, non-reproductive, and pregnant), the majority of the captures were non-reproductive females from S-2. One lactating female was captured from S-5E and one female from S-2 was captured where reproductive status could not be determined (Table 2).

Male brush mice

A total of four male brush mice were captured. Two non-scrotal male brush mice were captured at the S-5E reach and one from S-2. One male brush mouse was captured from S-2 where reproductive status could not be determined (Table 2).

Table 1. Chi-Square Values and Probability for Testing the Equal Proportions of Males to Females of Each Species at Each Site [Chi-Square Value (Probability)]

Site	Deer Mouse	Brush Mouse	Pinyon Mouse	Harvest Mouse	Montane Voles	Long-tailed Voles	Vagrant Shrews
S-2							
	0.3913(0.532)	*	*	None Captured	9.9998(0.0016)	*	*
S-4E							
	0.5814(0.4458)	None Captured	*	57.361(<0.00001)	None Captured	None Captured	None Captured
S-5E							
	*	*	*	*	None Captured	None Captured	None Captured

Asterisk (*) indicates insufficient sample size for analysis.

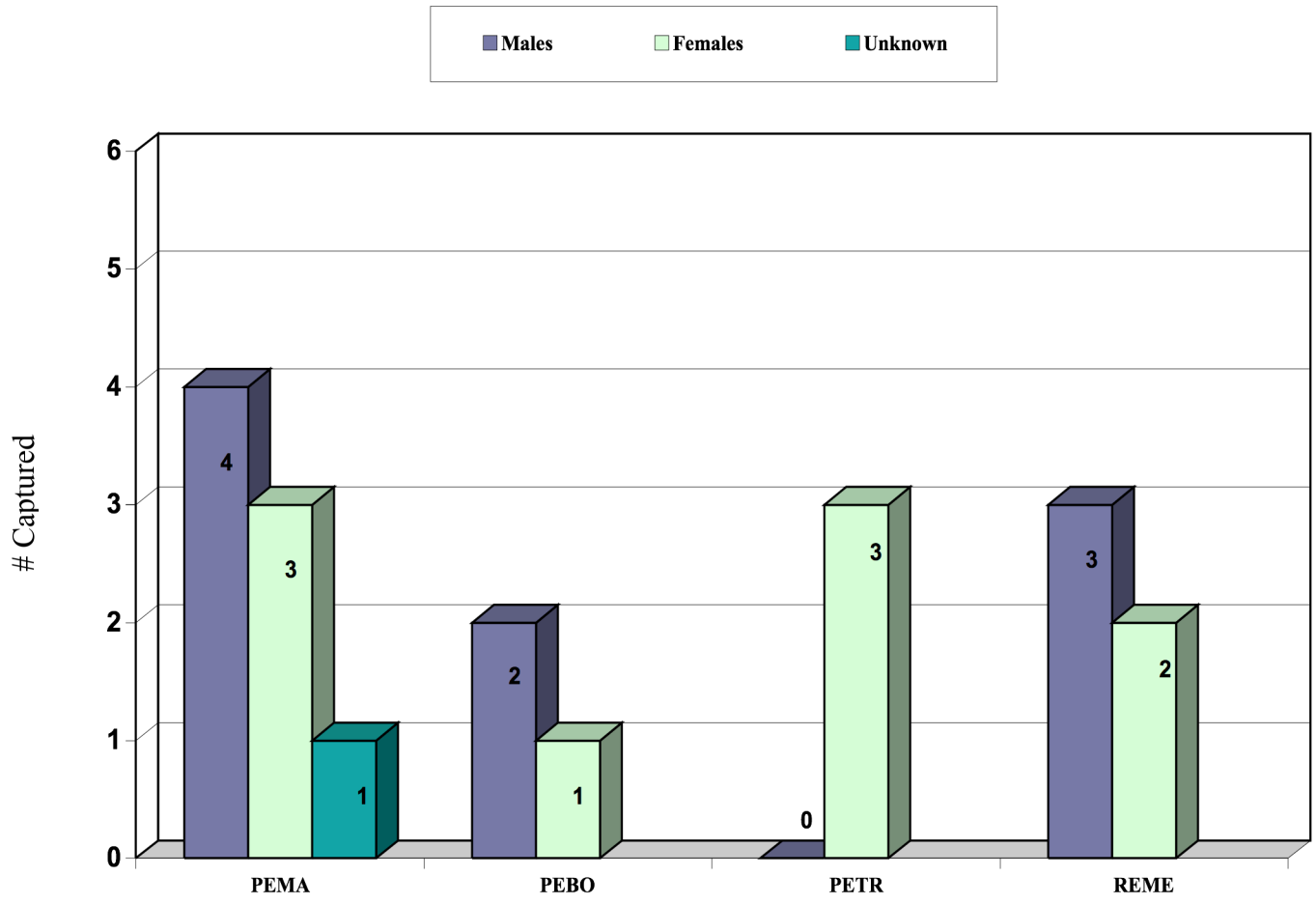


Figure 8. Males and females of each species captured in Sandia Canyon reach S-5E.

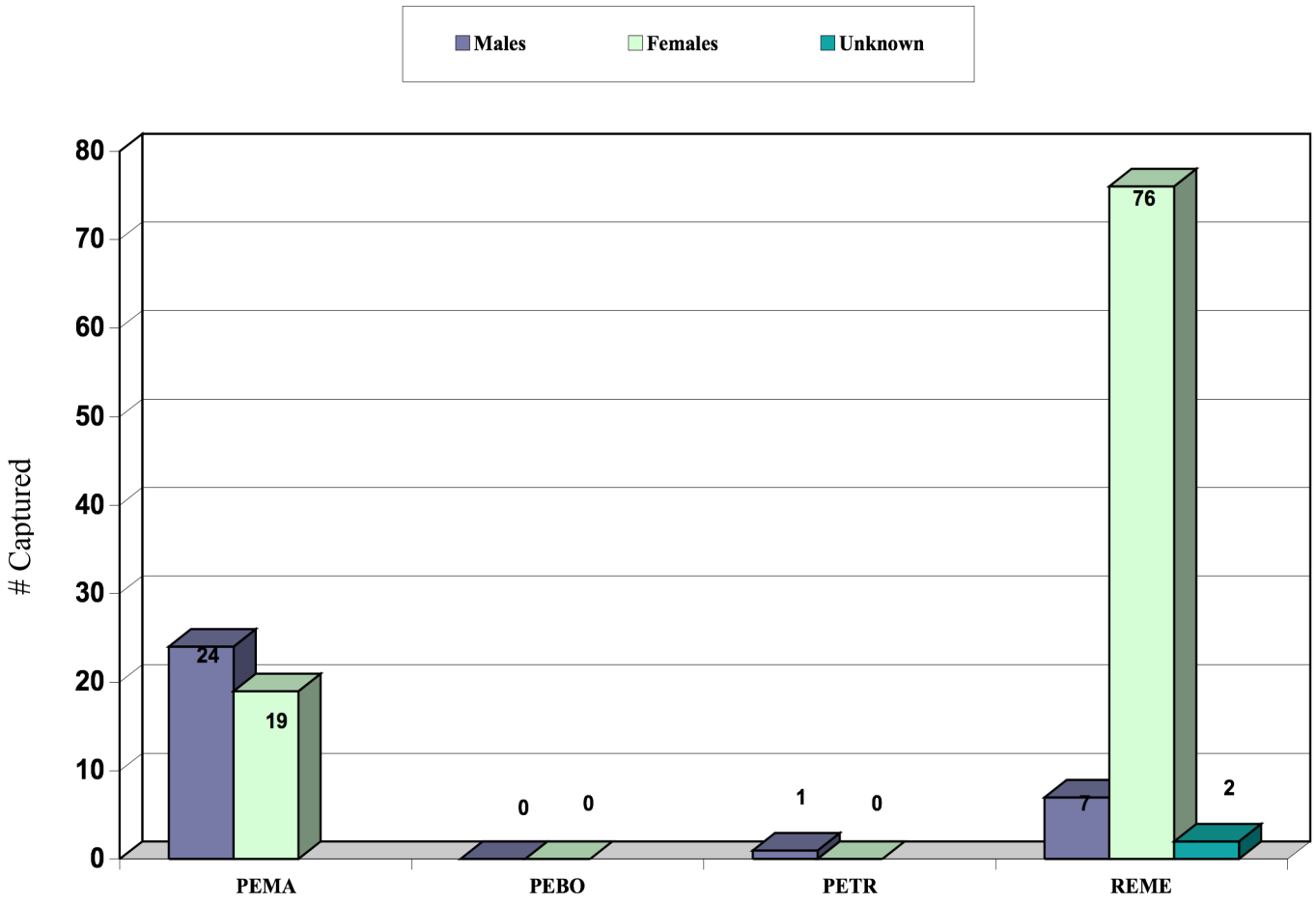


Figure 9. Males and females of each species captured in Sandia Canyon reach S-4E.

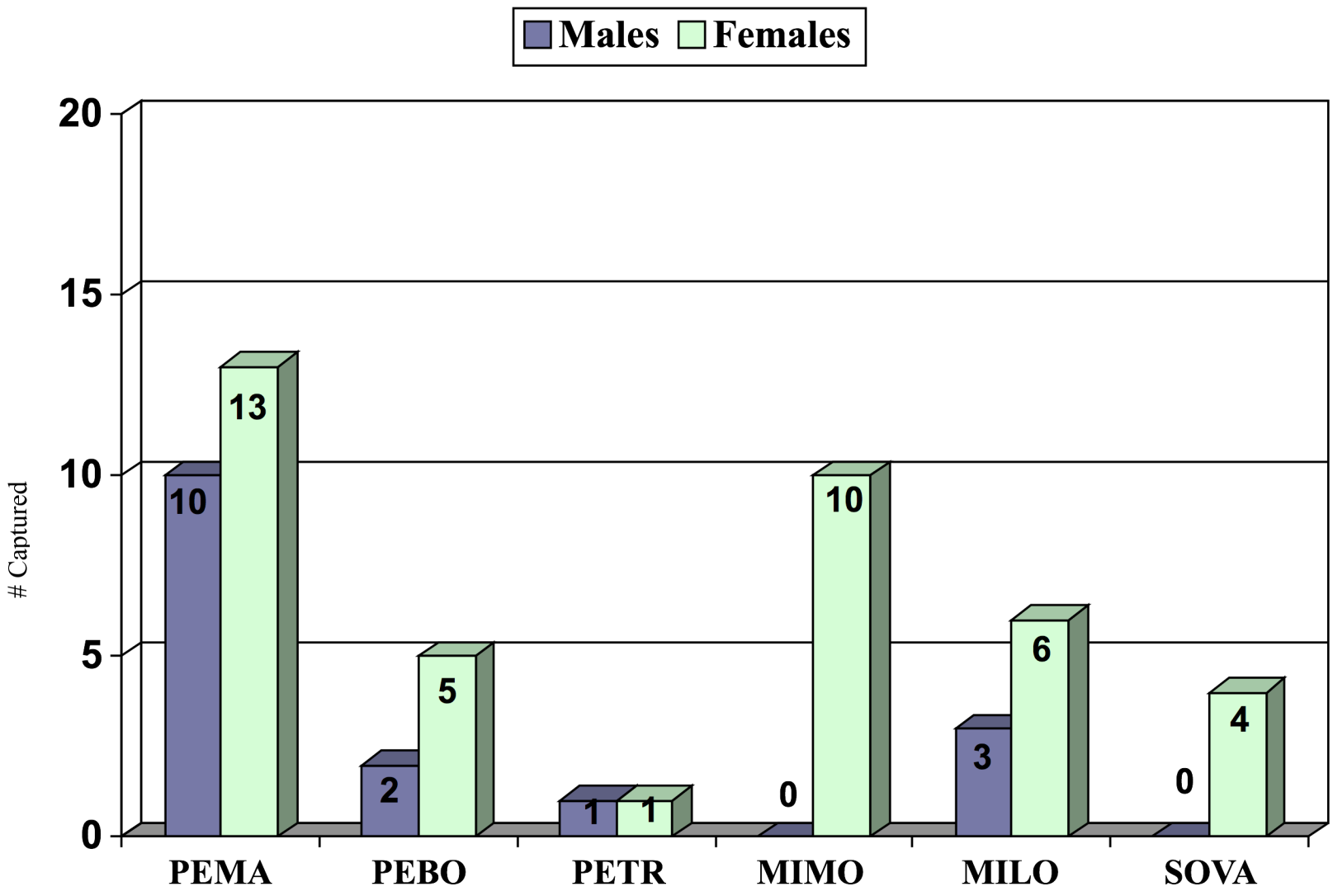


Figure 10. Males and females of each species captured in Sandia Canyon reach S-2.

Table 2. Number of Male and Female Brush Mice Captured in All Three Sampling Locations

	S-5E (lower)	S-4E (middle)	S-2 (upper)
Males			
Juveniles	0	0	0
Non-Scrotal	2	0	1
Scrotal	0	0	0
Unknown	1	0	1
Females			
Juveniles	0	0	0
Lactating	1	0	0
Non-reproductive (adult)	0	0	4
Pregnant	0	0	0
Unknown	0	0	1

Female deer mice

Thirty-five female deer mice were captured in this study. Similar numbers of non-reproductive female deer mice were captured in two sampling areas, S-4E (n = 16) and S-2 (n = 13). This was the only reproductive category captured in S-2. One non-reproductive female deer mouse was captured in S-5E. One lactating and one juvenile female deer mouse were captured from S-5E. S-4E had two lactating and one juvenile female deer mouse (Table 3, Figure 11).

Male deer mice

Non-scrotal male deer mice were captured in all three reaches, S-5E (n = 4), S-4E (n = 22), and S-2 (n = 8). One juvenile male deer mouse and one scrotal male were captured in S-2. There were two male deer mice captured in S-4E where reproductive status could not be determined (Table 3, Figure 12).

Female harvest mice

Sixty-three non-reproductive female harvest mice were captured in S-4E, and no female non-reproductive harvest mice were captured in S-5E. Lactating female harvest mice were only captured in S-4E (n = 3). Juvenile female harvest mice were captured in S-5E (n = 2) and S-4E (n = 8). There were two female harvest mice captured in S-4E where reproductive status could not be determined (Table 4 and Figure 13).

Male harvest mice

Non-scrotal male harvest mice were captured from S-5E (n = 2) and S-4E (n = 6). One male harvest mouse was captured in S-4E where reproductive status could not be determined (Table 4; Figure 13).

Table 3. Number of Male and Female Deer Mice Captured in All Three Sampling Locations

	S-5E (lower)	**S-4E (middle)**	**S-2 (upper)**
Males			
Juveniles	0	0	1
Non-Scrotal	4	22	8
Scrotal	0	0	1
Unknown	0	2	0
Females			
Juveniles	1	1	0
Lactating	1	2	0
Non-reproductive (adult)	1	16	13
Pregnant	0	0	0
Unknown	0	0	0

Table 4. Number of Male and Female Harvest Mice Captured in All Three Sampling Locations

	S-5E (lower)	**S-4E (middle)**	**S-2 (upper)**
Males			
Juveniles	1	0	0
Non-Scrotal	2	6	0
Scrotal	0	0	0
Unknown	0	1	0
Females			
Juveniles	2	8	0
Lactating	0	3	0
Non-reproductive (adult)	0	63	0
Pregnant	0	0	0
Unknown	0	2	0

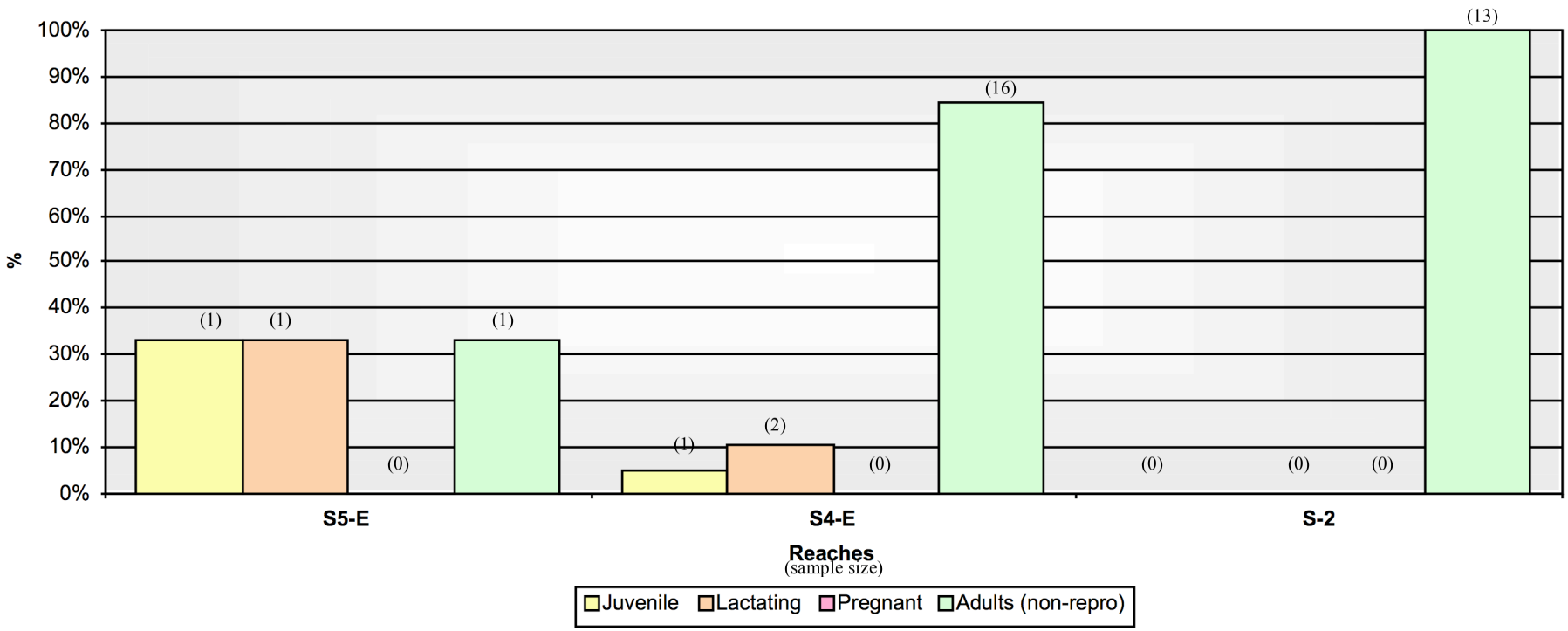


Figure 11. Reproductive status of female deer mice captured during the sampling period in Sandia Canyon.

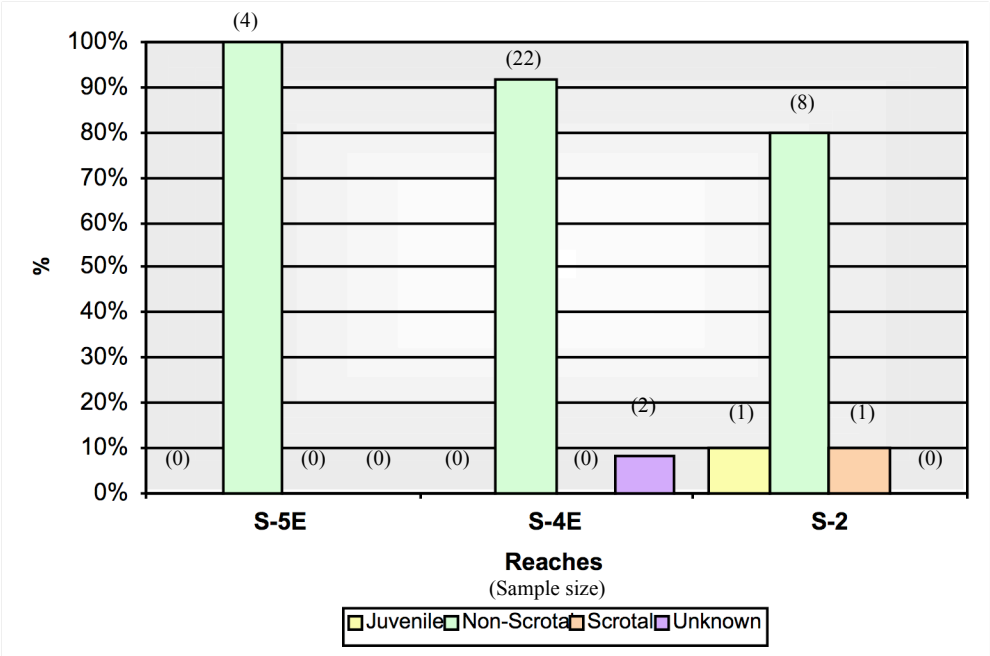
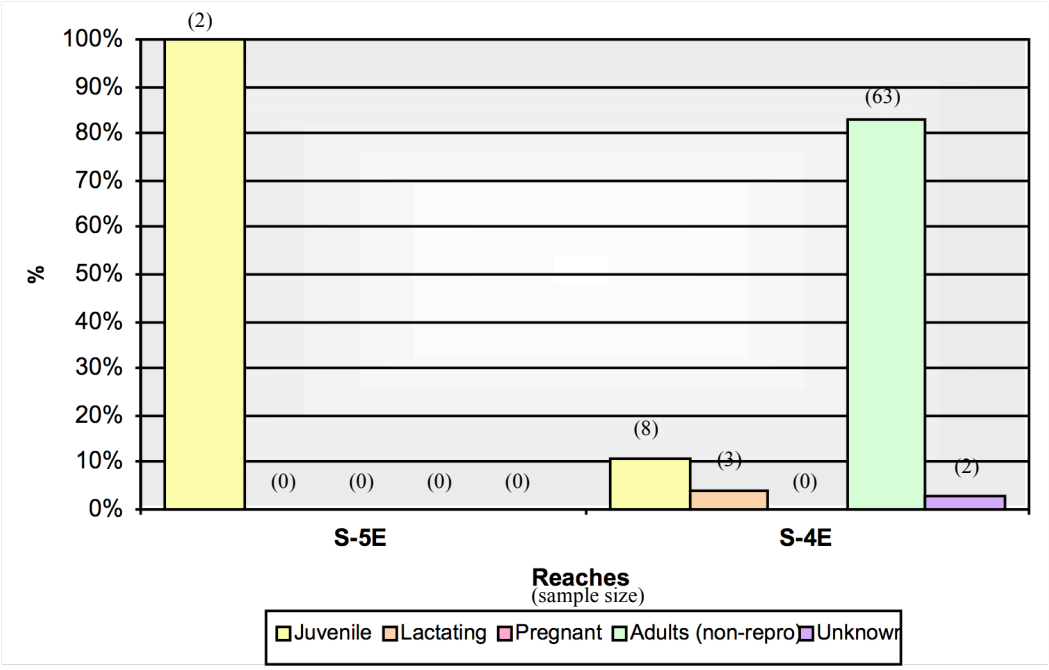
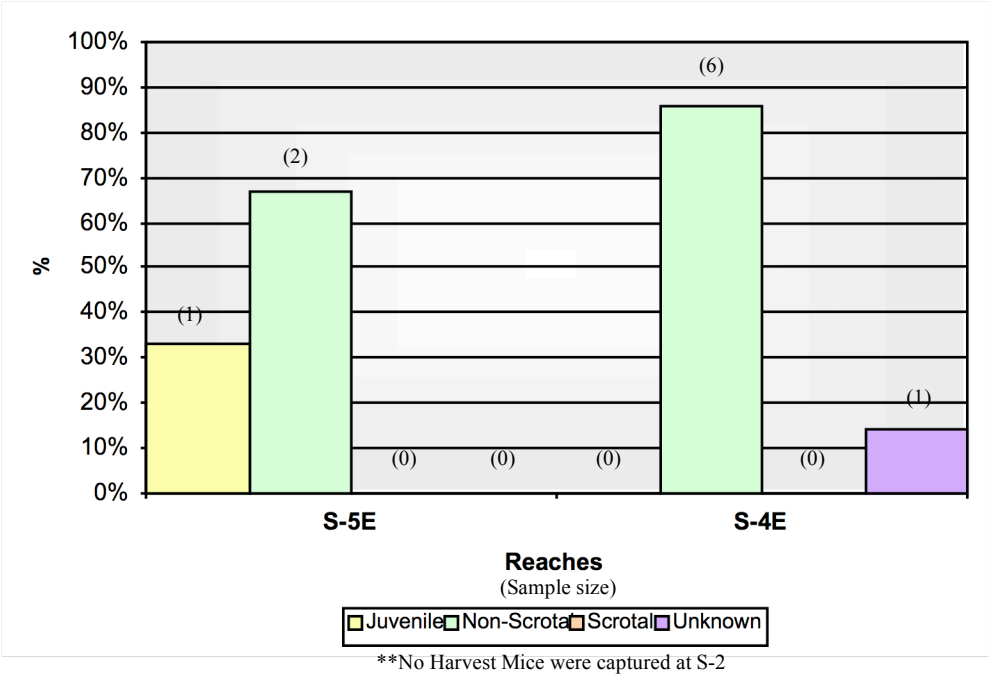


Figure 12. Reproductive status of male deer mice captured during the sampling period in Sandia Canyon.



**No Harvest Mice were captured at S-2

Figure 13. Reproductive status of female harvest mice captured during the sampling period in Sandia Canyon.



**No Harvest Mice were captured at S-2

Figure 14. Reproductive status of male harvest mice captured during the sampling period in Sandia Canyon.

Female pinyon mice

There were no female pinyon mice captured in reach S-4E. Two non-reproductive female pinyon mice were captured in S-5E and one non-reproductive female pinyon mouse was captured in S-2. One pregnant female pinyon mouse was captured in S-5E (Table 5).

Male pinyon mice

Male pinyon mice were not captured in S-5E. One non-scrotal male pinyon mouse was captured in each S-4E and S-2 (Table 5).

Female long-tailed voles

Five non-reproductive female long-tailed voles and one female where reproductive status could not be determined were captured from reach S-2 (Table 6).

Male long-tailed voles

Three non-scrotal males were captured from S-2 (Table 6).

Table 5. Number of Male and Female Pinyon Mice Captured in All Three Sampling Locations

	S-5E (lower)	S-4E (middle)	S-2 (upper)
Males			
Juveniles	0	0	0
Non-Scrotal	0	1	1
Scrotal	0	0	0
Unknown	0	0	0
Females			
Juveniles	0	0	0
Lactating	0	0	0
Non-reproductive (adult)	2	0	1
Pregnant	1	0	0
Unknown	0	0	0

Table 6. Number of Male and Female Long-Tailed Voles Captured in All Three Sampling Locations

	S-5E (lower)	S-4E (middle)	S-2 (upper)
Males			
Juveniles	0	0	0
Non-Scrotal	0	0	3
Scrotal	0	0	0
Unknown	0	0	0
Females			
Juveniles	0	0	0
Lactating	0	0	0
Non-reproductive (adult)	0	0	5
Pregnant	0	0	0
Unknown	0	0	1

Female montane voles

Six non-reproductive female montane voles, two lactating montane voles, and two where reproductive status could not be determined were captured from S-2 (Table 7).

Male montane voles

Male montane voles were not captured at any of the sampling locations (Table 7).

Table 7. Number of Male and Female Montane Voles Captured in All Three Sampling Locations

	S-5E (lower)	S-4E (middle)	S-2 (upper)
Males			
Juveniles	0	0	0
Non-Scrotal	0	0	0
Scrotal	0	0	0
Unknown	0	0	0
Females			
Juveniles	0	0	0
Lactating	0	0	2
Non-reproductive (adult)	0	0	6
Pregnant	0	0	0
Unknown	0	0	2

Four vagrant shrews were captured in reach S-2 of Sandia Canyon only. No pitfall traps were set in the other reaches because the habitat was not suitable.

Body Weights

Body weights of each species by sex are shown in Figures 15–20. Only those species with sufficient sample size (n>3) were analyzed to see if similar body weights were found by species and sex among the sites. Male deer mice were the only species with sufficient sample sizes to be compared across all three sites. However, there was sufficient sample size to compare adult body weights of female deer mice between two sites, S-2 and S-4E, using a *t*-Test.

Female deer mouse

There was no significant difference ($\alpha = 0.05$) detected between sites (*t*-Test, $t = 0.5348$, $p = 0.3003$). Mean weights ranged from 12.55 g (S-2) to 13.5 g (S-4E).

Male deer mouse

The weights of adult male deer mice were compared across all three sites. There was no significant difference ($\alpha = 0.05$) detected between sites (GLM, $F = 0.78$, $p = 0.4673$). Mean weights ranged from 14.4 g (S-5E) to 16.3 g (S-4E).

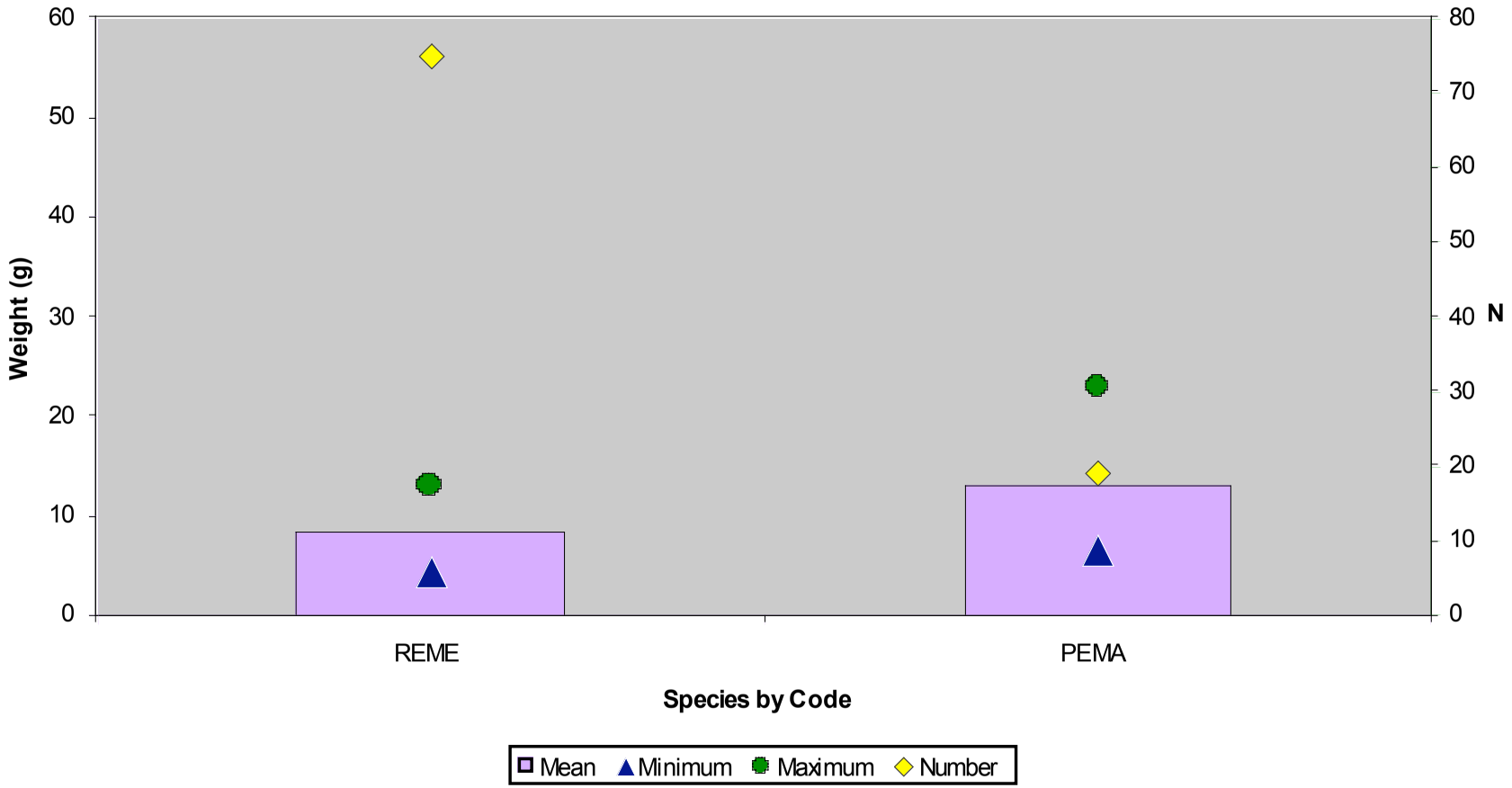


Figure 15. Mean, maximum, and minimum weights of adult female small mammals captured in S-4E (middle) Sandia Canyon. Sample size is shown on the axis to the right.

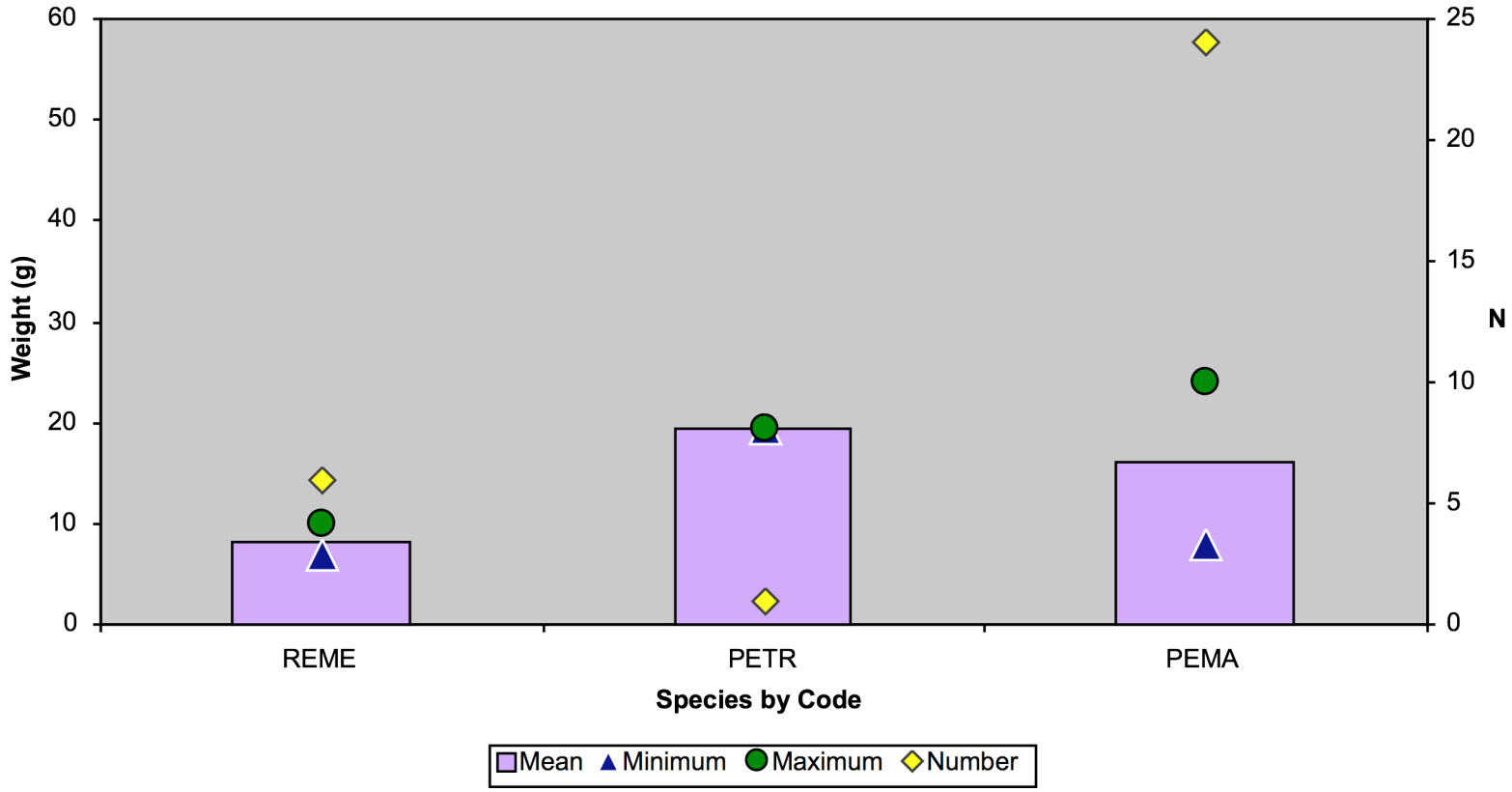


Figure 16. Mean, maximum, and minimum weights of adult male small mammals captured in S-4E (middle) Sandia Canyon. Sample size is shown on the axis to the right.

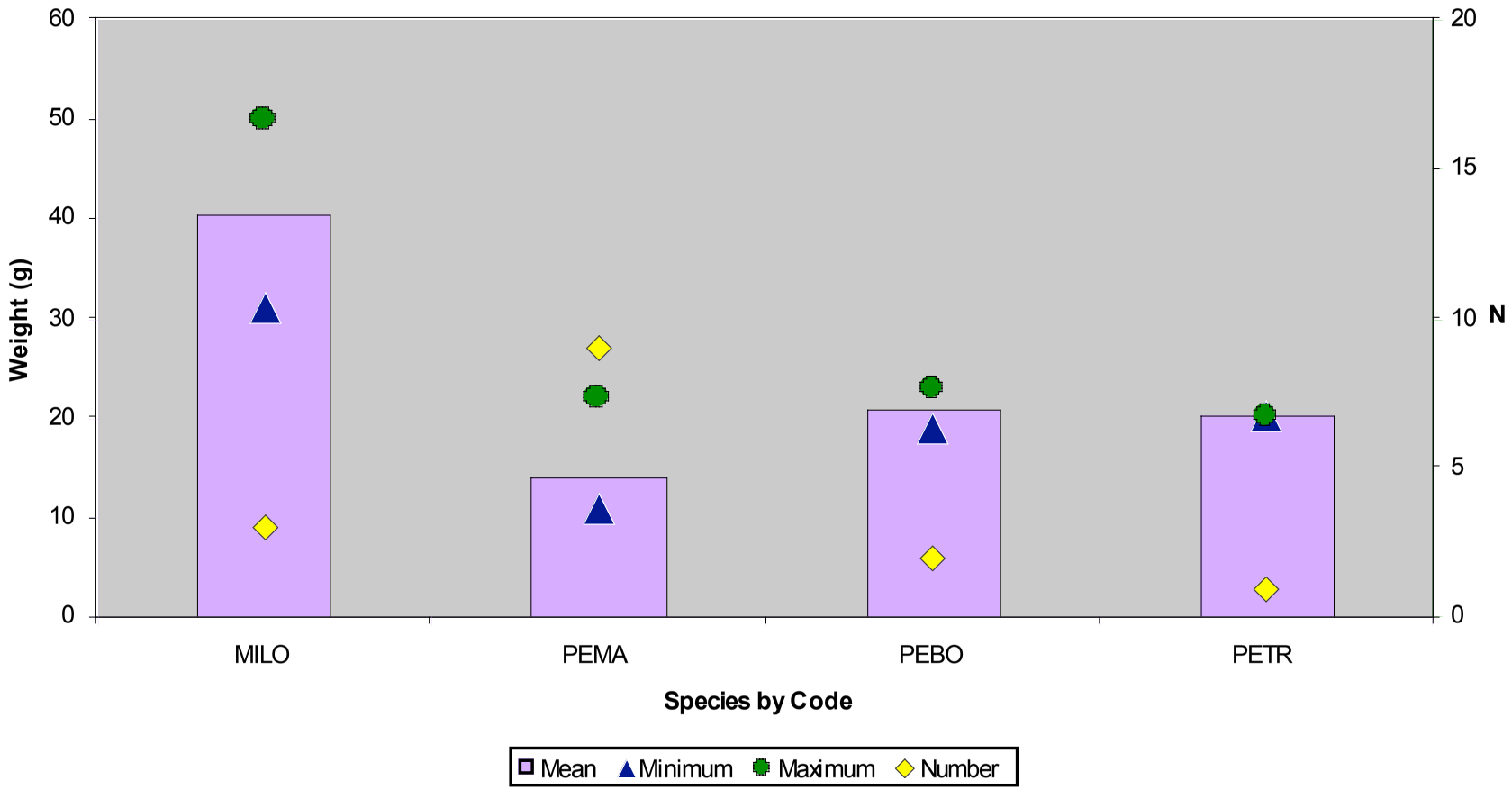


Figure 17. Mean, maximum, and minimum weights of adult male small mammals captured in S-2 (upper) Sandia Canyon. Sample size is shown on the axis to the right.

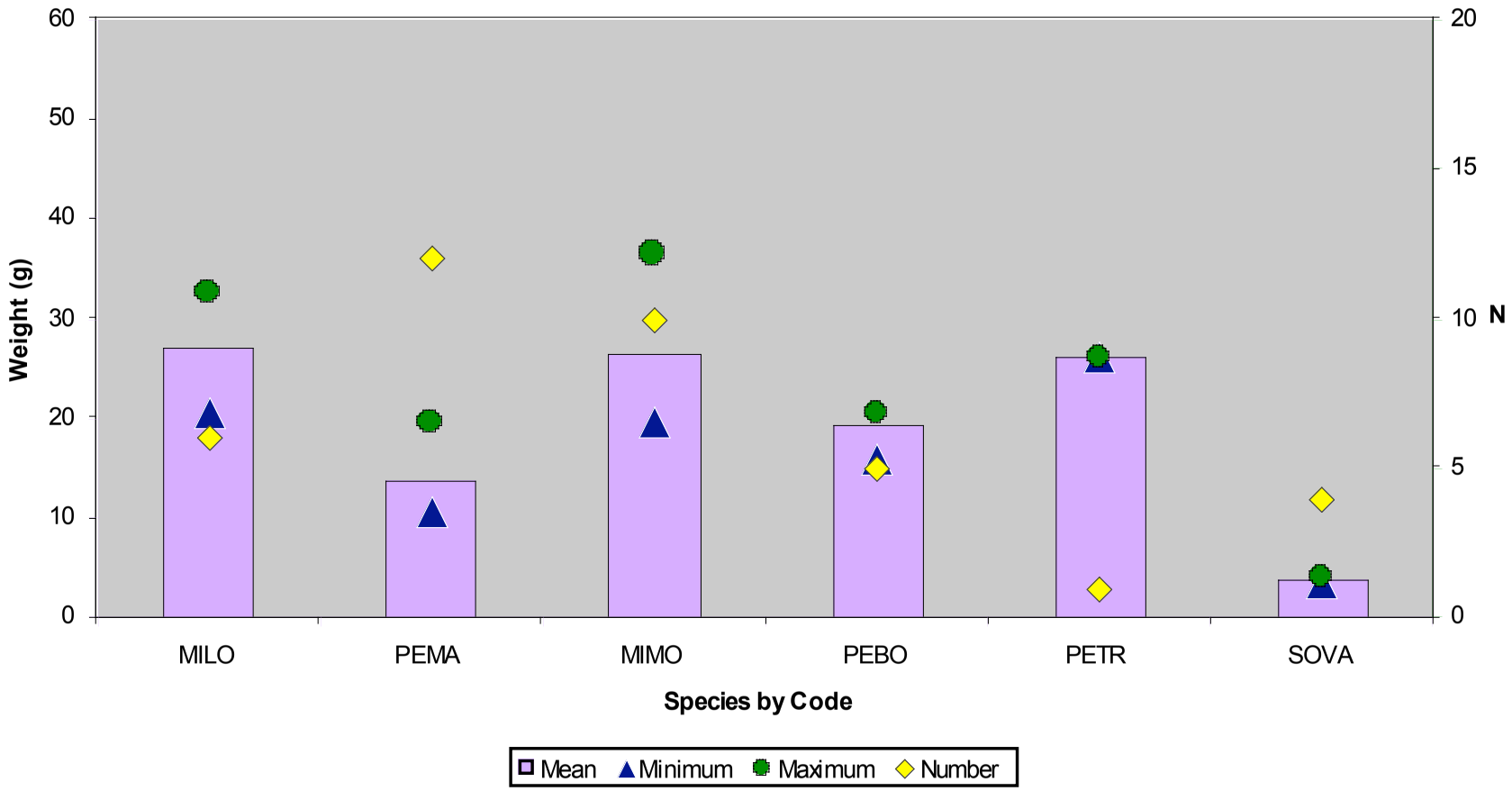


Figure 18. Mean, maximum, and minimum weights of adult female small mammals captured in S-2 (upper) Sandia Canyon. Sample size is shown on the axis to the right.

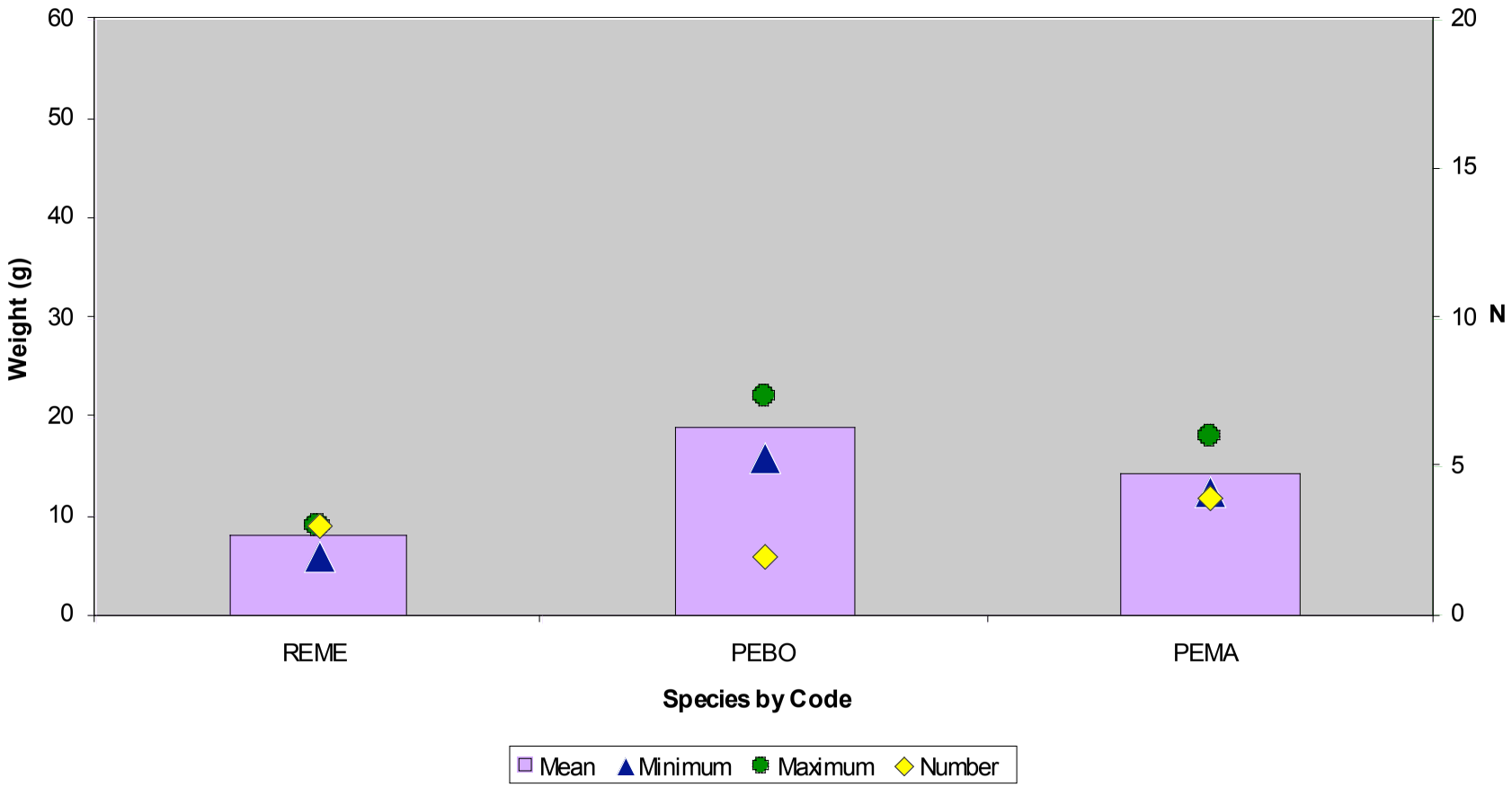


Figure 19. Mean, maximum, and minimum weights of adult male small mammals captured in S-5E (lower) Sandia Canyon. Sample size is shown on the axis to the right.

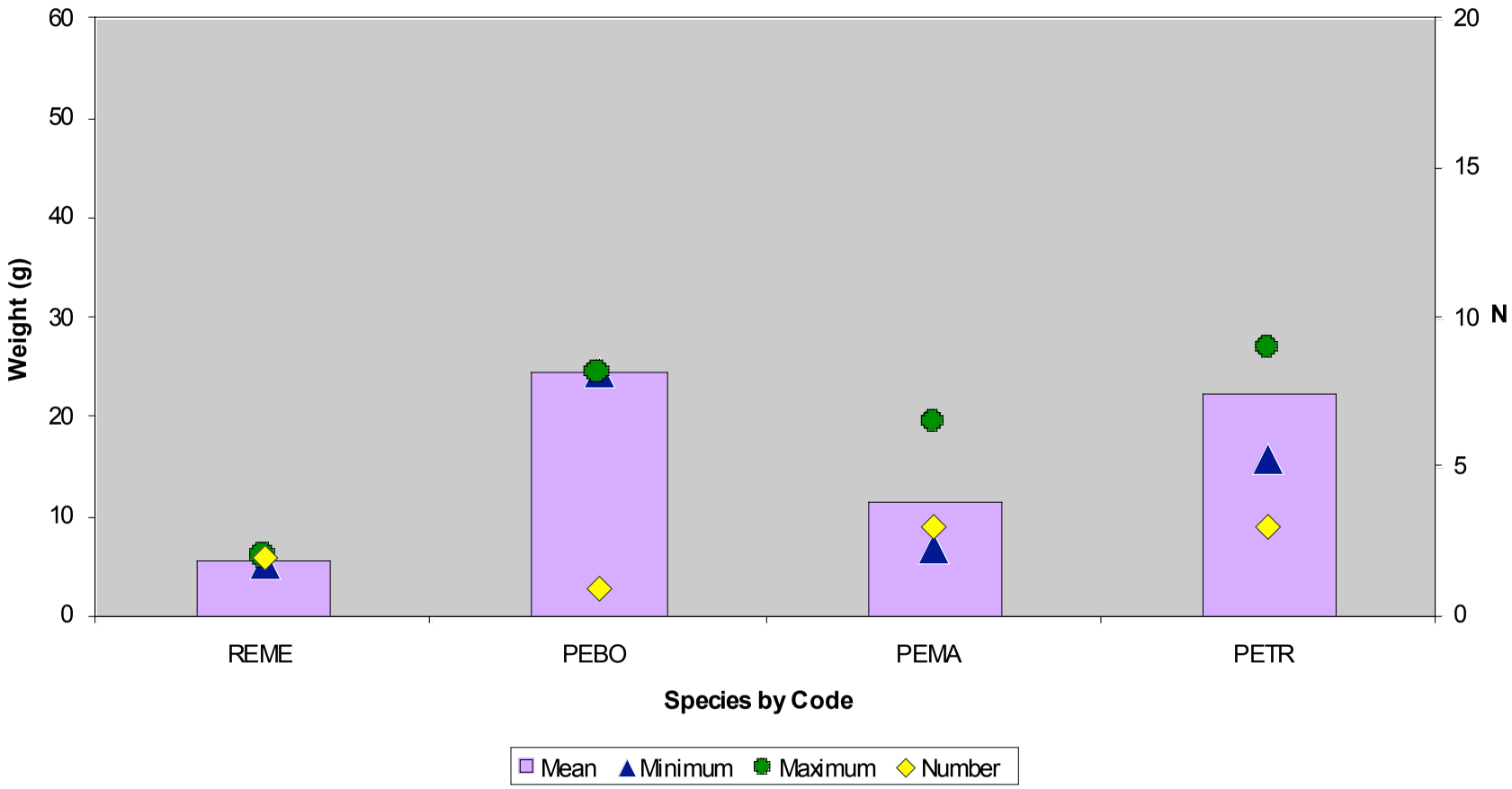


Figure 20. Mean, maximum, and minimum weights of adult female small mammals captured in S-5E (lower) Sandia Canyon. Sample size is shown on the axis to the right.

SUMMARY AND DISCUSSION

A small mammal study was initiated in Sandia Canyon to assess whether there were potential adverse ecological effects due to the presence of contaminants in the terrestrial media (LANL 2007). This report summarizes the small mammal field trapping results from three reaches in Sandia Canyon (S-2, S-4E, and S-5E) for the sampling period in November 2007.

Differences in species diversity, evenness, capture rates, and species composition were seen between the three reaches. Seven different small mammal species were captured among the three sampled reaches. Six species were captured at S-2, four from S-4E, and four from S-5E. S-2, near the Sandia Canyon headwaters, had the highest species diversity and evenness and S-4E (located mid canyon) had the lowest. However, S-4E had the highest mean percent daily capture rate. Diversity measures both variety and relative abundance of different species. The S-2 reach had more variety in the species captured than the S-4E reach as well as a higher evenness of numbers of each species captured. The S-4E reach had high captures of a single species (harvest mouse) and moderate to low captures of the other two species found at that reach. Reach S-5E (located near State Road 4 in the lower canyon), had the lowest capture rate, but had a higher diversity index and evenness than the S-4E reach. This reach had a higher species variety and a higher evenness in the numbers of animals per species caught even though low numbers of all species were captured. Higher species diversity may indicate a more stable ecosystem and resiliency to impacts.

The difference in species composition, diversity, and capture rates seen between the three reaches is likely due to the differences in habitat. Habitat differences affected the types and numbers of species captured. The three reaches sampled formed an elevational and moisture gradient down the canyon with S-2 near the canyon's headwaters, S-4E near mid canyon, and S-5E in the lower canyon. The habitat characteristics of these reaches vary greatly. S-2 is dominated by a large wetland and had perennial water, S-4E is an open ponderosa pine and piñon pine shrubland/grassland with intermittent water, and S-5E is piñon-juniper woodland with a few scattered ponderosa pine and even more intermittent water. S-2 diversity was greatly increased by the influence of water-

dependent species. The low capture rates seen at S-5E are typical of a dry piñon-juniper woodland. The largest number of harvest mice captured was from S-4E. Studies have shown that harvest mice are a high consumer of seeds (Armstrong 1975). The habitat within the S-4E reach had a high seed content due to an abundance of forbs, grasses, and shrubs.

Sex ratios were compared within each reach using an assumption of equal distribution between the two sexes (only adults were considered). For species where there were sufficient sample sizes, some differences were detected. In all cases where differences were detected, there were a statistically higher numbers of females found. There were significantly more female harvest mice (n = 76) captured at S-4E than males (n = 7) and only female montane voles (n = 10) were captured at S-2. Studies on capture response of small mammals have suggested that through the year each sex may respond differently to traps (Beer et al. 1958; Kaufman and Kaufman 1982). This difference in capture response could explain differences in why more of one sex was captured than the other. Another possibility could also be related to the general longer life span of females over males (Beer et al. 1958; Kaufman and Kaufman 1982). However, these one-time-sampling data are not sufficient to explain with any certainity the results seen.

Reproductive status of animals captured were similar between the three reaches. In general, the majority of animals captured were non-reproductive/non-scrotal adults. Very few pregnant females were captured. In addition, very few juveniles were captured. The reproductive structure of these animals captured may be an indication of the time of the year that the trapping took place. For many small mammals, the breeding season ends in early fall (Armstrong 1975; Findley et al. 1975). Therefore, by November, there would not be many pregnant females and, depending when the last litter was born, would also explain the low number of juveniles.

Body weights were compared for species among the three reaches where there was sufficient sample size. However, there was only sufficient sample size to compare male adult deer mice between the three sites and adult female deer mice between two sites. No differences in body weights were detected. Body weight is an important indicator of animal health. The body weights measured on captured animals were within the range of

weights published for the species (Armstrong 1975, Findley et al. 1975). Additional studies and anlysis would need to be conducted to determine if there were any adverse trends with body weights. However, this study suggests there is no body weight concern.

The November 2007 small mammal population investigation revealed some differences in the species composition, diversity, evenness, and capture rates between the three reaches. Habitat types and conditions were the most likely reason for the differences seen. Sex ratios and reproductive status of some species were similar, but some differences were seen. Some of the differences are difficult to assess with only one sample point in time. Additional sampling would be required to further investigate sex ratio differences and reproductive structure.

ACKNOWLEDGMENTS

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Appendix A. Small Mammal Trapping Summary Details

Reach Name	Trap Night	Number of Sherman Traps	Number of Sherman Trap Lines	Distances between Sherman Trap Lines	Number of Pitfall Traps	Number of Pitfall Lines	Distance Between Pitfall Trap Lines	Success/Trap Night (Sherman Traps)	Success/Trap Night (Pitfall Traps)
S-2	1	100	5	10 m	20	2	40 m	22	1
S-2	2	100	5	10 m	20	2	40 m	20	1
S-2	3	100	5	10 m	20	2	40 m	6	0
S-2	4	100	5	10 m	20	2	40 m	7	0
S-4E	1	100	5	10 m	0	0	0	38	N/A
S-4E	2	100	5	10 m	0	0	0	40	N/A
S-4E	3	100	5	10 m	0	0	0	29	N/A
S-4E	4	100	5	10 m	0	0	0	22	N/A
S-5E	1	100	5	10 m	0	0	0	5	N/A
S-5E	2	100	5	10 m	0	0	0	6	N/A
S-5E	3	100	5	10 m	0	0	0	4	N/A
S-5E	4	100	5	10 m	0	0	0	4	N/A

Appendix B. Complete Data of Small Mammals Captured in Sandia Canyon

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
S-5E	PEBO	*Peromyscus*	*boylii*	20071105	12	M	16	2	8.5	2.1	Non-scrotal
		Peromyscus	*boylii*	20071106	11	M	22	2	9.5	2	Non-scrotal
		Peromyscus	*boylii*	20071107	12	F	24.5	2	9.8	2	Lactating
S-5E	PEMA	*Peromyscus*	*maniculatus*	20071105	48	M	18	1.9	6.4	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071105	18	UNK	-999	-999	-999	-999	N/A
		Peromyscus	*maniculatus*	20071106	75	F	7	1.5	5	1.3	Non-reproductive
		Peromyscus	*maniculatus*	20071106	12	M	13.5	1.6	6.5	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071106	59	M	12.5	1.4	7	1.5	Non-scrotal
		Peromyscus	*maniculatus*	20071107	50	M	13.5	1.9	5.8	1.6	Non-reproductive
		Peromyscus	*maniculatus*	20071107	45	F	8.5	1.1	5.5	1.2	Juvenile
		Peromyscus	*maniculatus*	20071107	70	F	19.5	1.9	6.5	1.7	Lactating
S-5E	PETR	*Peromyscus*	*truei*	20071105	73	F	24	2.4	8.5	2.7	Non-reproductive
		Peromyscus	*truei*	20071106	87	F	16	2	6.5	2.3	Non-reproductive
		Peromyscus	*truei*	20071108	84	F	27	2.1	6	2.4	Pregnant
S-5E	REME	*Reithrodontomys*	*megalotis*	20071105	75	M	9	1.5	6	1.2	Non-scrotal
		Reithrodontomys	*megalotis*	20071106	75	M	6	1.5	6	1.3	Juvenile
		Reithrodontomys	*megalotis*	20071108	65	F	5.5	1.4	5.2	1.2	Juvenile
		Reithrodontomys	*megalotis*	20071108	75	M	9	1.4	6.5	1.3	Non-scrotal
		Reithrodontomys	*megalotis*	20071108	54	F	6	1.6	4.5	1.1	Juvenile
S-4E	PEMA	*Peromyscus*	*maniculatus*	20071105	33	F	13.5	1.9	5.2	1.5	Non-reproductive
		Peromyscus	*maniculatus*	20071105	46	F	23	1.9	6.7	1.8	Lactating
		Peromyscus	*maniculatus*	20071105	16	F	13.5	1.3	5	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071105	37	F	14.5	1.9	5.8	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071105	34	M	18	1.8	6	1.7	Unknown
		Peromyscus	*maniculatus*	20071105	13	M	16	1.9	6.4	1.9	Unknown
		Peromyscus	*maniculatus*	20071105	94	M	18.5	1.8	7	2	Non-scrotal

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Peromyscus	*maniculatus*	20071105	56	M	22.5	1.7	5.5	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071105	32	M	24	1.9	7	2	Non-reproductive
		Peromyscus	*maniculatus*	20071105	10	M	17	1.8	5.9	1.9	Non-scrotal
		Peromyscus	*maniculatus*	20071105	20	M	20	1.7	6.2	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071105	23	M	13.5	1.7	5.7	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071105	36	M	19.5	2	5.8	1.8	Non-scrotal
		Peromyscus	*maniculatus*	20071105	50	F	9	1.4	6.7	1.2	Non-reproductive
		Peromyscus	*maniculatus*	20071105	93	M	20	1.7	7.5	1.9	Non-reproductive
		Peromyscus	*maniculatus*	20071106	21	M	20	2	6.5	1.9	Non-scrotal
		Peromyscus	*maniculatus*	20071106	18	F	16.5	1.9	6.2	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071106	30	M	15	1.8	6	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071106	33	M	14	1.7	5.6	1.8	Non-scrotal
		Peromyscus	*maniculatus*	20071106	98	M	10	1.5	6.8	1.4	Non-scrotal
		Peromyscus	*maniculatus*	20071106	60	M	16	1.8	6	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071106	19	F	11	1.7	5.7	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071106	49	M	10.5	1.5	6.9	1.3	Non-scrotal
		Peromyscus	*maniculatus*	20071106	52	F	12	1.8	6.7	1.6	Non-reproductive
		Peromyscus	*maniculatus*	20071106	6	M	14.5	1.6	6	1.9	Non-scrotal
		Peromyscus	*maniculatus*	20071106	35	M	18.5	1.8	6	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071106	61	F	14.5	1.9	5.7	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071106	28	F	7	1.7	4.8	1.5	Juvenile
		Peromyscus	*maniculatus*	20071106	38	F	11.5	1.7	5.5	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071106	37	F	16	2	6	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071106	29	F	15.5	1.9	6	1.9	Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Peromyscus	*maniculatus*	20071107	24	F	6.5	1.6	4.5	1.4	Non-reproductive
		Peromyscus	*maniculatus*	20071107	23	M	13.5	1.7	5.5	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071107	12	M	15	1.8	5.5	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071107	45	M	15.5	1.8	5	1.9	Non-scrotal
		Peromyscus	*maniculatus*	20071107	18	M	10	1.7	5.5	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071107	37	M	17	1.8	6.1	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071107	72	M	8	1.6	5.3	1.5	Non-scrotal
		Peromyscus	*maniculatus*	20071107	30	F	15	1.8	5.2	1.6	Non-reproductive
		Peromyscus	*maniculatus*	20071108	22	F	12	1.7	6.2	1.6	Non-reproductive
		Peromyscus	*maniculatus*	20071108	19	F	12.5	1.8	5.6	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071108	1	F	14.5	1.5	7.5	1.3	Lactating
		Peromyscus	*maniculatus*	20071108	16	F	11.5	1.6	6	1.2	Non-reproductive
S-4E	PETR	*Peromyscus*	*truei*	20071108	19	M	19.5	2.2	10	2.3	Non-scrotal
S-4E	REME	*Reithrodontomys*	*megalotis*	20071105	7	F	9	1.5	6	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	72	F	9.5	1.5	5.9	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	54	F	8	1.5	5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	52	F	8.5	1.5	5.7	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	38	F	7	1.6	6.7	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	66	F	8.5	1.6	5.5	1.5	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	90	M	9	1.5	6	1.2	Non-scrotal
		Reithrodontomys	*megalotis*	20071105	9	F	9	1.4	6.2	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	5	F	7	1.5	4.9	1.3	Juvenile

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Reithrodontomys	*megalotis*	20071105	12	F	9	1.9	5.2	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	49	F	9	1.5	5.5	1.7	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	55	M	-999	1.9	6.8	1.7	Non-scrotal
		Reithrodontomys	*megalotis*	20071105	17	M	10	1.5	6	1.1	Non-scrotal
		Reithrodontomys	*megalotis*	20071105	4	F	7	1.6	6.2	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	21	F	9	1.5	4.9	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	19	F	8.5	1.5	5.2	1.5	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	1	F	10	1.4	6.6	1.3	Lactating
		Reithrodontomys	*megalotis*	20071105	14	M	7.5	1.2	5.8	1.3	Unknown
		Reithrodontomys	*megalotis*	20071105	76	F	8.5	1.5	6	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	74	F	11.5	1.7	7.2	1.4	Lactating
		Reithrodontomys	*megalotis*	20071105	69	F	11.5	1.5	7.7	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	2	F	8.5	1.7	5.5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071105	31	F	9.5	1.5	6	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	44	F	11.5	1.5	6.6	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	4	F	8.5	1.5	6.5	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	49	F	10.5	1.5	6.7	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	71	UNK					N/A
		Reithrodontomys	*megalotis*	20071106	10	M	7.5	1.4	6	1.2	Non-scrotal
		Reithrodontomys	*megalotis*	20071106	6	F	7.5	1.7	5.7	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	8	M	7	1.6	5.7	1.1	Non-scrotal
		Reithrodontomys	*megalotis*	20071106	1	F	9.9	1.5	6	1.9	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	88	F	7.5	1.5	5.1	1.3	Juvenile

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Reithrodontomys	*megalotis*	20071106	3	UNK					N/A
		Reithrodontomys	*megalotis*	20071106	6	F	8.5	1.5	6	1.4	Unknown
		Reithrodontomys	*megalotis*	20071106	7	F	7	1.5	5.2	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	17	F	8.5	1.6	5.6	1.6	Juvenile
		Reithrodontomys	*megalotis*	20071106	55	M	8.5	1.4	5.5	1.3	Non-scrotal
		Reithrodontomys	*megalotis*	20071106	2	F	10.5	1.5	6.8	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	15	F	7.5	1.5	5.4	1.4	Juvenile
		Reithrodontomys	*megalotis*	20071106	99	F	7.5	1.4	5.5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	94	F	8.5	1.4	6	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	16	F	6.5	1.4	5.5	1.5	Juvenile
		Reithrodontomys	*megalotis*	20071106	14	F	7.5	1.3	4.5	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	85	F	7	1.4	5.5	1.2	Juvenile
		Reithrodontomys	*megalotis*	20071106	86	F	8.5	1.7	6	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071106	16	F	6.5	1.5	6	1.3	Juvenile
		Reithrodontomys	*megalotis*	20071106	5	F	7	1.5	5.8	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	3	F	8.5	1.5	6	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	55	F	7.5	1.5	6	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	1	F	6.5	1.6	5.5	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	9	F	8	1.4	5.8	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	6	F	7.5	1.5	5.4	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	86	F	7.5	1.5	5.8	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	66	F	4.5	1.6	5.6	1.1	Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Reithrodontomys	*megalotis*	20071107	7	F	7	1.5	5.5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	69	F	8	1.6	6.7	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	49	F	9.5	1.5	5.5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	14	F	9	1.5	5.5	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	8	F	9	1.5	5.5	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	94	F	6.5	1.2	5.5	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	91	F	8.5	1.6	6.3	1.2	Unknown
		Reithrodontomys	*megalotis*	20071107	19	F	8	1.5	6.6	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	60	F	9	1.5	5	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	16	F	7	1.4	5.6	1.4	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	4	F	11	1.5	6.5	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	17	F	13	1.5	7	1.4	Lactating
		Reithrodontomys	*megalotis*	20071107	15	F	9	1.5	5.5	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071107	82	F	7.5	1.5	5.4	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	7	F	7.5	1.5	5.3	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	21	F		1.6	6	1.1	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	49	F	7.5	1.5	5.2	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	59	F	8	1.5	5.7	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	59	F	7.5	1.5	5.7	1.3	Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Reithrodontomys	*megalotis*	20071108	86	F	6.5	1.4	6	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	85	F	7	1.5	5.4	1.2	Juvenile
		Reithrodontomys	*megalotis*	20071108	10	F	8.5	1.5	6	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	6	F	9.5	1.5	6	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	71	F	9	1.4	5.1	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	90	F	7.5	1.5	6	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	55	F	8	1.4	5.7	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	45	F	6.5	1.6	6	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	38	F	10	1.6	7.7	1.7	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	5	F	8.5	1.6	5.5	1.2	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	85	F	8.5	1.6	5.8	1.3	Non-reproductive
		Reithrodontomys	*megalotis*	20071108	51	F	10.5	1.5	6.8	1.4	Non-reproductive
S-2	MILO	*Microtus*	*longicaudus*	20071106	93	F	27	2	5.5	1.6	N/A
		Microtus	*longicaudus*	20071106	71	M	31	1.9	5.5	1.1	Non-scrotal
		Microtus	*longicaudus*	20071106	46	M	40	2	6	1.4	Non-scrotal
		Microtus	*longicaudus*	20071106	27	F	32.5	1.9	5.5	1.3	Non-reproductive
		Microtus	*longicaudus*	20071106	84	F	30	1.8	6	1.4	Non-reproductive
		Microtus	*longicaudus*	20071106	69	M	50	2.1	6.7	1.8	Non-scrotal
		Microtus	*longicaudus*	20071106	47	F	27	1.9	6	1.3	Non-reproductive
		Microtus	*longicaudus*	20071106	22	F	20.5	1.2	4.7	1.1	Non-reproductive
		Microtus	*longicaudus*	20071108	71	F	25	1.8	5.2	1.2	Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
S-2	MIMO	*Microtus*	*montanus*	20071106	83	F	22	1.8	4.3	1.3	Non-reproductive
		Microtus	*montanus*	20071106	49	F	31	1.9	5	1.4	Non-reproductive
		Microtus	*montanus*	20071106	44	F	22.5	1.7	5	1.4	Lactating
		Microtus	*montanus*	20071106	13	F	19.5	1.7	4	1.5	Non-reproductive
		Microtus	*montanus*	20071106	88	F	36.5	2	5.6	1.6	Lactating
		Microtus	*montanus*	20071106	26	F	35	1.9	5.2	1.4	Non-reproductive
		Microtus	*montanus*	20071107	47	F	26	1.7	4.5	1.3	N/A
		Microtus	*montanus*	20071107	30	F	23.5	2	4.5	1.3	N/A
		Microtus	*montanus*	20071108	50	F	23	1.7	4.2	1.3	Non-reproductive
		Microtus	*montanus*	20071108	47	F	26.5	1.8	5	1.4	Non-reproductive
S-2	PEBO	*Peromyscus*	*boylii*	20071105	56	F	18.5	2.1	7.5	2	N/A
		Peromyscus	*boylii*	20071105	83	F	20.5	2.1	9.5	2.2	Non-reproductive
		Peromyscus	*boylii*	20071106	74	M	19	2	8	2.1	Non-scrotal
		Peromyscus	*boylii*	20071107	84	M	23	2	1.5	2.1	N/A
		Peromyscus	*boylii*	20071107	75	F	20.5	2.3	9.5	2.3	Non-reproductive
		Peromyscus	*boylii*	20071107	96	F	20.5	2.1	9.3	2.2	Non-reproductive
		Peromyscus	*boylii*	20071107	86	F	16	2	9	2.2	Non-reproductive
S-2	PEMA	*Peromyscus*	*maniculatus*	20071105	82	M	15	1.7	6.4	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071105	46	M	13	1.8	6.4	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071105	24	M	22	2	7.4	1.6	Non-scrotal
		Peromyscus	*maniculatus*	20071105	11	F	-999	1.8	6	1.5	Non-reproductive
		Peromyscus	*maniculatus*	20071105	47	F	11	1.9	6	1.7	Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Peromyscus	*maniculatus*	20071105	65	F	12	1.7	6	1.9	Non-reproductive
		Peromyscus	*maniculatus*	20071105	25	M	14	2	6.5	1.7	Non-scrotal
		Peromyscus	*maniculatus*	20071105	90	F	11.5	1.8	5.8	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071105	26	M	14	1.7	6	1.5	Scrotal
		Peromyscus	*maniculatus*	20071105	44	F	19.5	1.8	7.3	1.5	Non-reproductive
		Peromyscus	*maniculatus*	20071105	81	M	14	1.9	6	1.8	Non-scrotal
		Peromyscus	*maniculatus*	20071105	93	M	-999	1.8	5.3	1.5	Non-scrotal
		Peromyscus	*maniculatus*	20071105	88	F	13	2	8.2	2.1	Non-reproductive
		Peromyscus	*maniculatus*	20071105	74	M	11	1.7	6.2	1.5	Non-scrotal
		Peromyscus	*maniculatus*	20071105	13	F	13	1.7	5.1	1.7	Non-reproductive
		Peromyscus	*maniculatus*	20071105	100	F	16	2.1	8.2	2	Non-reproductive
		Peromyscus	*maniculatus*	20071105	37	F	10.5	1.7	5.7	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071106	81	F	15	1.8	6.5	1.8	Non-reproductive
		Peromyscus	*maniculatus*	20071106	72	F	12.5	1.7	6	1.5	Non-reproductive
		Peromyscus	*maniculatus*	20071106	61	F	15	1.8	5.7	1.9	Non-reproductive
		Peromyscus	*maniculatus*	20071106	75	M	11.5	1.3	5.9	1.5	Non-scrotal
		Peromyscus	*maniculatus*	20071108	90	F	14.5	1.8	6.8	1.6	Non-reproductive
		Peromyscus	*maniculatus*	20071108	24	M	12	1.7	6	1.6	Juvenile
S-2	PETR	*Peromyscus*	*truei*	20071108	81	F	26	2.2	9.6	2.6	Non-reproductive
		Peromyscus	*truei*	20071108	85	M	20.1	2.2	9.3	2.5	Non-scrotal
S-2	SOVA	*Sorex*	*vagrans*	20071105	PITFALL	F	4	1.1	3.7		Non-reproductive
		Sorex	*vagrans*	20071105	67	F	3.5	1	4.1		Non-reproductive

Reach Name	Species Code	Genius	Species	Trap Date	Trap Number	Gender	Weight (g)	Foot (cm)	Tail (cm)	Ear (cm)	Reproductive Status
		Sorex	*vagrans*	20071105	61	F	4	1	4		Non-reproductive
		Sorex	*vagrans*	20071106	PITFALL	F	3.5	1	4		Non-reproductive

Appendix C. Hantavirus Results from Sandia Canyon Small Mammal Sampling

Location	Date	Trap	Ear Tag	Species	Sex	Comments
S-5E Lower	11/5/07	12	83	Pebo	M	
Lower	11/5/07	48	86	Pema	M	
Lower	11/5/07	73	87	Petr	F	
Lower	11/6/07	12	658	Pema	M	
Lower	11/6/07	75	660	Pema	F	
Lower	11/6/07	87	662	Petr	F	
Lower	11/6/07	59	663	Pema	M	POSITIVE
Lower	11/7/07	70	701	Pema	F	
Lower	11/7/07	45	702	Pema	F	
Lower	11/7/07	50	703	Pema	M	
Lower	11/7/07	12	704	Pebo	F	
Lower	11/8/07	84	801	Petr	F	
Lower	11/8/07	54	802	Reme	F	
Lower	11/8/07	75	803	Reme	M	POSITIVE
Lower	11/8/07	65	804	Reme	F	
S-4E Middle	11/5/07	5	30	Reme	F	
Middle	11/5/07	72	33	Reme	F	
Middle	11/5/07	36	37	Pema	M	
Middle	11/5/07	33	38	Pema	F	
Middle	11/5/07	2	39	Reme	F	
Middle	11/5/07	31	40	Reme	F	
Middle	11/5/07	49	53	Reme	F	
Middle	11/5/07	50	55	Pema	F	
Middle	11/5/07	54	56	Reme	F	
Middle	11/5/07	69	57	Reme	F	
Middle	11/5/07	74	58	Reme	F	
Middle	11/5/07	66	60	Reme	F	
Middle	11/5/07	38	61	Reme	F	

Location	Date	Trap	Ear Tag	Species	Sex	Comments
Middle	11/5/07	94	62	Pema	M	
Middle	11/5/07	21	63	Reme	F	
Middle	11/5/07	34	64	Pema	M	
Middle	11/5/07	23	66	Pema	M	
Middle	11/5/07	19	85	Reme	F	
Middle	11/5/07	52	117	Reme	F	
Middle	11/5/07	7	123	Reme	F	
Middle	11/5/07	10	133	Pema	M	
Middle	11/5/07	37	135	Pema	F	
Middle	11/5/07	46	137	Pema	F	
Middle	11/5/07	17	142	Reme	M	
Middle	11/5/07	4	150	Reme	F	
Middle	11/5/07	12	167	Reme	F	
Middle	11/5/07	32	177	Pema	M	
Middle	11/5/07	13	187	Pema	M	
Middle	11/5/07	20	274	Pema	M	
Middle	11/5/07	14	290	Reme	M	
Middle	11/5/07	9	311	Reme	F	
Middle	11/5/07	1	394	Reme	F	
Middle	11/6/07	28	618	Pema	F	
Middle	11/6/07	38	619	Pema	F	
Middle	11/6/07	15	620	Reme	F	
Middle	11/6/07	23	621	Pema	F	
Middle	11/6/07	6	622	Reme	F	
Middle	11/6/07	6	623	Reme	F	
Middle	11/6/07	35	624	Pema	M	
Middle	11/6/07	29	625	Pema	F	
Middle	11/6/07	21	626	Pema	M	
Middle	11/6/07	17	628	Reme	F	
Middle	11/6/07	37	629	Pema	F	

Location	Date	Trap	Ear Tag	Species	Sex	Comments
Middle	11/6/07	33	630	Pema	M	
Middle	11/6/07	6	631	Pema	M	
Middle	11/6/07	44	634	Reme	F	
Middle	11/6/07	8	635	Reme	M	
Middle	11/6/07	88	636	Reme	F	
Middle	11/6/07	10	637	Reme	M	
Middle	11/6/07	5	638	Reme	F	
Middle	11/6/07	52	639	Pema	F	
Middle	11/6/07	55	640	Reme	M	
Middle	11/6/07	86	641	Reme	F	
Middle	11/6/07	49	642	Reme	F	
Middle	11/6/07	98	643	Pema	M	
Middle	11/6/07	60	644	Pema	M	
Middle	11/6/07	16	645	Reme	F	
Middle	11/6/07	16	646	Reme	F	
Middle	11/6/07	2	648	Reme	F	
Middle	11/6/07	18	649	Pema	F	
Middle	11/6/07	94	650	Reme	F	
Middle	11/6/07	99	651	Reme	F	
Middle	11/6/07	85	652	Reme	F	
Middle	11/6/07	14	655	Reme	F	
Middle	11/6/07	9	656	Pema	M	
Middle	11/7/07	86	713	Reme	F	
Middle	11/7/07	49	714	Reme	F	
Middle	11/7/07	69	715	Reme	F	
Middle	11/7/07	72	716	Pema	M	
Middle	11/7/07	3	717	Reme	F	
Middle	11/7/07	6	718	Reme	F	
Middle	11/7/07	1	719	Reme	F	
Middle	11/7/07	30	720	Pema	F	

Location	Date	Trap	Ear Tag	Species	Sex	Comments
Middle	11/7/07	7	721	Reme	F	
Middle	11/7/07	9	722	Reme	F	
Middle	11/7/07	19	723	Reme	F	
Middle	11/7/07	14	724	Reme	F	
Middle	11/7/07	18	725	Pema	M	
Middle	11/7/07	45	726	Pema	M	
Middle	11/7/07	23	727	Pema	M	
Middle	11/7/07	12	728	Pema	M	
Middle	11/7/07	55	729	Reme	F	
Middle	11/7/07	4	730	Reme	F	
Middle	11/7/07	66	731	Reme	F	
Middle	11/7/07	94	732	Reme	F	
Middle	11/7/07	82	733	Reme	F	
Middle	11/7/07	15	734	Reme	F	
Middle	11/7/07	16	735	Reme	F	
Middle	11/7/07	17	736	Reme	F	
Middle	11/7/07	80	738	Reme	F	
Middle	11/7/07	24	739	Pema	F	
Middle	11/7/07	8	740	Reme	F	
Middle	11/7/07	91	741	Reme	F	
Middle	11/8/07	85	812	Reme	F	
Middle	11/8/07	85	813	Reme	F	
Middle	11/8/07	90	814	Reme	F	
Middle	11/8/07	71	815	Reme	F	
Middle	11/8/07	86	816	Reme	F	
Middle	11/8/07	21	817	Reme	F	
Middle	11/8/07	6	818	Reme	F	
Middle	11/8/07	38	819	Reme	F	
Middle	11/8/07	7	820	Reme	F	
Middle	11/8/07	1	821	Pema	F	

Location	Date	Trap	Ear Tag	Species	Sex	Comments
Middle	11/8/07	5	822	Reme	F	
Middle	11/8/07	16	823	Pema	F	
Middle	11/8/07	59	825	Reme	F	
Middle	11/8/07	45	826	Reme	F	
Middle	11/8/07	19	827	Petr	M	
Middle	11/8/07	10	828	Reme	F	
Middle	11/8/07	55	829	Reme	F	
Middle	11/8/07	19	830	Pema	F	
Middle	11/8/07	22	832	Pema	F	
Middle	11/8/07	51	833	Reme	F	
S-2 Upper	11/5/07	82	1	Pema	M	
Upper	11/5/07	90	2	Pema	F	
Upper	11/5/07	37	3	Pema	F	
Upper	11/5/07	13	4	Pema	F	
Upper	11/5/07	83	7	Pebo	F	
Upper	11/5/07	11	8	Pema	F	
Upper	11/5/07	100	9	Pema	F	
Upper	11/5/07	81	10	Pema	M	
Upper	11/5/07	88	11	Pema	F	
Upper	11/5/07	93	12	Pema	M	
Upper	11/5/07	46	14	Pema	M	
Upper	11/5/07	47	15	Pema	F	
Upper	11/5/07	65	21	Pema	F	
Upper	11/6/07	75	601	Pema	M	
Upper	11/6/07	84	602	Mimo	F	
Upper	11/6/07	71	603	Mimo	M	
Upper	11/6/07	27	604	Mimo	F	
Upper	11/6/07	49	605	Mimo	F	
Upper	11/6/07	46	606	Mimo	M	POSITIVE
Upper	11/6/07	69	607	Mimo	M	POSITIVE

Location	Date	Trap	Ear Tag	Species	Sex	Comments
Upper	11/6/07	22	608	Mimo	F	
Upper	11/6/07	74	609	Pebo	M	
Upper	11/6/07	88	610	Mimo	F	
Upper	11/6/07	47	611	Mimo	F	
Upper	11/6/07	44	612	Mimo	F	
Upper	11/6/07	13	613	Mimo	F	
Upper	11/6/07	26	614	Mimo	F	POSITIVE
Upper	11/6/07	81	615	Pema	F	
Upper	11/6/07	72	616	Pema	F	
Upper	11/6/07	61	617	Pema	F	
Upper	11/7/07	75	705	Pebo	F	
Upper	11/7/07	96	706	Pebo	F	
Upper	11/7/07	83	707	Mimo	F	
Upper	11/7/07	30	708	Mimo	F	
Upper	11/7/07	93	709	Mimo	F	
Upper	11/7/07	47	710	Mimo	F	
Upper	11/7/07	84	711	Pebo	M	
Upper	11/7/07	86	712	Pebo	F	
Upper	11/8/07	90	805	Pema	F	
Upper	11/8/07	85	806	Petr	M	
Upper	11/8/07	81	807	Petr	F	
Upper	11/8/07	50	809	Mimo	F	
Upper	11/8/07	24	810	Pema	M	
Upper	11/8/07	47	811	Mimo	F	
Upper	11/8/07	47	811	Mimo	F	

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