**Mammalian Diversity and Conservation Laboratory**

**Graduate Student**

**Jason L. Malaney**

**Thesis title:**

Distribution, habitat characteristics, and population demographics of snowshoe hare (*Lepus americanus*) at the extreme southern edge of its geographic range.

24 November 2003

**Thesis abstract:**

Distribution, habitat characteristics, and population demographics of snowshoe hare (*Lepus americanus*) were studied during summer 2001 and 2002 in northern New Mexico. The first goal was to better determine the distribution and habitat associations of snowshoe hare in New Mexico and assess the degree of ecological segregation between snowshoe hare and mountain cottontail (*Sylvilagus nuttallii*) at the southern edge of their zone of sympatry. The second goal was to test between the primary productivity and habitat quality hypothesis, which may account for latitudinal gradients in demographic features in snowshoe hare.

Spotlight and trapping transect surveys were used to better establish the distribution of snowshoe hare in New Mexico. I found snowshoe hare to be distributed widely throughout the Sangre de Cristo and San Juan mountains of northern New Mexico. No snowshoe hare were documented in the Jemez Mountains. During these surveys, five instances of syntopy between snowshoe hare and mountain cottontail were documented. Forty habitat variables were collected at locations where leporids were observed to determine boreal habitat associations of each species. Results of MANOVA, discriminant function analysis, and principal components analysis, revealed that snowshoe hare and mountain cottontail boreal habitats were not significantly different. However, there was a suggestion that snowshoe hare occur in denser boreal forest while mountain cottontail occur in more open habitat. Consequently, there may be potential for competition between these syntopic partners in New Mexico. Furthermore, forest disturbance, fragmentation, and global warming may degrade snowshoe hare habitat.

A mark-recapture study resulted in the capture of 61 different snowshoe hare over five, 10-day trapping periods during summer 2002. There was an additional 9 new individuals captured during an 8-day trapping period in spring 2003. There was a high density of 0.767 hares/ha during the July trapping
However, even this density was low in comparison with more northern populations. Excluding hares that were captured in only one or two trap stations, home ranges varied from 0.40 – 3.0 ha (mean = 1.10 ha for adults and 1.93 ha for juvenile/subadults). Adult female snowshoe hare had a mean litter size of 3.78 (range 1 – 6) with 3.2 (range 3 – 4) litters per female. Based on Jolly-Seber estimates for over-winter survival, juvenile/subadults had a survival estimate of 0.481 whereas the adult survival estimate was 0.778. Natality and survival estimates were similar to more northern latitudes. New Mexico snowshoe hare had significantly poorer physical body condition than Yukon individuals. Compared to northern populations, snowshoe hare in New Mexico exhibited lower densities, smaller home ranges, poorer body condition, and syntopy with mountain cottontail. Natality and survival were similar to more northern population. These results supported the hypothesis that habitat fragmentation is a major determinant of population demographics of extreme southern snowshoe hare populations. Snowshoe hare should be conservation and management priority in New Mexico based on its important ecological role, possibility for competition with mountain cottontail, and the potential for reduction in suitable habitat due to climate change, land-use, and forest management.

Education:

B.S. (Cum Laude) Wildlife and Fisheries Sciences; Eastern New Mexico University; December 2000

M.S. Biology: Applied Ecology; Eastern New Mexico University; December 2003

PhD Biology; University of New Mexico; Dissertation topic: Phylogeography of the snowshoe hare (*Lepus americanus*) and western jumping mouse (*Zapus princeps*). In progress.

Awards:

- Graduated Cum Laude; Eastern New Mexico University; 2000
- Outstanding Graduating Senior in Wildlife and Fisheries Sciences; Eastern New Mexico University; 2000
- Blue Key Honor Society

Grants supporting his thesis:

- $ 6,000 - Share with Wildlife, New Mexico Department of Game and Fish: Distribution, Habitat Associations, and Population Attributes of Snowshoe hare (*Lepus americanus*) in New Mexico. 2002
- $ 2,441 - T&E Inc.: Distribution, Habitat Associations, and Population Attributes of Snowshoe hare (*Lepus americanus*) in New Mexico. 2002
$ 483 - ENMU Graduate Research Fund: Distribution, Habitat Associations, and Population Attributes of Snowshoe hare (*Lepus americanus*) in New Mexico. 2002

**Professional presentations related to his thesis:**


Malaney, J. and J.K. Frey. 2003. Primary productivity and habitat quality hypotheses for control of snowshoe hare (*Lepus americanus*) demography: a test at the southern range limit and conclusions for conservation. Southwestern Association of Naturalists. *(winner Clark Hubbs Award)*


Malaney, J. and J.K. Frey. 2004. Habitat differentiation between snowshoe hare (*Lepus americanus*) and mountain cottontail (*Sylvilagus nuttallii*) at their southern zone of sympatry. Southwestern Association of Naturalists. *(winner Clark Hubbs Award)*

**Publications resulting from thesis:**


Juvenile snowshoe hare from Jason’s study site

Jason studies his field notes on his study site.
Jason savoring the gopher tail from a batch of green chile critter stew!