**Space-use behavior and multi-scale habitat selection by American marten in Minnesota**

Space-use behavior and habitat selection are ecologically important processes that integrate an animal's need for food and other resources with the spatial heterogeneity of resources across the landscape. Because the ability to acquire critical resources such as food and shelter is directly related to individual fitness, animals make behavioral decisions about which habitat to use to maximize fitness. A significant amount of effort has gone into characterizing habitat use by American marten (*Martes americana*) because habitat loss was a contributing factor to large-scale population declines during the early twentieth century, and because marten respond to habitat loss at low thresholds. Home range size and habitat use varies regionally, yet relatively few studies have on habitat use have taken place in the south-central portion of the marten range.

We deployed radio-collars on 202 marten in northeastern Minnesota from 2008-2013, relocated marten at approximately 7-10 day intervals, and used location data to characterize space-use and habitat selection. Sixty-eight percent of marten were residents with established home ranges, 16% dispersed into a home range after capture, and 15% established temporary home ranges that they abandoned. Juveniles were more likely to disperse or establish temporary home ranges than adults. We obtained enough locations to calculate home ranges and core areas for 83 marten. Home ranges of adult males were significantly larger than those of adult females, while juvenile marten established home ranges that were intermediate in size. Marten monitored for ≥2 years showed high fidelity to home ranges among successive years.

We evaluated habitat selection at three different spatial scales. At the landscape scale, marten selected home ranges that were composed predominantly of mature forest, although individual marten showed different preferences for forest types. Within their home ranges, marten preferred mixed-wood and coniferous forest and avoided young/regenerating stands. At the scale of rest sites and reproductive dens, marten selected sites in mature, structurally complex forest stands. Sites used by marten had higher coarse woody debris volume, higher snag density, and larger mean tree and snag diameter compared to random sites. Selection for resting structures was also influenced by sex and season. A greater proportion of females used rest sites in tree cavities compared to males, while males used tree branches more frequently than females. Marten selected above-ground rest sites more often during summer, while winter rest sites were predominantly in subnivean (below the snow) or subterranean structures. Forest management practices aimed at supporting marten populations should retain stands of mature, structurally complex forest to maintain suitable habitat.