

## **Impacts of introduced Abert's squirrels on the endangered Mount Graham red squirrel**

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Accidental and intentional introductions of mammal species outside their native ranges can result in declines and extinctions of native fauna. Where mammals have evolved with taxonomic complements of competitors and predators, the effects of introduced mammals may be more subtle and outcomes less dire or easily predicted. Experiments may permit detection of otherwise-obscured factors that lead to declines of small and vulnerable populations. Small populations at range peripheries are especially at risk from synergistic impacts of ecological stressors, and in some cases, a single introduction may serve as the final nudge over the precipice of extinction. Imperiled Mount Graham red squirrels (*Tamiasciurus hudsonicus grahamensis*: MGRS) have occurred in syntopy with Abert's squirrels (*Sciurus aberti*) since the 1940s introduction of the non-native species that added to a plethora of threats to persistence. Some effects of fire and beetle damage may have enhanced Abert's squirrel populations by increasing the availability of open forest structure, which is preferred by the species. We review

the potential impacts and mechanisms of competition between MGRS and Abert's squirrels and outline an experimental removal to test formulated hypotheses. Finally, we used remote cameras at occupied MGRS middens (i.e., larders) and random points during late summer and fall, and late winter and spring, to measure Abert's squirrel presence as an index of kleptoparasitism at larderhoards during periods of high and low food availability, predicting that middens will be targeted by Abert's squirrel in late winter when resources are most limited. As predicted, Abert's squirrels were detected at middens and random locations with equal frequency during late summer and early fall. These squirrel species have co-occurred on Mount Graham for decades, suggesting that the MGRS can tolerate Abert's squirrel impacts to some unknown degree. Understanding the extent to which Abert's squirrels are pushing the ecological boundaries of coexistence will bolster predictions for MGRS conservation when considered along with other stressors. The precarious existence of the MGRS is mirrored globally, and our study will provide new information on what can be expected in similar cases.