Evaluation of Abundance Indices for Striped Skunks, Common Raccoons and Virginia Opossums in Southern Wisconsin

by Gerald A. Bartelt,
Bureau of Integrated Science Services, Monona,

Robert E. Rolley,
Bureau of Integrated Science Services, Monona

and Lawrence E. Vine,
Bureau of Integrated Science Services, Horicon

Abstract

We compared mark-recapture estimates of predator population sizes to 5 commonly used abundance indices to gain insight into the usefulness of the indices for monitoring predator population changes. Striped skunks (Mephitis mephitis), common raccoons (Procyon lotor) and Virginia opossums (Didelphis virginiana) were trapped on 3 approximately 6-mile² areas in southern Wisconsin during March-May, 1984-86 to estimate population densities. Spotlight counts, modified scent stations, simulated nests, snow-track counts and road-kill surveys were conducted February-June, 1984-86 on the 3 study areas as indices to abundance. Data from snow-track counts and road-kill surveys were not sufficient for analysis. Low capture probabilities (usually less than 15%) made model selection difficult for all species and resulted in wide confidence intervals for raccoon population estimates. Minimum density of skunks, raccoons and opossums varied from 0.2-4.5, 5.3-13.9 and 2.3-7.1/mile², respectively. Correlations between population indices and population density estimates were not significant in many cases. Only the correlation of opossum spotlight counts with density and the correlation of simulated-nest destruction rate with skunk density were significant. However, the destruction rate of simulated nests was highly correlated with the capture rate of all mammalian predators, and the correlation between skunk visitations to scent-station lines and capture rate was significant. The lack of significant correlation does not invalidate the indices due to the low power of the tests and the low precision of the indices and raccoon population estimates. As we applied them, spotlight counts, scent-station surveys and simulated-nest surveys required extremely large sample sizes to reliably detect annual changes in population indices on the order of 20 to 50%. However, we did observe significant differences between years in the three indices with sample sizes of 15-30 (areas pooled), when changes in population indices were on the order of 2-5 fold. In this study, abundance indices would not have been useful in detecting annual or area changes of less than 75-100% between our 6-mile² study areas. These abundance indices may be useful for detecting 2-5 fold changes in predator abundance for larger regions or as a trend indicator over several years.