APPARENT SURVIVAL, DISPERSAL, AND ABUNDANCE OF BLACK-TAILED PRAIRIE DOGS

by

AMANDA R. GOLDBERG

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ABSTRACT

Black-tailed prairie dogs (Cynomys ludovicianus) are a species of management and conservation concern. Prairie dogs have lost both habitat and occupied area due to plague, which is caused by the bacterium Yersinia pestis, pest control, and habitat conversion to agricultural land. Our goals were to estimate survival rates and dispersal rates, and to compare methods for estimating abundance of black-tailed prairie dogs for both management and conservation. We trapped black-tailed prairie dogs at four small National Parks from April 2009 through August 2011. Prairie dogs were trapped and marked for two trapping sessions per year in order to estimate seasonal rates of apparent survival. Apparent survival rates were estimated using the package RMark in R to construct models for program MARK. We found estimates to vary according to field site, sex, year, and season (summer or winter). Possible reasons for the differences in survivorship among sites could be presence of disease, quality of forage, predation, or frequency of dispersal. Visual counts were also conducted each trapping session beginning in April of 2010 to estimate abundance. Mark-recapture, mark-resight, and visual counts were compared to determine which method would be the most effective for estimating abundance of prairie dogs. We found mark-resight to produce the most precise estimates of abundance. While it costs more money to conduct a mark-resight estimate than visual counts because of repeated sessions, they produced significantly different results from one another 75% of the time, which was especially apparent on sites that had some form of visual barriers such as tall vegetation and uneven ground. However, if further information is needed in terms of sex ratios, age ratios, or the exact number of prairie dogs, then mark-recapture is the only method that can be used. Land managers need to address the level of accuracy needed, topography, and vegetation height before choosing which sampling method is best for the prairie dog towns in question. Finally, we looked at rates of intercolony and intracolony dispersal by placing 149 VHF collars and 6 GPS collars on prairie dogs at three colonies. Intracolony dispersal was also monitored through visual observation and trapping records over the three years of the study. We found 23 intracolony and eight intercolony dispersal events. Combined, these three studies offer insight not only into monitoring of prairie dog populations but also potential influence by plague both within and among colonies of prairie dogs.