

Clark's Nutcracker Demography and Habitat Use in Bridger-Teton National Forest—Preliminary Analyses

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Abstract

Abstract—The population status of and habitat use by Clark's nutcrackers (*Nucifraga columbiana*) has rarely been studied and remains poorly understood, in part due to the previous lack of a reliable method of surveying nutcracker populations. Anecdotal evidence suggests that Clark's nutcrackers have recently declined precipitously throughout large parts of their range. A likely factor causing these declines is their mutualism with whitebark pine (*Pinus albicaulis*), which has suffered massive die-offs due to the recent mountain pine beetle (*Dendroctonus ponderosae*) epidemic and white pine blister rust (*Cronartium ribicola*) infections. Because nutcrackers enable whitebark pine regeneration through their caching behavior, ongoing whitebark pine restoration efforts will not be sustainable if nutcracker populations decline or their habitat use changes to a degree that they are not available to carry out seed dispersal. Reliable long-term monitoring of nutcrackers is necessary to assess their population trends, to determine conservation priorities and to assess effectiveness of management activities. Because data quality determines validity of managers' decisions, it is critical that monitoring programs obtain results that are statistically robust. Previous research has shown that nutcrackers are difficult to monitor accurately with common songbird survey techniques including point counts, playback point counts, line transects, and Breeding Bird Survey routes. My study is based on the predictions that nutcracker detectability differs seasonally and in different habitats, and sampling bias occurs when detection probability is not taken into account. I am studying a population of Clark's

nutcrackers in Bridger-Teton National Forest, in the Greater Yellowstone Ecosystem, where the birds are still relatively abundant. In 2009, I carried out occupancy surveys to determine which covariates influenced changes in detectability of nutcrackers. My initial objectives were to determine if: (1) season and habitat are significant causes of heterogeneity of detectability of nutcrackers, (2) occupancy probabilities corrected for detectability improve occupancy estimates, and (3) occupancy surveys are a reliable, cost-effective means to survey nutcrackers. Using the likelihood-based method in the program PRESENCE (ver. 2.3), I calculated nutcracker detectability and occupancy as a function of season and within differing habitats. In my preliminary analyses, I concluded that nutcracker detectability varies with season and habitat composition, corrected occupancy probabilities are essential for accurate nutcracker occupancy estimates, and occupancy surveys are an effective method to use to monitor nutcracker population trends. Complete results will be forthcoming in a separate paper. When developing Clark's nutcracker monitoring programs, it is important to take variation in detectability into account, in order to determine accurate occupancy and abundance estimates. By incorporating detectability into monitoring designs, we can implement management interventions that will successfully facilitate the persistence of the nutcracker populations. This will enable effective restoration of the whitebark pine communities and will help maintain a healthy ecosystem.

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