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# POPULATION TRENDS AND A REVISED MANAGEMENT PLAN FOR QUAIL IN CALIFORNIA

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## ABSTRACT

California supports a diversity of habitats suitable for mountain quail (*Oreortyx pictus*), California quail (*Callipepla californica*), and Gambel's quail (*Callipepla gambelii*). These three species require different habitats for foraging, nesting and brood-rearing, and over-winter survival, yet most published information focuses on California quail. Currently the state-wide surveys for quail are limited to the North American Breeding Bird Survey (BBS) and the Audubon Christmas Bird Count. We used BBS data (1970–2013) to create abundance maps for quail throughout California. We developed 5-year averages to account for boom-and-bust cycles, and then established 100 random points for mountain and California quail, and 60 random points for Gambel's quail. Mountain quail populations have declined from high counts in the late 1970s. California quail populations peaked in the early 1990s, declined in the early 2000s, rebounded and are currently declining again. Gambel's quail populations peaked in the mid-1990s and in 2004, but have been declining since. Currently we are comparing quail population trends to road density, human population, and land use on a broad-scale. Improving our understanding of California's quail species requires research and monitoring across multiple spatial scales at which their population dynamics are influenced. At the large-scale (statewide), we are developing fall quail surveys to monitor population trends. Additionally, we are continuing fine-scale (local) counts at water sources and other locations. There is a poor understanding of western quail biology relative to northern bobwhite, therefore our new management plan will focus on prioritized research needs, including the relationship of quail to habitat, home range estimation, methods for population estimation that include detection probabilities, and genetic diversity and population structure.

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