



Release:
23 November 2009

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Non-native black rats as riparian songbird nest predators in California's Central Valley

Black rats have been implicated as nest predators in numerous studies on islands, often contributing to severe population decline and local extirpation of bird species. Black rats now occur at riparian sites in California's Central Valley. Several predation events by rats at songbird nests have been documented in California, but the potential impact of black rats on songbird nesting success for riparian areas is not well-documented.

A Master's thesis by Jeanne Hammond quantified the role of black rats as nest predators in a riparian forest site in the Central Valley. Using Song Sparrows (a common riparian bird) as a focal species, the objectives of this research were to identify the importance of black rats as nest predators using nest cameras and to measure Song Sparrow reproductive response to black rat removal.

The research was conducted at two study sites in closed-canopy riparian forest on the Cosumnes River Preserve near Galt, California.

Sixteen nests (15 Song Sparrow and 1 Spotted Towhee) were video-taped over two breeding seasons. Of eight predation events recorded, four of the nest predators were identified as Brown-headed Cowbirds and four as black rats.

A before-after-control-impact (BACI) design was conducted with one experimental black rat removal site and one reference site. Pre-treatment data were collected at both sites during 2003, rats were removed from fall 2003 through summer 2004, and post-treatment data were collected during the 2004 breeding season.

After rat removal, Song Sparrow seasonal fecundity, total productivity, and daily nest survival increased more on the removal than on the nearby control plot. However, these effects were modest and not always statistically significant.

The rat removal effects measured in this study may have been modest because the size of the rat removal site was not sufficient to effectively reduce the rat density and deter immigration.

Management Implications

- Non-native black rats are nest predators and may be depressing reproductive success of some riparian songbirds.
- Reducing the density of black rats through poisoning or trapping can modestly increase reproductive success of riparian songbirds, but the long-term efficacy of this strategy is not yet well-understood.
- Natural processes (e.g., flooding or maintaining a mosaic of habitat types) that reduce black rat density may benefit riparian nesting songbirds.

Paper citation:

Hammond, J.L. 2008. Identification of nest predators and reproductive response of the Modesto Song Sparrow, *Melospiza melodia mailliardi*, to experimental predator removal. MS Thesis, Humboldt State University, Arcata, California.