



Burrowing Owl Research:

Survival and Movements of Juvenile Burrowing Owls in the Tucson Basin

Background

In response to regional western burrowing owl declines, the Arizona Partners in Flight Bird Conservation Plan has identified the study of dispersal movements as a primary research need. Development in the Tucson Basin has led to concern regarding the status of the local burrowing owl population. Western burrowing owls living and breeding within the Tucson Basin face the challenge of dispersing through an urban matrix where natural burrows are becoming increasingly scarce as suitable habitat is converted to human dominated land use patterns.

The objective of this study was to examine selected aspects of burrowing owl demography on Monthan Air Force Base and describe the movement patterns of juvenile burrowing owls in the Tucson Basin. Specific objectives included:

- Describe post-fledgling movements of juvenile burrowing owls in the Tucson Basin.
- Evaluate habitat used during post-fledgling movements.
- Estimate juvenile survival during the dispersal period.

Approach:

The Arizona Game and Fish Department (AGFD) used the following approach to examine juvenile burrowing owl survival and movement patterns within the Tucson Basin:

- **Standardized Surveys** - Areas that met the vegetation structure characteristics of potential nesting habitat (i.e., open, treeless areas with low vegetation density and presence of fossorial mammals) on the Davis-Monthan Air Force Base, the Tucson Electric Park, the Santa Cruz River channel, and the Town of Marana were surveyed during the 2004 and 2005 breeding seasons.
- **Juvenile Movement Patterns** – Juvenile burrowing owls were captured using two-way box traps, mist nets, and bow nets. Juveniles were fitted with necklace style transmitters and relocated weekly. **Dispersal Habitat** – The characteristics of habitat features for juvenile burrowing owls were examined at two scales because animals are thought to select habitat in a hierarchical fashion (Johnson 1980). The first level of analysis examined vegetation characteristics in the immediate vicinity of the burrowing owl location. The second level of analysis assessed land use patterns in the landscape surrounding owl locations. We examined habitat characteristics and land use patterns at known locations and compared these to characteristics of randomly chosen locations nearby.
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- **Juvenile Survival** - The staggered entry Kaplan-Meier estimator was used to assess weekly juvenile survival rates.

Results:

Our results indicate that successful juvenile dispersal is possible given the current composition of land use in the Tucson Basin. Vegetation characteristics of dispersal locations generally conformed to the classic definition of burrowing owl habitat. That is, dispersal habitat consisted of a dominance of bare ground, low vegetation height, and low shrub and tree density. However, some interesting exceptions were observed. Dispersing juveniles utilized man-made structures such as cement culverts, drainage pipes and cracks in sidewalks as dispersal burrows. In addition, burrowing owls were documented in areas of undisturbed native vegetation dominated by dense stands of creosote bush. These results suggest dispersing owls are more plastic in habitat use than



previously believed and undisturbed creosote flats may be important dispersal habitat.