



## Does agriculture affect avian migration and distribution?

### Environmental Issue

Migratory patterns of many avian species have changed

- Migratory routes and distances have been altered<sup>1</sup>
- Proportions of migrants within populations have decreased<sup>2</sup>

Land conversion to agriculture may be causing migrant birds to become resident

- Agriculture can alter levels of critical resources<sup>3</sup>
- High year-round prey levels may cause birds to stop migrating



Burrowing owls are a model organism for studying effects of agriculture on migration

- Proportion of migrants varies among populations
- While northern populations have declined, populations in some agricultural environments are increasing
- Year-round prey availability in agricultural areas may be causing migratory individuals to become resident<sup>4</sup>

### Scientific Approach

Hypothesis: Changes in food abundance associated with increased agriculture have caused burrowing owls to stop migrating.

#### Research Plan:

- \* Use stable isotope ratios in feathers and resighting of color bands to determine which individuals overwinter and which migrate
- \* Determine where migratory owls overwinter based on isotopic signatures
- \* Experimentally augment prey levels at a subset of burrows to simulate effect of elevated prey on overwintering
- \* Determine whether local food abundance influences the probability of overwintering through prey sampling at nest burrows



Conversion of western drylands to agriculture may be causing burrowing owls (*Athene cunicularia hypugaea*) to stop migrating.

### Impact

#### Burrowing owl conservation

- Endangered in Canada and a species of concern in the U.S.
- Results may help explain changes in range and abundance
- Addresses possible effects of future land use decisions for persistence of burrowing owl populations

#### Migratory birds and global change

- Need for experimental tests of the causes of altered avian migration
- Changes in migratory behavior could affect distribution of migratory birds on a large scale
- Results may help assess the potential effects of agriculture and climate change on other species of migratory birds

REFERENCES: 1. Berthold and Pulido 1994, Fiedler 2001; 2. Berthold 2001; 3. Fiedler 2001; 4. Conway, personal communication  
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