

**A. Title: Age-specific survival and habitat use of Rusty Blackbirds in Arkansas**

**B. Project summary:** I will use transmitters placed on a cohort of rusty blackbirds in Arkansas to monitor age specific survival and habitat use. Birds will be captured by mist-netting. Each captured bird will be sexed and aged based on published plumage criteria. Transmitters will be attached via a figure-8 harness so that the transmitter sits over the synsacrum of captured birds. Transmitter-equipped birds will be monitored weekly to daily (depending on the number of birds equipped) to monitor survival, habitat, and home range. Habitat use will be evaluated at a micro and macro scale. Macro-scale attributes will be evaluated on aerial photos while micro-habitat features will be assessed on the ground.

**C. Project Leader:** Dr. Chris Kellner, Professor of Wildlife Science, Arkansas Tech University, Biology Department, Arkansas Tech University, Russellville, AR 72801; email: [ckellner@atu.edu](mailto:ckellner@atu.edu)  
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**D. Project Partners:** None

**E. Budget:**

<b>SWG amount requested:</b>	\$ 92,110.00
<b>Match amount</b>	\$ 68,050.00
<b>Total Cost</b>	\$160,160.00

## **A. Need**

Populations of rusty blackbirds (*Euphagus carolinus*) have been declining for at least a century (Greenberg and Droege 1999). Analyses of Christmas Bird Count and Breeding Bird Survey data indicate the population has declined by 95% over the past 40-50 years (Niven et al. 2004). This decline is alarming because we do not know what is causing it and have not proffered any management strategies to reverse or stabilize the decline (Greenberg and Matsuoka 2010). Although low overwinter survival has been offered as one contributing factor to declining populations (Greenberg et al. 2011), Rusty Blackbirds are difficult to capture and almost impossible to recapture (Greenberg and Matsuoka 2010; Mettke-Hoffman et al. 2011) so we know almost nothing about their overwinter survival. Further, although many speculate that habitat loss is the driving force behind that population decline (ex, Greenberg and Droege 1999, Hamel et al. 2009, Greenberg and Matsuoka 2010, Greenberg et al. 2011), we have not systematically evaluated winter habitat use (Mettke-Hoffman et al. 2011). Further, in the first systematic evaluation of winter habitat use by Rusty Blackbirds, Luscier et al. (2010) found that Rusty blackbirds were less specialized in habitat use than expected. A better understanding of habitat use and requirements would help direct habitat management and conservation efforts. However, although the habitat centered hypothesis is the most often cited reason for population declines in Rusty Blackbirds (ex, Hamel et al. 2009, Greenberg and Matsuoka 2010, Greenberg et al. 2011), as Greenberg and Droege (1999) point out, the magnitude in the population crash has exceeded the magnitude of habitat loss. Consequently, the decline in populations of Rusty Blackbirds is likely due to multiple factors. My objective is to evaluate survival and habitat use by Rusty Blackbirds so that we can develop a more comprehensive hypothesis of what is causing Rusty Blackbird population to decline.

## **B. Objectives**

The overriding goal of this research is to evaluate overwinter survival in a cohort of rusty blackbirds to which transmitters will be attached. Specific objectives include: 1) Assessing the daily/weekly survival by sex and age class; 2) Evaluating the survival of blackbirds among different habitats; 3) Evaluating habitat use; and 4) Assessing home range and movements.

## **C. Location**

The work will occur within Arkansas in areas that have most consistently reported rusty blackbirds. Those include the Arkansas River Valley, the Mississippi Alluvial Plain and the Gulf Coast Plain. Recently reported sightings submitted to eBird (<https://ebird.org/map/>), will be assessed as possible locations for mist-netting. I will attempt to capture birds on Federal land (Bald Knob, Cache River, Felsenthal, Overflow, and White River National Wildlife Refuges) as well as in more disturbed habitats so that a full spectrum of survival and habitat estimates will be possible.

#### **D. Approach**

The budget would fund one graduate student and two field assistants for two winter field seasons. I will closely direct the work and training of the student and field assistants. Over the two-year period I will attempt to affix transmitters to 90 birds. I will use Rappole and Tipton's (1991) method of affixing transmitters over the area of the synsacrum by means of a figure-eight loop that goes over each leg of the bird. That method has not been shown to affect behavior or survival of birds (Streby et al. 2015). Further, I will follow established recommendations of using transmitters that are less than 5 % of the mass of the birds to which the transmitter will be attached (ex, Powel et al. 2010; Townsend et al. 2012).

Transmitter equipped birds will be followed until they die or migrate out of the area. In addition, to determining survival, I plan to evaluate home range size (by minimum convex polygon), and daily movements of a subset of the total cohort. Consequently, I will be able to determine which habitats are most important to individual birds and whether patterns are consistent across sex and age-classes.

Birds will be captured by mist-nets following procedures outlined in Mettke-Hofmann et al. (2015): a custom bait mixture of crushed hard boiled eggs, corn meal and cracked corn will be placed in areas frequented by rusty blackbirds and nets will be set up in appropriate locations near the bait. All captured birds will be weighed, sexed and aged based on plumage criteria (Mettke-Hofmann et al. 2010). Transmitters will be fitted to birds in each sample of captured birds to maintain an approximate equal distribution of sexes and age class. We may track birds to evaluate additional netting locations.

I will use the standard Kaplan-Meier (1958) method of survival analysis on the cohort of blackbirds that I follow during each of two winter periods. That method will allow for staggered entry into the analysis which is essential because I will not be able to capture all of the birds simultaneously.

#### **E. Expected Results**

I expect to fill in several knowledge gaps concerning rusty blackbird wintering survival and ecology. First, I will be able to add significantly to our knowledge of the daily survival of rusty blackbirds in Arkansas during the period of this study. In addition, by placing transmitters on blackbirds, I will be able to track daily movements on a subset of birds which will not only allow me to evaluate space requirements for overwintering blackbirds but it will also allow me to compare different habitats. For example, will blackbirds in relatively undisturbed habitat have smaller home ranges and daily movements as compared to birds that overwinter in more agriculturally disturbed habitats? I believe that this information will be extremely useful generating more robust hypotheses about declining rusty blackbirds and consequently, also identifying appropriate management strategies.

## F. Budget

### Grant Request

Graduate Assistant Stipend (2 years)	26,400	
GA Fringe Benefits	24	
Technician Salary (Extra Labor)	17,650	
Technician Fringe Benefits	1,366	
Supplies	13,950	
Travel	<u>7,260</u>	
Subtotal - Direct Costs	66,650	
Indirect (38.20% MTDC)	25,460	
<b>Total Grant Request</b>	<b>92,110</b>	<b>58%</b>

### ATU Match

Tuition (18 hours per year)	10,224	
PI Salary (25% effort per year)	42,732	
PI Benefits	12,644	
Supplies	2,450	
<b>Total Match</b>	<b>68,050</b>	<b>42%</b>

<b>Total Project Cost</b>	<b>160,160</b>	<b>100%</b>
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### Qualifications:

I have had extensive experience in the methodologies required for success in this project. I have had experience observing rusty blackbirds on many occasions in Arkansas during the winter and also in Alaska and Canada one summer. So, I am confident in my ability to locate the species. I am also a federally licensed bird bander. My first use of mist-nets was in 1982 and have banded well over 1000 and probably more than 100 species in the U.S. Panama, and Brazil. I have placed transmitters on loggerhead shrikes, American kestrels and northern bobwhite. Consequently, I am familiar with the techniques required for handling and attaching transmitters. I have also had experience radio tracking as pine martens, tule elk, and black bears (in aircraft). I also have also used Landsat imagery and aerial photos to model avian habitat and am familiar with procedures that can identify flooded forests as well as different vegetation types. Finally, I should also mention that I have directed over 10 graduate student in their thesis research. All of the students that I have directed successfully completed their thesis and are currently either enrolled in a PhD program or are working in a natural resource field.

## Literature Cited

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