

**Effects of Vegetation on Nesting Success of Painted Bunting (*Passerina ciris*)
in Northwest Arkansas**

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Summary

This study will determine how vegetation structure at nest sites affects nesting success of Painted Buntings (*Passerina ciris*) in northwest Arkansas. The Painted Bunting is a small passerine bird that is declining in most areas of its range due to a variety of factors, including habitat loss such as native grasslands (Meyers 2011, Lowther et al. 1999). Our research will start in the late spring/early summer of 2014 and continue through summer 2016 and will involve observing Painted Buntings at nest sites and quantitatively determining the structure of vegetation near nests. The latter will be accomplished through vegetation sampling in survey plots. Successful hatching and fledging rates and cowbird parasitism for each nest will also be measured. Infrared security cameras will be used to monitor both diurnal and nocturnal activity around the nest and to detect predation. Our results will provide management guidelines for the restoration of native grasslands for Painted Buntings.

Budget

	50%	35%
SWG amount requested:	\$36,742	\$36,742
Match amount:	\$31,435	\$15,420
Total amount of project:	\$68,177	\$52,162

Need

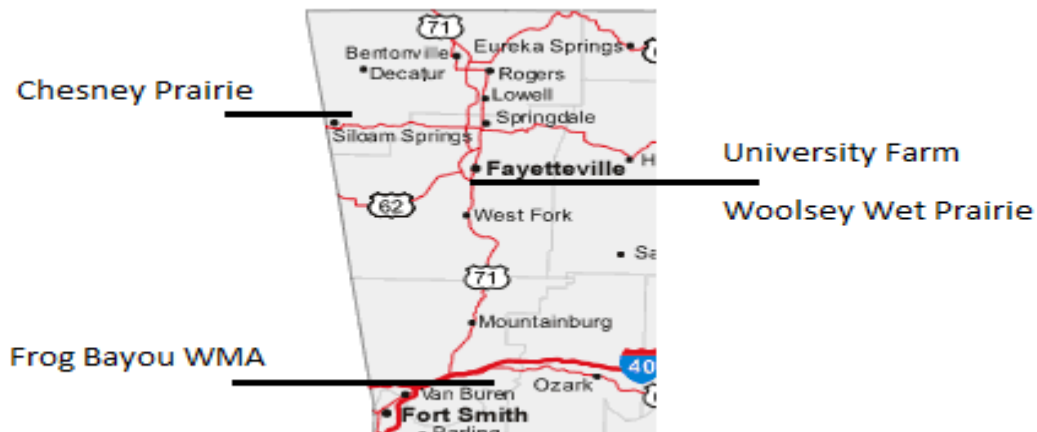
Our research will help to fill three gaps in the current knowledge of Painted Bunting (*Passerina ciris*) ecology. First, we plan to investigate Painted Bunting breeding and nesting behavior in northwestern Arkansas, a portion of the species' range in which there have been no nesting studies. Secondly, we propose to study the nocturnal behavior of nesting Painted Buntings. Currently, nothing is known about the nocturnal behavior of this species in its breeding range (Lowther et al. 1999). Thirdly, we will quantify vegetation characteristics of Painted Bunting habitat in northwestern Arkansas. Although studies by Shugart and James (1973) and Kopachena and Crist (2000) examined general features of Painted Bunting breeding habitat in western North America, extensive, quantitative Painted Bunting habitat studies in south central and western North America are few, and none have linked nesting success with vegetation structure. The results of this research will determine habitat management specifically for northwestern Arkansas for the Painted Bunting, which is a species of relatively high conservation priority (Meyers 2011) and has been placed on the Yellow List of The United States WatchList of Birds of Conservation Concern (American Bird Conservancy, WatchList 2007).

Purpose and Objectives

The purpose of this study is to determine the impact of vegetation structure and species composition on Painted Bunting nesting success in northwestern Arkansas. The main research objectives are as follows:

- Determine the effects of vegetation on the nest site preference of Painted Buntings, i.e., which specific combinations of vegetation factors are significant in nest site selection.
- Determine the effect of vegetation on nest parasitism and predation.
- Determine the effect of vegetation on the overall fledgling success of Painted Buntings at each nesting location.

Location



We intend to focus our research efforts at several sites in northwestern Arkansas: Frog Bayou Wildlife Management Area in Crawford County, managed by the AGFC; Chesney Prairie in Benton County, managed by the ANHC; the University of Arkansas Farm in Washington County; and Woolsey Wet Prairie Sanctuary in Washington County, a restored prairie as

mitigation for the Fayetteville Waste Management facility. Frog Bayou WMA is located in the Arkansas Valley ecoregion, the University of Arkansas Farm and Woolsey Wet Prairie Sanctuary in the Boston Mountains ecoregion, and Chesney Prairie in the Ozark Highlands ecoregion. These study sites contain a variety of forest edge, prairie, and overgrown field habitat types. We began research at Frog Bayou WMA in summer of 2013.

Approach

During the spring/summer 2014-2016 field seasons, we will record the locations and arrival times of Painted Bunting pairs at study sites in northwestern Arkansas as well as observations of their behavior on breeding territory and near the nest. We plan to survey at least 40 nests per year, but this number is dependent on Painted Bunting abundance and overall field conditions.

Upon discovery, nests will be monitored every 2-3 days until fledging or failure. After either of those events, vegetation measurements will be taken around the nest site. We intend to use a 5-meter radius circular plot centered on each active Painted Bunting nest site, nested within an 11.3-m radius nest-patch plot. Vegetation species used in nest construction will be noted, at least as far as they can be accurately determined. For each nest, we will record nest height in vegetation (m), nest distance from habitat edges (m), initial brood size, number of eggs hatched successfully, number of young successfully fledged, and the presence of cowbird eggs and young. Cowbird parasitism of Painted Bunting nests was previously noted by Parmelee (1959). Vegetation sampling on each 5-m plot will involve recording all woody and herbaceous plant species, and measuring percent cover, vegetation height, and plant stem count, using modifications of methods developed by James (1971).

Security cameras and micro-DVRs will be used at selected nest sites to record diurnal and nocturnal predator activity and to monitor nest activity. The security camera systems will be similar to those used by Miller (2013). Information may be recorded onto 8GB SDHC memory cards for 4 days at a time at 6 frames per second. Predator sign, such as hair and scat, and observations of potential predators in Painted Bunting breeding territories will also be noted.

Timeline

Spring/summer 2015

- Field work will be conducted at selected study sites.

Fall/winter 2015

- Results will be analyzed.

Spring/summer 2016

- Field work will be conducted at selected study sites.

Fall/winter 2016

- Results will be analyzed and submitted for publication.

Expected Results and Benefits

Determining habitat features for Painted Buntings at the nesting site will be important in informing conservation planning efforts for the species and providing guidelines for management of grasslands for this species. Other SGCN present at the study sites, Frog Bayou WMA in particular, include Yellow-billed Cuckoo (*Coccyzus americanus*), Bell's Vireo (*Vireo bellii*), and Eastern Towhee (*Pipilo erythrophthalmus*).

We request funding for the 2015 and 2016 field seasons. It will be used for travel to and from field sites, summer support for Thead, and support for 2 field technicians. SDHC memory cards and sufficient equipment for two monitoring systems were purchased last year from Supercircuits (www.supercircuits.com) and will be used to perfect the field techniques during the 2014 field season. More equipment are requested for the 2015 and 2016 field seasons to expand that aspect of our work. Smith's salary will be used as matching funds.

BUDGET - University of Arkansas

SALARIES & WAGES	Base Salary	Type Appoint.	PERSON-MONTHS			Year 1			Year 2			
			CAL	AY	SMR	Sponsor	UA Match	35% UA Match 50%	Sponsor	UA Match 35%	UA Match 50%	
Dr. Kim Smith		9 mo.			0.10		1,059			1091		5455
Lauren Thread			1	3 mo.	@ \$1,000	3,000			3000			
Hourly, non-student(s)			2	3 mo.	@ \$1,000	6,000			6000			
Total S&W						9,000	1,059	5,297	9000	1091		5455
FRINGE BENEFITS												
					Institutional Rate:							
Faculty/staff academic / calendar salary					27.10%		287			296		
Faculty/staff academic / calendar salary					27.10%			1,435				1478
GRA(s)					3.10%	93			93			
Hourly, non-student					7.30%	438			438			
Total FB						531	287	1,435	531	296		1,478
Total Salaries + Benefits						9,531	1,346	6,732	9,531	1,387		6,933
TRAVEL - Domestic						4,435						
MATERIALS & SUPPLIES (not fees or services, which are "Other")						7,780						
OTHER DIRECT COSTS (Itemize by type; insert extra rows if needed.)												
Modified Total Direct Costs (above subtotal costs subject to F&A Cost)						21,746	1,346	6,732	9,531	1,387		6,933
F & A COST (MTDC x RATE):					10.0%	2,175			953			0
F & A COST (UNRECOVERED):					36.5%		7,937	7,937		3479		3479
F & A COST (COST-SHARE):					46.5%		626	3,130		645		3224
<i>(Direct Costs not subject to F&A Cost, with the exception that the first \$25K of each subaward is subject to F&A):</i>												
GRA TUITION						1,140				1197		
					† Credit Hours: 3							
					Rate: \$380							
TOTAL DIRECT COST						22,886	1,346	6,732	10,728	1,387		6,933
TOTAL PROJECT COST						\$25,061	\$9,909	\$17,799	11,681	5,511		13,636

Travel Details

Destinations	No. of Trips	Road (\$0.42/mile)
Frog Bayou WMA	60	2,520
Chesney Prairie	60	1,512
Woolsey Wet Prairie Sanctuary	60	252
University of Arkansas CSES Farm	60	151
Total	240	\$4,435

Equipment/Materials & Supplies

Item	Quantity	Cost
Day/night outdoor security camera (\$80)	20	1600
Mini digital video recorder (\$190)	20	3800
BNC to BNC cable with power (\$25)	20	500
12v Rechargeable lithium ion battery (\$90)	20	1800
RCA to BNC adapter (\$2)	40	80
Total		7780

Qualifications

Smith is a University Professor of Biological Sciences and has been studying avian ecology of northwestern Arkansas for over 40 years (Smith 1977). He has conducted numerous studies of the breeding birds of the Ozarks (e.g. Nagy and Smith 1997) and on the effects of vegetation structure on breeding birds (e.g. Rodewald and Smith 1998). One of his recent doctoral students, Christie Melhart Slay, completed a similar study to this one on shrubland birds in Connecticut (Slay and Smith 2009). She and Smith published the first ever study looking at nocturnal behavior of female passerines (Slay et al. 2012).

Lauren Thead is a doctoral student working with Smith. She came to the University of Arkansas in 2010 as a Doctoral Academy Fellow. She has completed all coursework associated with her degree and began fieldwork on Painted Bunting at Frog Bayou WMA in summer of 2013. Summer of 2014 will be used to expand her study areas and perfect the camera monitoring technique.

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