

## **Habitat selection and reproductive success of Bell's Vireo (*Vireo bellii bellii*) in managed habitats of central Missouri**

Bell's Vireo (*Vireo bellii bellii*) populations are declining in Missouri and they are considered a species of management concern throughout the Midwest. A better understanding of what cues Bell's Vireos use in selecting where to breed and subsequent reproductive success is necessary to make management decisions to maximize successfully breeding vireos. I hypothesize that management activities, habitat type and vegetation characteristics will interact at multiple levels to influence reproductive success of Bell's Vireos. To establish which habitat characteristics maximize Bell's Vireo reproductive success in central Missouri it is necessary to study vireos in more than one habitat type.

For my dissertation research I am monitoring territories established by Bell's Vireos in areas with varying habitat types and management priorities in central Missouri. I have three main goals:

- 1) Record order of territory settlement including mapping territory size
- 2) Locate and monitor all nest attempts in each territory
- 3) Quantify habitat characteristics of territories

These goals are labor intensive and require a great deal of time and travel as well as dedication and perseverance. Field technicians and transportation are essential for a project that encompasses widespread study sites like this and the funding provided by ASM made the exploration, establishment and monitoring of study sites possible. Bell's Vireo territories are associated with early successional habitats that usually included a great deal of poison ivy, blackberries and ticks. I thank my hard working field technicians for their hard work and persistence, without which the successes of this summer would not have been possible. The Missouri Department of Conservation has also been invaluable in their support of my research. Their time and willingness to cooperate and work around my research has been more than I ever expected.

Thanks to funding provided by ASM and other generous Missouri organizations that support ecological research, the first two years of my dissertation research have been extremely successful. While I did not meet all original goals, after working with Bell's Vireos for two summers in central Missouri I believe the groundwork has been laid for a successful dissertation project. During my preliminary 2008 field season in Missouri, I exceeded my goals

outlined in my original proposal. I identified six study sites encompassing a broad array of habitats and management strategies: Whetstone Creek, Prairie Forks and Reform Conservation Areas, Tucker Prairie, Overton Bottoms and Albert Children’s Audubon Wildlife Area. Between May 7 and Aug 24, 2008 I banded 116 vireos, located 25 nests and banded nestlings from five of these. I also took blood samples birds for future genetic analysis. Perhaps most valuable, I learned how to work with Bell’s Vireos in the central Missouri shrub-land ecosystem and gained confidence I could locate, capture and follow enough vireos and nests to answer my research questions. For this study, sample sizes will be limited by time and manpower, not by how many birds are present. Having such a large number of banded individuals from 2008 laid the groundwork for documenting order of arrival during summer 2009.

This summer has been challenging but successful, I expanded efforts to nest monitoring as well as re-sighting returning banded birds and banding new birds. I also added a 7<sup>th</sup> study site, Davisdale CA, another Quail Emphasis Area, as I am hoping to describe how the species responds to habitat management targeted towards quail. My field crew and I are ending the summer with 38 returned banded birds, 93 territories identified and information on arrival date or nest success on 71. We monitored 100 nests and 30 were successful (Table 1). However, we did not find every nest in every territory, the original goal, as 93 proved to be too many to follow completely. Too many is a much better problem than not enough! Next summer I will determine arrival date and if a nest fledged in all territories but select a subset of territories to locate and monitor every nest attempt.

Table 1 -Summary of nest data by site

Study Site	Total	Fledged	Success Rate
Prairie Forks	11	5	45
Tucker Prairie	2	2	100
Overton	17	6	35
Whetstone	25	8	32
Davisdale	7	1	14
Reform	28	8	28
Albert Children	10	0	0
Total	100	30	

This summer one of my field crew, Ben Christ, is an undergraduate intern. Ben is working on an independent project using genetic tools to look for extra pair paternity which will help the overall project by determining if offspring within a territory belong to the male territory owner. To attribute reproductive success to territory quality and selection, the young produced in a territory must be genetic offspring of the territory owner. While Bell's Vireos are socially monogamous it is relatively common in songbird species to breed with individuals other than their social mates. His project is ongoing through the upcoming school year but he has already presented a poster on his work this July and will present again on the final results in May 2010.

In addition to summer fieldwork in Missouri, I traveled to Jalisco, Mexico in January 2009 to assess the possibility of establishing a future long term research project at this location. In collaboration with Dr. Barbara Kus from the US Geological Survey, I investigated the likelihood of studying Bell's Vireos near the Chamela - Cuixmala Biosphere Reserve. The trip was extremely successful with 100s of individual birds identified in multiple habitat types. We color banded 11 and re-sighted six individuals. This is the first time this has been done with Bell's Vireos on the wintering grounds. Most importantly we established working relationships with local scientists and reserve managers as well as members of the community. As most of our work will be done on private land, the cooperation of the local landowners is essential. This trip laid the foundation for a long-term research project I will pursue throughout my career.

Again, thank you for being a part of providing me with these opportunities. Receiving this scholarship played a large role in making these last two years successful and exciting. With two more years to go I have high hopes my dissertation will produce quality data that will increase our understanding of Bell's Vireo habitat requirements and behavior.