ILLINOIS AUDUBON SOCIETY
Helping to Preserve the Flora and Fauna of Illinois since 1897

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A War Bluff Valley Sanctuary
Final Report
Grant Agreement #: 06-022W

Grantee: Illinois Audubon Society
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217-544-2473

Time-frame of the report: Conclusion of the grant agreement – July 31, 2006

Grantee Representative completing the report: Tom Clay
Executive Director
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Project objective:
To gather valuable baseline inventory on the herpetofauna of War Bluff Valley Sanctuary, which can be used by resource professionals for assessing future population changes and correlations on habitat type and herpetofauna suitability. The information can also be used to educate the public on the importance of habitat protection and restoration for herpetofauna, which is declining in the many parts of the state.

Summary of the Project Accomplishments:

Total Project expenditures: $1,800
Julius Frazier
Contractual services from July 2005 through June 2005 to conduct inventory

Matching funds: Contractor donated travel expenses; $854.40 (The original estimate was for $1080.00, but with gas prices nearly tripling since the grant application, Julius made fewer trips and spent more nights in the field instead.)

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Herpetofauna Inventory of War Bluff Valley Wildlife Sanctuary, Golconda, Illinois August 2006

Julius Frazier and Roberto Brenes
Southern Illinois University, Carbondale, IL 62901

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Introduction

Because of its geological history and geographic location, Illinois exhibits a high diversity of amphibians and reptiles. Illinois encompasses14 natural divisions forming an unusually wide diversity of habitats (Phillips et.al.1999), (Conant, Collins 1998) and is home to 62 species of reptiles and 40 species of amphibians, many of which are at the edge of their range. Seven of the 14 natural divisions are found in the southern most 11 counties (including Pope County), which comprise a very small percentage of the state's total area. Of the 102 species of amphibians and reptiles found in Illinois, 81 (79%) are found within the 11 southern counties, including 9 which are not found elsewhere in Illinois. This unique array of different habitats in such a small geographic area allows for a high diversity of wildlife. However, with new range extensions still being reported for the area, little information on the local herpetofauna is available for the southern part of the state. Therefore, our objective was to describe the species composition of the War Bluff Valley Sanctuary, and the changes in the reptile and amphibian community structure throughout the year.

Methods/ Materials

Site Description

War Bluff Valley Sanctuary (WBVS) is a 485-acre protected area located in Pope County near Golconda, Illinois approximately 4 miles from the Ohio River in southeastern Illinois. WBVS is managed by the Audubon Society of Illinois and contains a variety of habitats including permanent and vernal ponds, creeks, seasonal streams, open grasslands, scrub, regenerating forest, lowland and upland hardwood forests, and exposed rocky bluffs. The sanctuary borders the Shawnee National Forest and serves as a refuge for a large variety of birds, insects, mammals, amphibians and reptiles including the state threatened timber rattlesnake (*Crotalus horridus*) and Bird-voiced treefrog (*Hyla avivoca*). Because of the sanctuary's geographic location and the relatively low number of visitors per year, little is known about the community structure of the herpetofauna in this area.

Techniques

We used five different techniques to survey all available habitats as an attempt to compile the most complete representation of species possible. Monthly surveys throughout the entire sanctuary began in August 2005 and continued until July 2006. We comprised a list of all herpetofauna historically know to occur in the geographical area of the sanctuary, Pope County (Phillips et.al.1999), and a list of habitats existing within the sanctuary. Utilizing these two lists we were able to conduct species specific habitat oriented searches for more allusive animals. To survey animals inhabiting forests and streams we used a series of interconnecting loops as search transects that included all trails and streams of the sanctuary, thus allowing surveyors to search all existing habitats.

While surveying along transects we used visual encounter surveys (VES) to record herpetofauna sightings. To account for more allusive herpetofauna not easily found under normal visual surveys, we haphazardly set up 10 cover boards throughout the sanctuary to create easily searched habitats for such animals. Cover boards consisted of sheets of tin previously found on the sanctuary grounds, (2 × 4 m). To survey for aquatic salamanders and turtles we used seine nets and dip nets to search deep turbid water not accessible by other means. These techniques coincided with peek activity times such as breeding seasons. For non-accessible animals residing in hard to search habitats such as high in trees, we used frog call surveys for anurans calling during their breeding season (Heyer et. al. 1994). All search efforts utilized the most noninvasive technique possible, to minimize disturbance of the organisms.

Search effort differed between seasons. During cold months, survey trips were day trips, designed to allow surveyors to search during the warmest time of day and for as long as possible. During the warmer months, survey trips included spending the night at the sanctuary as to allow surveyors to search during all times of day. Surveys began in the afternoon and lasted until late at night as to encounter corpuscular and nocturnal species. Surveyors also conducted searches from early morning through the heat of the day, thus targeting diurnal species. Additional survey trips were associated with seasonal rains and weather changes to find breeding amphibians that are rarely encountered at other times of the year.

The species account was used to construct a species list for the sanctuary. The data obtained from transects, was used to determine species diversity and abundance of

individual species as well as to describe the reptile and amphibian community structure throughout the year.

Results

From the 38 species historically known to occur in War Bluff valley Sanctuary (J.W. Graber Pers. comm.) we found 29 during the survey, accounting for 76% of total species, which represent 64% of the species known to occur in Pope County (Table 1). From the species recorded, 24 (83%) were recorded using Visual Encounter Surveys (VES), 2 (7%) using dip nets, 2 (7%) using frog calls and 1 (3%) using a seine net. No animals were found under our cover boards, (Table 1). The herpetofaunal community showed a seasonal pattern of activity with more animals found in warmer than colder months (Figure 1).

Table 1: Species historically found in Pope Co. and War Bluff Valley Sanctuary and herpetofauna found during the August 2005 to July 2006 survey, and techniques used.

Historically found in Pope Co.	Historically found in WBVS	Found in WBVS during survey	Technique
Ambystoma maculatum		X	Dip net
Ambystoma texanum			
Ambystoma tigrinum		X	Seine
Ambystoma opacum	X	X	VES
Eurycea cirrigera		X	VES
Eurycea longicauda	X	X	VES
Eurycea lucifuga		X	VES
Plethodon dorsalis	X		
Plethodon glutinosus	X	X	VES
Notophthalmus viridescens	X	X	Dip net
Siren intermedia			
Bufo americanus	X	X	VES
Bufo fowleri	X	X	VES
Acris crepitans	X	X	VES
Hyla avivoca		X	Frog call
Hyla cinerea		X	VES
Hyla versicolor	X		
Hyla chrysoscelis			
Pseudacris crucifer	X	X	VES

Table 1: Cont.

Pseudacris feriarum	X	X	Frog call
Gastrophryne carolinensis			
Scaphiopus holbrookii			
Rana areolata	X		
Rana catesbeiana	X	X	VES
Rana clamitans	X	X	VES
Rana sphenocephala	X	X	VES
Rana sylvatica	X		
Chelydra serpentina	X		
Chrysemys picta			
Graptemys ouachitensis			
Graptemys pseudogeographica			
Terrapene carolina	X	X	VES
Trachemys scripta	X		
Kinosternon subrubrum			
Sternotherus odoratus			
Apalone mutica			
Apalone spinifera	X		
Sceloporus undulatus	X	X	VES
Eumeces fasciatus	X	X	VES
Eumeces laticeps	X		
Scincella lateralis	X	X	VES
Cnemidophorus sexlineatus			
Carphophis amoenus	X	X	VES
Coluber constrictor	X		
Diadophis punctatus	X	X	VES
Elaphe obsoleta	X	X	VES
Farancia abacura			
Heterodon platirhinos	X		
Lampropeltis calligaster	X		
Lampropeltis getula	X	X	VES
Nerodia erythrogaster			
Nerodia sipedon	X	X	VES
Opheodrys aestivus	X	X	VES
Storeria dekayi	X		
Storeria occipitomaculata	X		
Thamnophis sauritus	X		
Thamnophis sirtalis		X	VES
Virginia valeriae			
Agkistrodon contortrix	X		
Agkistrodon piscivorus			
Crotalus horridus	X		

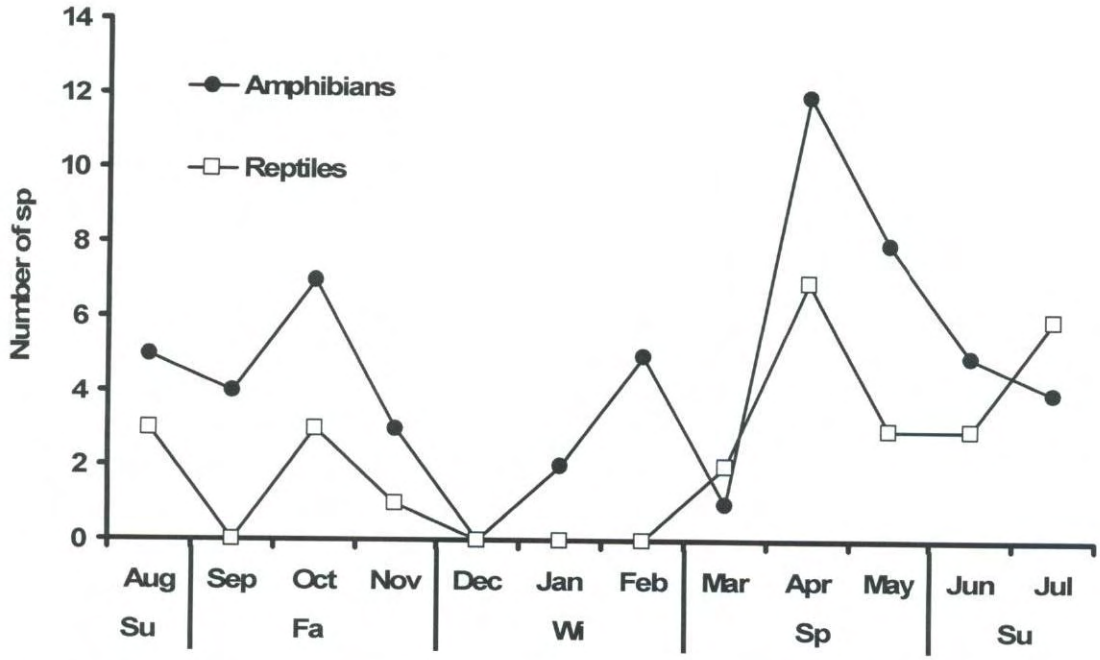

Figure 1: Number of species found during the surveys at War Bluff valley sanctuary from August 2005 to July 2006. The symbols Su: summer, Fa: fall, Wi: winter, and Sp: spring.

Discussion

During the year survey of War Bluff valley sanctuary we accounted for 76% of the species previously recorded by resident naturalist J. Garber, therefore 16 of the species found by Garber were not found during our survey. This could be because most of these species are rare such as the state threatened timber rattlesnake (*Crotalus horridus*), or with short activity periods like the Crawfish Frog (*Rana areolata*), which are only active during March and April. However, we recorded seven species that were not previously recorded for the sanctuary, such as the state threatened Bird-voiced Treefrog (*Hyla avivoca*), the Spotted salamander (*Ambystoma maculatum*) and the common Garter Snake (*Thamnophis sirtalis*) among others, (Table1). This could be because of the techniques employed by surveyors such as dip netting and frog calls.

The majority of animals surveyed (83%) were found using VES. The high success of the VES could be a consequence of; first, VES were used every time there was a survey trip. Second, VES cover more ground while searching thus allowing surveyors to search a larger area. VES caused less stress because capture was not always necessary furthermore; captures were only used for identification purposes making handling time and time held in captivity outside of the original habitat very short. The low rate of captures using dip nets (7%) could be because we only used this technique when we were conducting habitat oriented searches in areas with turbid water too small for a seine net. This type of habitat represents a small percentage of the sanctuary grounds therefore, making the use of dip nets relatively uncommon. Frog calls accounted for only 7% of our findings because this technique was used for frogs that we only heard. If the frog was both heard and sighted than it was recorded as a VES encounter because, although listening to frog calls is a useful and noninvasive technique it is also the most subjective technique we used (Heyer et.al. 1994). Seining was kept to a minimum because this technique can be stressful to non-target aquatic animals in the search area such as tadpoles, salamander larvae and a variety of invertebrates that can inadvertently be removed from their aquatic environments for a potentially harmful period of time (Heyer et.al. 1994). For that reason this technique was only used to survey large aquatic habitats inaccessible to dip nets and accounted for only 3% of the total captures. According to Heyer et.al. (1994) the best material to use for cover boards is untreated pine board or plywood, because wooden cover boards provide a more thermally stable environment. This could be an explanation for why we did not find any species associated with our tin cover boards.

At the end of the survey we were able to corroborate the previous species list of the reptiles and amphibians of the WBVS recorded by J. Garber, and also added 7 new species to the existing species account. In addition, we establish the foundations for a potential long term monitoring program, which could allow us to create a more complete species account, not only for WBVS but for adjacent areas. This species account could be extremely useful in conservation efforts for the region.

References Cited

Conant, R., C.T. Collins. 1998 Reptiles and Amphibians of Eastern/ Central North America. Peterson Field Guides.

Heyer, W. R., M. A. Donnelly, R. W. McDiarmid, L. C. Hayek, and M. S. Foster. 1994. Measuring and Monitoring Biological Diversity. Smithsonian Institution Press.

Phillips, C. A. R. A. Brandon, and E. O. Moll. 1999. Amphibians and Reptiles of Illinois. Illinois Natural History Survey · Champaign.

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