FIELD SURVEY OF THE EASTERN COLLARED LIZARD (*CROTAPHYTUS COLLARIS COLLARIS*) AT FERNE CLYFFE STATE PARK, JOHNSON COUNTY, ILLINOIS

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Project Objectives:

To determine whether or not the eastern collared lizard (*Crotaphytus collaris collaris*) (Prints 2-3 and Slides 2-3) still exists at Ferne Clyffe State Park (Fig. 1) in Johnson Co. Illinois and also whether or not the population has spread from the Blackjack Oak Trail bluff line to other bluff lines within the park.

Project Description

In the early 1990's a graduate student from SIU-C found individuals of *C. collaris* at Ferne Clyffe State Park, Johnson Co. Illinois (T11S S27 R2E). Subsequently another graduate student from SIU-C did a field survey from l995-l997 of this small disjunct population for her Master's Thesis. The population was located only along the 3.22 km Blackjack Oak Trail bluff line. It's important to determine if this introduced population of collared lizards still exists due to their predatory nature for syntopic native lizards. The field survey is primarily to determine the presence or absence of *C. collaris* at Ferne Clyffe State Park. It's also important to know this due to the fact that this is an introduced reptile species and if still present would need to be regulated and state managed.

Introduction:

Ferne Clyffe State Park (Fig. 1) (37° 31' 46" N 88° 31' 58" W) was established in 1949, is 983 hectare in size and has several trails (Blackjack Oak Trail, Waterfall Trail, Big Rocky Hollow Trail and along the Round Bluff Nature Preserve). All trails have some degree of rock bluff present nearby with the Blackjack Oak Trail having possibly considerably greater bluff line area (Prints 12-15) and possibly greater exposure to sunlight.

Brandon and Wilson (l994) documented the existence of the eastern collared lizard (*Crotaphytus collaris*, Family Crotaphytidae) at Ferne Clyffe State Park and was published in Herpetological Review as a new state herpetological record for Illinois. Subsequently Beth Burke of SIU-C did her field research there (1995-1997) for her M. A. (1998) beginning with an initial study in the summer of 1994. She estimated the maximum population size in 1997 to be 31 individuals. The population is almost certainly introduced (S. Ballard pers. comm.; Phillips, C. A. et al. 1999). I have been funded by IDNR to determine if a population or any isolated individuals of the collard lizard are still present at Ferne Clyffe State Park.

The eastern collared lizard is a large (maximum size up to 115 mm SVL) diurnal Saurian predator (Conant, R. and J. T. Collins, 1991) which is placed in the Family Crotaphytidae and consists of seven species which are primarily located throughout the western US (Degenhardt,

W. G. et al; 1996). They are naturally occurring as far east as Missouri. Their microhabitat distribution is spotty and is restricted to glades and rocky areas where they can bask on perch sites (boulders) and search for food and males can search for females. They have a patch type distribution (Blevins, E. and K. A. With, 2011; and T. R. Johnson, 2000) occurring in rocky areas surrounded by vegetation. Clutches of eggs are laid underneath boulders (Legler, J. M. and H. S. Fitch; 1957) and it's felt they have communal nests. Collared lizards are considered the top predator within a Saurian population and are known to prey on other Saurian species hence the importance of determining whether or not they still exist at Ferne Clyffe State Park.

Materials and Methods:

Three initial voluntary field surveys were taken during May and June of 2011 before actual DNR funding to determine actual locations of the rock bluffs and to perform initial Saurian surveys. Seventeen field surveys (beginning July 2011) were made after funding was granted and during the months of May through the middle of October. Initial field surveys determined the plant species (woody trees, shrubs, and herbaceous layer) of each respective trail near the rock bluff areas. Plant community type and forest canopy cover % were also determined. In addition the rock substrate % exposed to sunlight and an estimation of shade was made at each bluff site. The botanical and rock formations surveys along each rock bluff area were used to determine good habitat conditions for collard lizards. Air temperature readings (°Celsius) were generally made during each field survey and were mostly made when the air temperature was at least 27 ^{o} C but fall 2012 surveys were made when much cooler temperatures were present. Time frame of the survey day was generally 900-2000 hours. A 30 meter measuring tape was used to determine a rough estimate of actual good collared lizard habitat size at the Blackjack Oak Trail bluff line. A noose with monofilament line attached to a 12 foot collapsible fishing pole will be used possibly to capture collared lizards. Bob Lindsay (IDNR Biologist) believed he saw a collared lizard at a glade SE of Pounds Hollow, Gallatin Co. and this area was surveyed three times for their presence.

Whenever possible, field surveys were taken during weekdays to increase the chance of finding collared lizards which would be less disturbed during the week when fewer people would be using the park trails. Other prime field surveys were when sunny and warm or hot. Survey days varied from 2-6 hours in length. Rock bluff line surveys (every 1-2 hours) were repetitive (from 2-4 times per field trip with a waiting period between surveys of at least forty-five minutes to one hour) with exposed rock areas especially perch, basking sites and rock crevices (prints 12-15) visually searched. Other reptile and amphibian species were also incidentally identified (especially *Sceloporus undulatus* since they occur syntopically and share many ecological similarities) and enumerated when present. Prints were made of the eastern collared lizard, other reptile and amphibian species, suitable habitat, invertebrate prey and

representative plant species of the bluff areas. Second observer field hours (those other than the Principal Investigator, WTM) were tabulated.

RESULTS AND DISCUSSION

Initial Survey and Habitat Descriptions

Initial surveys of the four trail rock bluff areas were taken at Ferne Clyffe State Park to determine the possibility of suitable collared lizard habitat. This entailed determining shade cover, % sunlight and floral composition especially of the tree canopy that is present on the sandstone bluff tops. Results of the initial floral survey and brief habitat description are as follows.

Blackjack Oak Trail features a nearby sandstone blufftop with 90% exposure of the top of the rock bluff substrate to sunlight (prints 12-15). Estimated suitable collared lizard habitat size was 407 m^2. The dominant overstory and tree species are *Quercus marilandica*, Blackjack Oak and *Juniperus virginiana*, Eastern Red Cedar. Other common tree species along the trail included *Quercus stellata*, Post Oak; *Ulmus alata*, Winged elm; and *Carya ovata*, Shagbark Hickory. These are recognized as indicator species of a xeric community (Ebinger, J. E. and H. F. Thut, 1970; Sundberg, W. J. and D. Ugent, 1997). Common species of shrubs, although sparse, included *Vaccineum arboretum*, Farkleberry, and *Rhus aromatic*a, Fragrant Sumac and are also recognized as species indicative of a xeric blufftop community. Species growing in the herbaceous layer included *Opuntia compressa*, Prickly Pear Cactus (print # 16), and *Ruellia humilis*, Wild Petunia and are indicative of a xeric habitat (Mohlenbrock, R. H. and D. M. Ladd, 1978 and Mohlenbrock, R. H., 1986). Lichens that covered the bare rock included *Parmelia conspersa* (green lichen) and *Cladonia cristatella* (British Soldier lichen).

Big Rocky Hollow Trail follows the edge of a bluff and the tree overstory (indicative of mesic or valley habitats) covered all but 1% of the sunlight that reaches the rock bluff. Since there was such little sunlight exposure of the sandstone rock areas this bluff was not checked again for collard lizards. The Waterfall Trail follows a dry rocky creek from the blufftop to the bottom where it continues along the face of the bluff. Exposure of the bluff area to sunlight is ~ 15% due to the tree overstory or canopy and very spotty. Sunlight exposure along the cliff bluff is less than 5% due to the tree overstory or canopy and this habitat was not checked again for the possibility of collard lizards. Round Bluff Nature Preserve rock areas had less than 5% exposure to sunlight and was not checked again for collard lizards. After the initial field surveys only the Blackjack Oak rock bluff line was searched for collared lizards.

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One juvenile collared lizard was observed on 8/22/2011 at 12:15 PM at Blackjack Oak bluff line and escaped into a rock crevice (print # 12) with 100% positive identification made by presence of the two black collars on the back of the neck. A second observer was present during this sighting. There was no other collared lizard found during any of the other thirteen field surveys. A large lizard scat was found by a second observer on 7/14/12 and was definitely not that of *Sceloporus undulatus* and may have been that of a collared lizard. Reports or comments from DNR personnel at Ferne Clyffe include: 1) Joe Nelson a DNR employee at Ferne Clyffe stated that he saw one individual collard lizard crossing the road leading to the lake four years ago which would be 2008 and 2) also that he has recently seen a few along Blackjack Oak Trail. These comments need to be verified, though, and may be just conjecture. 2nd observer hours at Ferne Clyffe totaled 40 hours.

Bob Lindsay (IDNR Natural Heritage Biologist) stated that he possibly saw a large collared lizard at a glade near Pounds Hollow, Gallatin Co. on June 7th 2012 which is about 62.7 km from Ferne Clyffe State Park. Three field surveys were taken on 7/15/12, 7/29/12 and 9/23/12 at the request of IDNR personnel. The glade was roughly 10X that of Blackjack Oak Trail bluff line and with 0 % shade. Only juvenile eastern fence lizards were found during the first two surveys while two hatchling (30-35 mm SVL) six-lined racerunners (*Cnemidophorus sexlineatus*) (Teiidae) were observed on 9/23/12. It's felt that Bob Lindsay saw a large six-lined racerunner. 2nd observer hours at the Pounds Hollow glade totaled six hours.

Although not the major emphasis for this study, eastern fence lizards (*Sceloporus undulatus*) (Phrynosomatidae) (Prints 4-6) were sighted on numerous occasions (total field observations of N=38) and were common except during extremely hot days. Adult males, females and hatchling fence lizards were found differing from Burke (1998) who didn't find any hatchlings. Many hatchling fence lizards (20-25 mm SVL) were fairly common in August and September (eight were observed on 9/30/12) and are indicative of a good size viable reproductive population. Hatchlings (N=2) were found as late in the year as 10/22/12. Fence swifts were present in trees during hot temperatures and on rock surfaces during warm temperatures. One juvenile skink, *Eumeces* sp., (Scincidae) was observed on 5/28/12. Reptile egg shell fragments and nest site (prints 7 and 8) were found on 7/22/12 with the largest fragment measuring 25x15 mm. These were identified as that of *Coluber constrictor* (Colubridae) based on external granules on the shell. Identification was by Steve Karsen. Two adult eastern box turtles *Terrapene carolina* (Emydidae) were also observed. Amphibians found or heard during the surveys included two american Toads (*Bufo fowleri*)(Bufonidae), a calling gray treefrog (*Hyla chrysoscelis*) (Hylidae), a cricket frog (*Acris crepitans*) (Hylidae) and four 2nd year juvenile ~40 mm SVL slimy salamanders *Plethodon glutinosus* (Plethodontidae) (Print # 9).

Most of the other species of herps and the greater numbers of eastern fence lizards were found after the September 2012 rains after the long drought that southern Illinois had in spring and summer 2012. The 2012 drought really affected the observations of herps.

Incidental observations were made of possible invertebrate prey of the Saurian species present and included Acrididae (Short-horned grasshoppers, Print # 11, a lichen morph), Cicindelidae (tiger beetles), and Formicidae (ants) which were observed but not very common. Phillips, et al. (1999) states that grasshoppers are a good food source for collared lizards.

SUMMARY

Only one collared lizard was observed and this is interpreted that they are very rare at the only Illinois locality. In addition since there is a good size reproductive population of eastern fence lizards at the Blackjack Oak Trail bluff line, it is clear that fence lizards are the dominant Saurian species. The population of fence lizards have benefitted greatly by the lack of and rarity of collared lizards present. Burke (1998) only found seven fence lizards and no hatchlings while this study has 38 observations of eastern fence lizards with numerous hatchlings and in effect the fence lizard population size has increased in size due to the almost complete disappearance of the collared lizard population. In addition, *Eumeces* sp. has also benefitted. Extinction rates are greater with small population size and population fluctuations will lead to extinction (Lynch, M. et al. 1995). This may be the case with the collared lizard population at Ferne Clyffe State Park. The small habitat size (407 M^2) may also possibly increase the extinction rate since collared lizards have a much larger home range than do fence lizards. The major outcomes of this project are that collared lizards are extremely rare and that there is a good size population of eastern fence lizards at the Blackjack Oak Trail bluff line of Ferne Clyffe State Park.

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PRINT AND SLIDE LIST

1)-Entrance to Blackjack Oak Trail

2)-Adult male *Crotaphytus collaris* (print and slide)

3)-Adult male and female *Crotaphytus collaris* (print and slide)

4)-Adult male *Sceloporus undulatus* basking-N37.53539 W88.97752

5)-Adult male *Sceloporus undulatus* on perch site

6)-Hatchling *Sceloporus undulatus* 20-25 mm SVL

7)-*Coluber constrictor* egg shell fragments

8)-*Coluber constrictor* egg nest site

9)-*Plethodon glutinosus*-2nd year juvenile

10)-Adult *Terrepene carolina*

11)-Lichen morph grasshopper

12)-Boulder and crevice where the only collared lizard was observed

13)-Rock and boulder formations

14)-Rock and boulder formations

15)-Rock and boulder formations

16)-*Opuntia* sp., a common species of cacti along Blackjack Oak Trail Bluff line

17)-Tools and equipment used in the field survey

PRINT 1

BLACKJACK OAK TRAIL
CAMPGROUND
MODERATE
2 MILES
EXTREME CAUTION

PRINT AND SLIDE 2

PRINT AND SLIDE 3

PRINT 4

PRINT 5

PRINT 6

PRINT 7

PRINT 8

PRINT 9

PRINT 10

PRINT 11

PRINT 12

PRINT 13

PRINT 14

PRINT 15

PRINT 16

PRINT 17