Factors Determining Richness of Reptile and Amphibian Species in a Riparian Wildlife Dispersal Corridor

by

Frank T. Burbrink,
Christopher A. Phillips,
and
Edward J. Heske

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Prepared by:

Center for Biodiversity
Illinois Natural History Survey
607 E. Peabody Drive
Champaign, IL 61820

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fishless pools along with severe inundation of terrestrial habitat prevents many species of snake, lizard, and salamander from occurring in the corridor. However, the riparian habitat of the corridor meets the life cycle requirements of 10 species of anura and 4 reptile species, and will allow them to persist within the corridor and pass between core areas in generational time.

eliminated only to discover the critical benefits they provided for the conservation of plants and animals (Saunders and Hobbs, 1991; Harris and Scheck, 1991).

Of the physical characteristics of the corridor important to conservation, Harrison (1992) identified habitat, width, length, human activities, and location as being the most significant. Of these variables, corridor width has gained much attention. Soulé and Gilpin (1992) suggested that a wide corridor facilitates the movement of organisms better than a corridor of narrow width. A narrow corridor characteristically provides less habitat than a wide corridor. Further, greater exposure to edge in narrow corridors can increase the exposure of inhabitants to predators and human activites. Consequently, corridors of substantial width and quality should contain a higher diversity of organisms, particularly that of corridor dwellers, than narrow areas (Friend, 1991; Harris and Scheck, 1991; Saunders and de Rebeira, 1991; Saunders and Hobbs, 1991).

When estimating the value of a corridor one must take into account the type of fauna utilizing the corridor, as well as the physical qualities of the corridor. Animals utilizing corridors to move between habitats can be considered either passage species or corridor dwellers. Passage species, such as medium-to-large sized mammals and birds, briefly travel through the corridor and require only a limited number of their life-cycle requirements to be met within the corridor. Corridor dwellers, on the other hand, remain in the corridor for several generations. This subset of corridor users includes

This river system occurs at the junction of 4 major physiological provinces: the Central Lowlands, the Interior Low Plateaus, the Coastal Plains, and the Ozark Plateau. In order to drain portions of the Cache River directly into the Mississippi and improve suitability of the surrounding floodplain for agriculture, the Post Creek Cutoff was constructed in 1915. This channel effectively divided the Cache River into the Upper Cache River and Lower Cache River. The Upper Cache River has a total drainage of 353 sq. km and ranges from 271 m to 103 m above sea level. The Lower Cache River has a total drainage of 927 sq. km and ranges from 102 m to 85 m above sea level. Rock outcroppings, cliffs, and sandstone overhangs with upland and lowland forests composed of oaks, hickories, maples, ashes, and cypresses make up the topography and vegetation of the Upper Cache River basin. In contrast, the Lower Cache River basin is primarily composed of flat bottomland swamps dominated by cypress and tupelo trees. Unlike the Upper Cache River, the Lower Cache River is subject to periodic flooding due to its low elevation, poor drainage, mismanaged placement of damms and levees, and channelization. This damaged floodplain is from 2 to 4 km wide. About 70% (145, 000 ha) of its wetland habitat has been converted to agriculture, which in effect separates the lowland floodplain from the adjacent upland forests and clouds the sluggish Cache River with silt (Hutchison, 1987; Demissie et al., 1990).

The Cache River connects the once contiguous large habitats of Wildcat Bluff/Heron Pond and Horseshoe Lake (Fig 1). Located in the Upper Cache River area, the Wildcat Bluff/Heron Pond Nature Preserve encompasses an area of 789 ha and is composed mostly of Cache River floodplain bounded by steep bluffs and mesic upland forests. The 200 ha of the Horseshoe Lake

Seacrh methods for reptiles and amphibians along each transect were similar to Campbell'sl and Christmans' (1982) time-constrained technique and Crump's and Scott's (1994) visual encounter survey (VES), with additional trapping effort for turtles and salamanders. Species were located within the 500-m transect by turning cover, inspecting retreats, watching for surface activity, listening for calls, and trapping. Floating metal screen funnel traps and seines were used in ponds, swamps, and streams to survey salamanders in the breeding season. Aquatic turtles were surveyed at each site using hoop traps with a funnel entrance made of corded fisherman's netting and baited with chicken liver. Visual enounter surveys were conducted several times from March through October of 1994 and then again in March through June of 1995. Breeding adult and larval salamanders were trapped during March of 1995, and turtles were trapped during May and June of 1995. A total of 22 person-hours was spent conducting surveys at each site.

Descriptions of the Research Sites

Core Area.- The two transects at Wildcat Bluff and Heron Pond in Johnson County were located at T13S, R3E, NW 1/4 of Sec 19 and T13S, R3E, NW 1/4 of Sec 30 (Karnak Quadrangle), respectively (Fig .1). Wildcat Bluff and Heron Pond are part of one large (785 ha) area of habitat found 2 km north of the town of Belknap in the Upper Cache River. The diverse habitat along the two 500-m transects includes a buttonbush-cypress swamp, a mesic bottomland and upland forest, shallow swamp ponds, rocky-bluff outcroppings, and a swift-moving section of the Cache River. Many of these areas become flooded in the early spring, but because of proper drainage are usually dried to their normal levels by late spring.

the riparian and old-field upland habitat. To the west, however, the habitat became modified into a flooded cypress/buttonbush swamp flanked by agriculture.

Site 4.- This site is the second of the two wide corridor areas. It was located 56 river-km from the core area at the border of Alexander and Pulaski counties at T15S, R1W, NW1/4 of Sec 7 (Tamms Quadrangle), on the eastern edge of the town of Tamms (Fig. 1). The habitat at this site was 1500 m wide and composed mostly of heavily-logged cypress/buttonbush swamp bordering a very silty and sluggish stretch of the Cache River. The area was littered with dead secondary growth trees and urban trash and showed evidence of recent flooding. Only a few tracts of land in this site remain uninundated by standing water all year. The corridor at this site is closely bordered by urban sprawl.

Analysis of data

The hypothesis that species richness of amphibians and reptiles is dependent upon corridor width was tested by single-factor analysis of variance (ANOVA), with wide (sites 2 and 4) and narrow (sites 1 and 3) as the treatments. The significance level was set at alpha equals 0.05, and the probability of type I statistical error (failure to reject the null hypothesis when it is actually false) was evaluated by power analysis (Cohen, 1988). Statistical tests were conducted using SPSS for windows, ver. 6.0 (SPSS, 1993), and power analysis was conducted using SOLO Power Analysis (SOLO, 1992).

Results

The species richness of amphibians and reptiles was not significantly affected by width of the riparian habitat at the site (F=2.35, df=1, P=0.26), but the power for the test was low (0.39). Similarly, the species richness of the five taxonomic groups (salamander, frogs, lizards, snakes and turtles) was not significantly affected by the width of the riparian habita (P>0.05 for each taxanomic group). For total species and the separate taxonomic groups, the trend was in a direction opposite to that expected; more species were detected in the narrow sites than in the wide sites.

The total number of species of reptiles and amphibians detected per site declined drastically with distance from the site (Fig. 2a). This pattern varied among taxanomic groups, however. The decline in species richness at sites 2, 3 and 4 was particularly striking for salamanders (Fig. 2c), snakes (Fig. 2d), and lizards (Fig. 2e), but weak or absent for frogs (Fig. 2b) and turtles (Fig. 2f).

Discussion

Species Richness and Its Relationship to Corridor Width, Distance from Core Area, and Habitat Heterogeneity

Width of the riparian habitat did not appear to be the main factor determining species richness of reptiles and amphibians at my study sites. An experiment modeling corridors by Soulé and Gilpin (1991) identified corridor width as a primary consideration when designing conservation plans that include wildlife movement corridors. In addition, several other authors have identified width as a factor that will determine the species richness of a corridor (Friend, 1991; Harris and Scheck, 1991; Saunders and de Rebeira, 1991; Saunders and Hobbs, 1991). In contrast to expectations, the total species community itself. Because of the lack of decline of certain species in the Lower Cache River, increased predation in the corridor is probably not a general explanation for the lower species richness within that corridor. The presence or absence of abundant food items may also play an important role determining richness of predatory species in a corridor. However, from observations made during this study, there was an abundance of prey items (insects, fish, frogs, birds, and small mammals) to sustain populations of predatory reptiles and amphibians. Fitch (1982), also suggested that snakes maintain stable populations in the face of drastic oscillations of prey abundance. Although unknown, interspecific competition for prey or habitat may also cause a decline in species richness in the corridor.

Habitat heterogeneity is an important factor in determining species richness within a corridor. Harrison (1992) suggested that the habitat within the corridor will influence which species utilize the corridor. In this study, the habitat types present at each site had an effect on which corridor dwellers were present. The wide sites in the corridor examined in this study contained only 1 type of natural habitat, lowland floodplain forest. This forest was typically surrounded by agriculture or old field habitat. Although the narrow sites had a smaller total area of riparian habitat, both contained several different habitat types. Site 1, the first narrow site, was composed of dry upland habitat, 2 fishless ponds, a small cypress swamp, a railroad track and was only 100 km from an adjacent bluff. The habitat heterogeneity at this site may account for the occurence of 19 more species than in the wide areas. Site 3, the second narrow site, was composed of a floodplain swamp but also included a small area of upland habitat with 2 ephemeral ponds surrounded by hardwood trees. The heterogeneity at this site may account for the compliance to these life-cycle requirements in hopes of better explaining the presence or absence of these species in the Cache River corridor.

Life-cycle Requirements of the Amphibians and Reptiles in the Cache River Basin

Frogs - Of the 11 frogs found in the core area, 10 occur throughout the corridor. Both *Hyla cinerea* and *H. avivoca* require some type of cypress swamp, flood plain swamp, marsh, or slough (Johnson, 1992; Smith, 1961; Wright and Wright, 1948; Trauth, 1992). Sloughs, swamps and flood plain forests abound in both the core area and the corridor. *H. versicolor, Pseudacris triseriata* , *P. crucifer*, and *Acris crepitans* require woodland ponds, lowland marshes, swamps, streams, or ditches (Johnson, 1992; Smith, 1961; Wright and Wright, 1949). Other than woodland ponds, those unspecific aquatic habitat requirements appear to be met by all habitats in the corridor containing water. In fact, Smith (1961) states that in Illinois the only habitat requirement for *A. crepitans* is any wet place. Judging from the abundance of these species throughout the corridor, most wet places in the Cache River basin may serve as breeding habitats for these frogs. It appears that the habitat requirements for the ranid frogs are also met at all of the sites along the corridor. *Rana clamitans, R. catesbeiana*, and *R. sphenocephela* will inhabit swamps, marshes, streams, creeks, ponds or sloughs (Johnson, 1992; Smith, 1961; Wright and Wright, 1949). Swamps, sluggish streams, and sloughs are quite common throughout the corridor. Smith (1961) mentions that in Illinois *R. catesbeiana* will occur anywhere there is a permanent body of summer, and fall. These frogs must be able to tolerate dampness during hibernation because of the severe inundation of the terrestrial habitat. The microhabitat for hibernation of *B. americanus* is 1 m under the surface of the soil, whereas *B. woodhousii, H. versicolor, P. crucifer, P. triseriata,* and *A. crepitans* hibernate under at the surface of the soil hidden under leaves, logs, rocks, and debris (Schmid, 1982; Storey and Storey, 1987). *H. cinerea* has been found to hibernate in the bark of rotting trees (Neill, 1948). *Rana catesbeiana* is known to hibernate in the aquatic area it uses in the active season, whereas *R. clamitans* have been found hibernating on land 100 feet from the nearest source of water (Bohnsack, 1951; Willis et al., 1956). In other situations *R. clamitans* and *R. sphenocephela* have been known to hibernate in stream banks and in logs (Neill, 1948). *Rana clamitans* has also been found to hibernate in aquatic situations (Wright and Wright, 1949). It is assumed that *H. avivoca* also hibernates terrestrially or aquatically near the habitat they use in the active season. Other than *B. americanus charlesmithi*, it is assumed that the flood plain riparian habitat of the Cache River corridor is sufficient for both breeding and hibernating of 10 species of frogs. As the life history of *B. americanus charlesmithi* reveals, they may be limited by drier habitats in the active and hibernating seasons and thus cannot maintain a healthy population in the lower Cache River.

Salamanders - No salamanders occur consistently throughout the corridor. For the ambystomatid salamanders, the overwhelming factor limiting their ability to reproduce in and maintain stable populations in the Lower Cache river is a lack of fishless ponds. Phillippi et al. (1986) mention the problem of flooding in the Cache River as a source for the introduction of not breed in the upland ponds at site 3, nor will they tolerate the fish-filled waters of sites 2 and 4. However, because *A. texanum* is known to occur in very disturbed areas throughout the state, it has not been clearly determined why their presence was not detected in the Lower Cache. McWilliams and Bachman (1988) discuss the importance of life history to help conserve populations of *A. texanum*. They suggest excluding fish predators and maintaining ephemeral ponds for the successful survival the larvae. These suggestions equally apply to maintaining fishless upland and lowland ponds for the successful survival of populations of *A. maculatum, A. texanum, A. opacum*, and *A. talpoideum*. Also, the effects of clear cutting has been shown to drastically decrease populations of *A. talpoideum* (Raymond and Hardy, 1991). Clear cutting for agriculture is evident along both sides of the Cache River extending down the entire length of the corridor. This clear cutting will obviously inhibit use of these areas by all species of *Ambystomaa* as well as many other species of reptiles and amphibians.

Like the ambystomatid salamanders, the 2 species of plethodontid salamanders do not occur consistently throughout the corridor. *Plethodon glutinosus* is known to inhabit damp ravines or moist areas in the summer and wooded hillsides in the spring (Johnson, 1992; Smith 1961). These salamanders have only been found in the Upper Cache River at site 1 and the core area, where they were consistently located under railroad ties on the well-drained embankment of site 1 and in the mesic forests of the core area. As noted by Pfingsten (1989), *P. glutinosus* will never be found in river bottoms or areas subject to flooding. With this information, it is clear that these salamanders would not occur on the floodplain of the riparian forest of the Cache river at sites 2, 3, and 4. *Eurycea lucifuga* was only captured near

Lizards - Of the 5 species of lizards occurring in the core area, only *Eumeces fasciatus* was found consistently throughout the corridor. According to Conant (1954), *E. fasciatus* in Ohio prefers ravines and moist environments. Fitch (1954), however, finds them to be common on wooded hillsides or hardwood forests. It appears from this study, that *E. fasciatus* is quite tolerant of the flooding conditions of site 2 and 4. In fact, at site 3 they were found on logs in the middle of the swamp. The flooded region of the Cache River probably has detrimental effects on many of the species of animals that prefer dry environments to live and lay their eggs. It has been observed that *E. fasciatus* will move its eggs to higher areas, such as stumps, when floodwaters rise (Henry S. Fitch, pers. comm.). This species is readily found in many unnatural conditions along the corridor: roadsides, houses, bridges, and fences. Like *B. woodhousii*, *E. fasciatus* may also traverse habitats outside of the corridor. Unlike *E. fasciatus*, *E. laticeps* does not seem to tolerate the inundated areas of the Lower Cache very well. Along with *E. fasciatus*, they are found in the dry upland areas of site 3 and the railroad embankment of site 1. Netting (1939) reports that *E. laticeps* is found in drier areas than *E. fasciatus*. *E. Laticeps* is also considered to be more arboreal, living mainly on dry cliffs, sunny hillsides, and hilltops (Conant, 1954). Thus, *E, laticeps* would probably not fare well in the inundated forests of the Cache River at sites 2 and 4. The other 3 species of lizards, *Scincella lateralis*, *Cnemidophorus sexlineatus*, and *Sceloporus undulatus*, do not occur along the Cache River below site 1. *S. lateralis* is fond of leaf litter in woodlands, woodland edges, mesophytic forests, pine woods and wooded fields. This species burrows in loose soil and is found in dry and moist habitats (Brooks, Jr., 1967; Fitch and von Achen, 1977). Surprisingly, they are not found in the sparsely-wooded area's of the uplands at site 3. Their absence in the upland at sites 2 and 4, where flooding is the worst, *E. fasciatus* is readily found. *S. undulatus hyacinthinus* has been found to hibernate in burrows beneath the ground, and spaces between rocks and logs. Even with the apparent lack of habitat in the active season, this species would undoubtedly suffer great losses from constant inundation during terrestrial or subterranean hibernation. Lastly, it has been well-documented that *C. sexlineatus* will hibernate in deep burrows during the winter. They were also found to hibernate only in areas with well-drained soils (Etheridge et al., 1983; summarized in Fitch 1958b). This would presumably limit them from hibernating in the damp Lower Cache River. Regardless of the lack of quality hibernating areas in the Lower Cache River, sites 2, 3 and 4 provide no habitat for *C. sexlineatus* in the active season.

Snakes - A total of 14 snakes were detected in the Cache River basin during this study. For ease in discussing their habitat requirements, they have been divided into 3 functional groups: aquatic snakes (*Nerodia erythrogaster*, *N. sipedon*, *N. rhombifer*, and *A. piscivorous*), large terrestrial snakes (*Agkistrodon contortrix*, *Lampropeltis getula*, *Coluber constrictor*, *Elaphe obsoleta*, and *Heterodon platirhinos*), and medium or small terrestrial or subterranean snakes (*Thamnophis sirtalis*, *T. sauritus*, *Diadophis punctatus*, *Virginia valeria*, and *Carphophis amoenus*).

The only species of snakes occurring consistently at every site in the corridor is *N. erythrogaster*. In the core area, this species is found very near the other three species of aquatic snakes (*N. sipedon*, *N. rhombifer*, and *A. piscivorous*). On first impression, it would seem that if *N. erythrogaster* occurs throughout the corridor, then the other three species should occur there. Unfortunately, the sites in the Lower Cache River fail to meet the habitat requirements for the periods of activity of *N. sipedon* and *N. rhombifer* and the periods of inactivity of *A. piscivorous.*

The Lower Cache River also fails to meet the habitat requirements for all of the large terrestrial snakes. *H. platirhinos* requires well-drained soils and is commonly found in deciduous forests and open woodlands. Like the lizard *C. sexlineatus*, it also does not occur in the Lower Cache River due to a lack of well-drained soils. This species may be found to hibernate in the same habitat it uses when active. *H. platirhinos* is known to burrow into sandy soil and probably could not tolerate the severe and extended inundation of terrestrial habitat in the Lower Cache River during hibernation (Platt, 1969). *A. contortrix, E. obsoleta, L. getula*, and *C. constrictor* all require wooded hillsides, although they all may be found in low-loying areas during the period of activity. During the period of inactivity, however, they retreat to forested hillsides, bluffs or rock outcroppings (Fitch, 1960, 1963[a], 1963[b]; Smith 1961).

A. contortrix, E. obsoleta, and *C. constrictor* have been known to hibernate communally in wooded hillsides (Ernst and Barbour, 1989). Although detailed natural history data on *L. getula* is lacking, they were located in the same habitats as *A. contortrix, E. obsoleta*, and *C. constrictor*. These 4 species were all found near the railroad embankment of site 1 and the core area. *E. obsoleta* has been found near the edge of the riparian forest and the small upland area of site 3. *E. obsoleta* and *C. constrictor* are commonly regarded as species occurring in wooded areas adjacent to fields (Mitchell, 1994; Weatherhead and Charland, 1985). The single *E. obsoleta* found at site 3 either hibernated in the marginal upland area there or traveled across roads, needs sloped areas with well-drained soil for hibernation. Fitch (1958a) finds C. *amoenus* common in rocky wooded areas. Simirlary, *D. punctatus* occurs in well-drained woodlands, and hilltop pastures with loose soil; they are found in moist soil, but probably do poorly in wet soil (Fitch, 1975). Because of the limited mobility of C. *amoenus* and assumed limited mobility of *D. punctatus*, these two species probably do not migrate to different habitats to hibernate (Barbour et al., 1969; Fitch, 1958a). It is thought that both *D. punctatus* and C. *amoenus* would not be able to tolerate flood conditions because of their fossorial lifestyle (Henry S. Fitch, pers. comm.). It is obvious that the lack of unflooded forests in sites 2 and 4 eliminate the chance for the survival of these two species in the wide areas of the Lower Cache River. In addition, the marginally wooded upland area of site 3 has a choked understory of large grasses, which may hinder the movements of such fossorial organisms. These two species were not located at site 1. It may be that the railroad embankment, which provided summer habitat for the transient larger snakes, cannot provide enough upland habitat to fullfill the entire life-cycle of such small snakes. Because of limited mobility of *D. punctatus* and C. *amoenus*, presumably site 1 would receive little recruitment from the core area. The semifossorial *V. valeria* is also of small size and found only in the core area. In, Illinois, this species commonly occurs in or near forested woodsides (Smith, 1961). Fitch (1958a) has found them in deciduous forests with rocks and brush. Also, this species has been found to hibernate in rock crevices (Collins, 1974). If these animals have to be associated with rocky wooded hillsides, then they should be expected not to be found anywhere along the Cache River corridor. The thin strip of agriculture separating the adjacent bluff from site 1 may prevent *V. valeria* from traveling to the railroad embankment or the riparian corridor of site 1.

be using the uplands, roads, or agriculture to disperse from major habitats. *Chrysemys picta* and *Sternotherus oderatus* are known from this study to only occur at site 1. Although they have different life history requirements, both species should be expected to be found throughout the entire corridor. *C. picta* and *S. oderatus* occur in slow-moving, shallow water. They are usually seen in creeks, streams, sloughs, oxbows, and ponds with soft bottoms. Although they are more terrestrial and are found only in the core area and site 2, *K. subrubrum* also inhabits those same areas and are fond of silty water. Both *C. picta* and *S. oderatus* hibernate in the water, whereas *K. subrubrum* hibernates on land (Ernst et al., 1994; Gibbons, 1983; Mitchell, 1994; Smith, 1961). They presumably do not require a different habitat in which to hibernate. Clearly evident, with the skewed distribution along this corridor of these three species, was a lack of reliable sampling. Unfortunately, trapping for turtles was not intense. To the detriment of a good turtle survey, most searches for reptiles were conducted by hand rather than by trap. This may have been the reason why *Apalone spinifer* was not detected in the core area or the corridor. Presumably, *A. spinifer* occurs in the Cache River basin (Phillippi et al., 1986). *A. spinifer* has an affinity for rivers, marshy creeks, bayous, oxbows, lakes, and impoundments with soft bottoms and aquatic vegetation. This species, as well as *K. subrubrum, S. oderatus*, and *C. picta*, should be well accommodated by the river, swamp, and slough habitat found within the entire corridor.

Conclusion, Implications for Conservation Biology of Reptiles and Amphibians through the Use of Corridors

Corridor width is a readily quantifiable factor that should be considered when corridors are being designed or evaluated in terms of their role in the

In addition to width of and habitat heterogeneity in a corridor, length of a corridor may be an important determinant of its success. Species richness may be higher closer to the core area, even in areas of very small width, because reptile and amphibian recruitment from the core area may allow populations to persist through high immigration rates. However, the results of my study indicate that this rescue effect may diminish or disappear very rapidly as the distance from the core area increases.

Although beyond the scope of this study, movement of corridor dwellers from the core area into the corridor and then along the corridor is vital to demonstrating the effectiveness of a corridor. Reptiles and amphibians are generally not as vagile as birds or large mammals. Many authors have published works on movements of reptiles and amphibians (Bennett et al., 1970; Brown and Parker, 1976; Cagle, 1944; Dole, 1965; Fitch, 1958a; Fitch and Shirer, 1971; Fond et al., 1991; Fraker, 1970; Freedman and Catling, 1979; Gregory, 1982; Gregory and Stewart, 1975; MaCartney et al., 1988; Martof, 1953; Patterson, 1978; Petranka and Petranka, 1981; Semlitch, 1981; Semlitsch, 1985; Stone et al., 1993; Stickel and Cope, 1947; Whitford and Vinegar, 1966; Willis et al., 1956). Some of these studies discuss the movement of reptiles and amphibians into different environments at different times of the year. Long distance traveling for many of these animals appears to be associated with movement within home ranges and movement from summer habitats to winter hibernacula. However, some amphibians and reptiles may move substantial distances in a short time. For example, Keister et al. (1982) found that in just over a year *T. carolina* moved a straight line distance of approximately 10 km. Even at this rate it would take 8 years

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Table 1. Reptile and amphibian species of the Cache River corridor. X=presence observed during this study and 0=presence not observed during this study.

Sternotherus odoratus	0[*,?]	X	0[?]	0[*,?]	0[?]
Kinosternon subrubrum	X	0[?]	X	0[?]	0[?]
Chelydra serpentina	X	X	X	X	X
Apolone spinefera	0[7]	0[7]	0[7]	0[7]	0[7]
Eumeces laticeps	X	X	0[5]	X	0[5]
Eumeces fasciatus	X	X	X	X	X
Scincella lateralis	X	X	0[5]	0[5]	0[5]
Cnemidophorus sexlineatus	X	X	0[5]	0[5]	0[5]
Sceloporus undulatus	X	X	0[5]	0[5]	0[5]
Carphophis amoenus	X	0[7]	0[5]	0[5]	0[5]
Diadophis punctus	X	0[7]	0[5]	0[5]	0[5]
Heterodon platirhinos	X	X	0[5]	0[5]	0[5]
Farancia abacura	0[*,7]	0[7]	0[4,9]	0[4,9]	0[4,9]
Elaphe obsoleta	X	X	0[*,3]	X	0[3]
Coluber constrictor	X	X	0[4]	0[4]	0[4]
Lampropeltis getula	X	X	0[4]	0[4]	0[4]
Thamnophis sauritus	0[7]	X	0[7]	X	0[7]
Thamnophis sirtalis	0[7]	X	0[7]	0[7]	0[7]
Virginia valeria	X	0[4]	0[4]	0[*,4]	0[4]
Nerodia erythrogaster	X	X	X	X	X
Nerodia sipedon	X	0[*,7]	0[7]	0[7]	0[7]
Nerodia rhombifer	X	0[*,7]	0[7]	0[7]	0[7]
Agkistrodon contortrix	0[7]	X	0[4]	0[4]	0[4]
Agkistrodon piscivorus	X	X	0[4]	0[4]	0[4]

Fig. 1. Map of the Cache River corridor showing the location of the research sites.

Fig. 2a. Relation between the number of reptile and amphibian species and the distance from the core area.

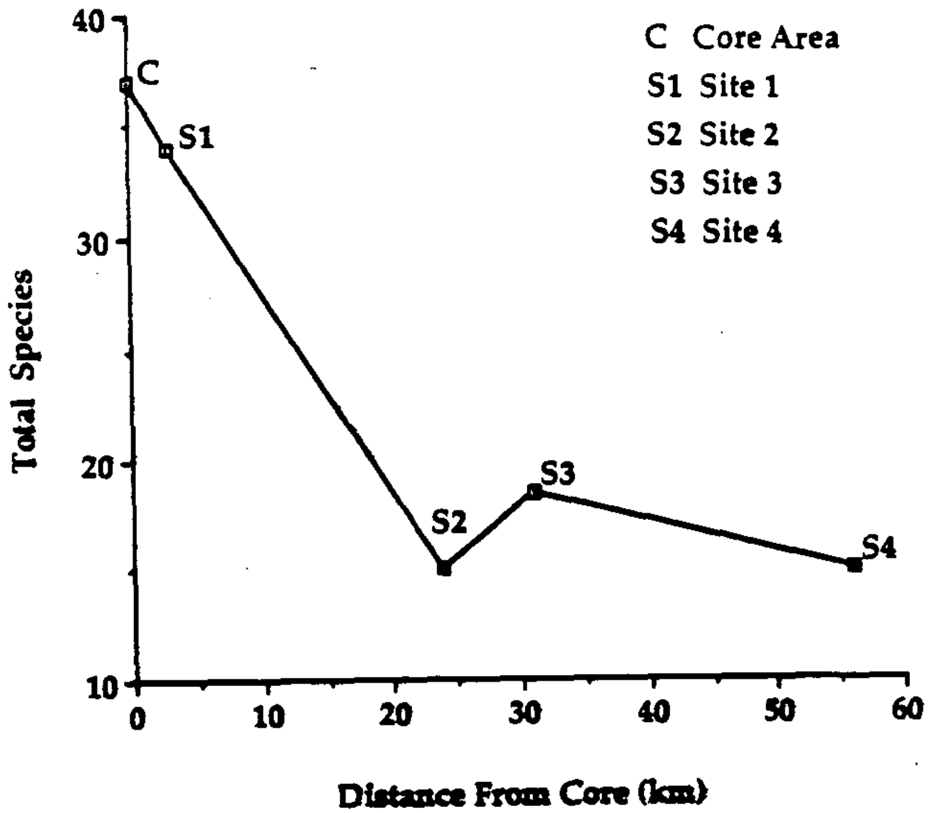
Fig. 2b. Relation between the number of frog species and the distance from the core area.

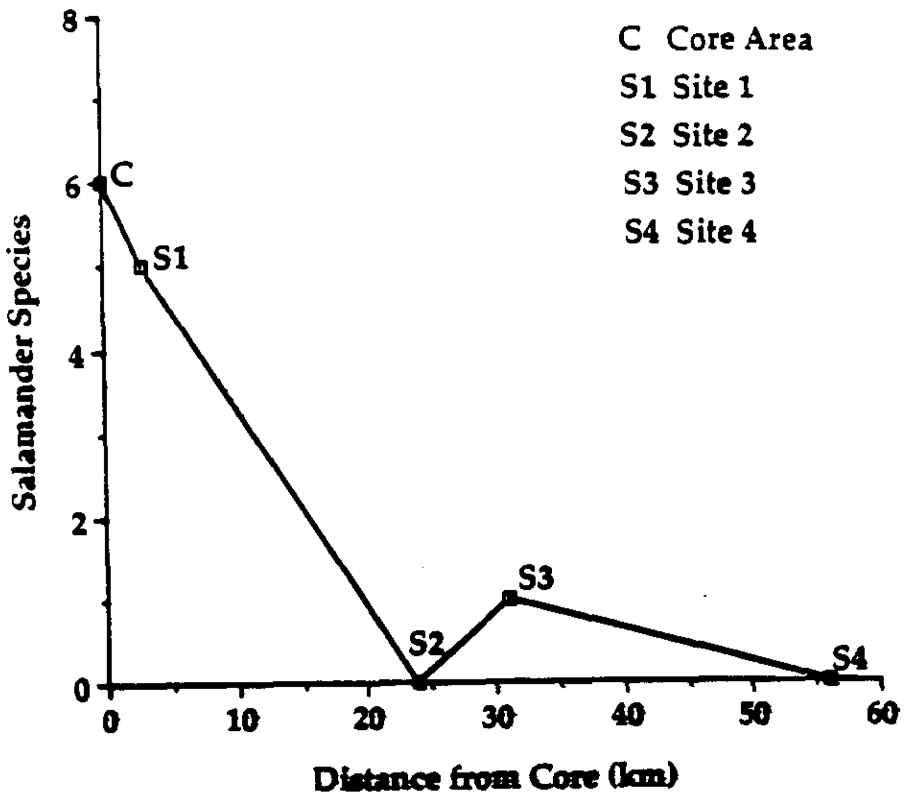
Fig. 2c. Relation between the number of salamander species and the distance from the core area.

Fig. 2d. Relation between the number of snake species and the distance from the core area.

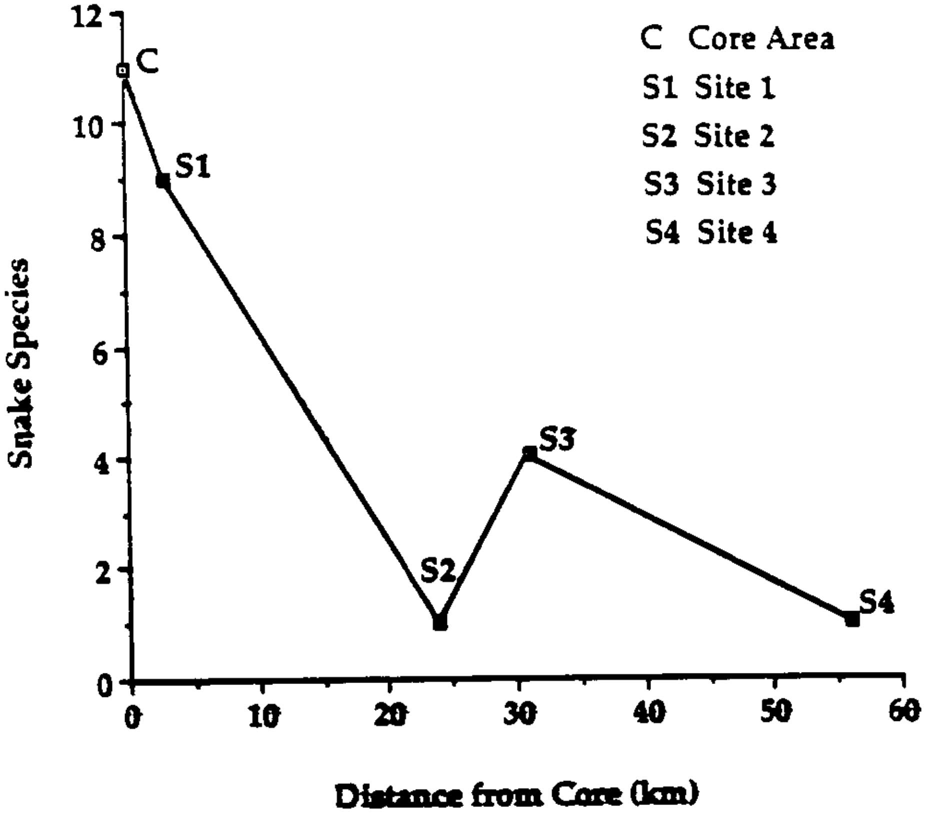
Fig. 2e. Relation between the number of lizard species and the distance from the core area.

Fig. 2f. Relation between the number of turtle species and the distance from the core area.


C Core Area
S1 Site 1
S2 Site 2
S3 Site 3
S4 Site 4
C
S1
S2
S3
S4
Total Species
40
30
20
10
0
10
20
30
40
50
60
Distance From Core (km)



C Core Area
S1 Site 1
S2 Site 2
S3 Site 3
S4 Site 4
Salamander Species
Distance from Core (km)
C
S1
S2
S3
S4
0
2
4
6
8
0
10
20
30
40
50
60


C Core Area
S1 Site 1
S2 Site 2
S3 Site 3
S4 Site 4
C
S1
S2
S3
S4
Snake Species
12
10
8
6
4
2
0
0
10
20
30
40
50
60
Distance from Core (km)

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
Museum of Natural Science

Illinois Department of Conservation
Division of Natural Heritage
Lincoln Tower Plaza
524 South Second Street
Springfield, Illinois 62706

January 15, 1996.

To Whom It May Concern:

I am writing to inform you that I wil not be requesting a permit to capture and handle reptiles and amphibians in Illinois State Parks for the year of 1996. I am currently employed at the Museum of Natural Science at Louisiana State University. Enclosed is a copy of my technical report that determines the effect of corridor width on species diversity and abundance of reptiles and amphibians in the Cache River corridor. The title of this report has since been changed to **Factors determining richness of reptile and amphibian species in a riparian wildlife dispersal corridor.** This report has been sent to you in manuscript style and will subsequently be submited in a shortened form to a scientific journal. I hope this study will be helpful in improving and maintaining reptile and amphibian diversity in the Illinois. Thank you very much for granting me permits in 1994 and 1995. Enjoy!

Sincerely,

Frank T. Burbrink

119 Foster Hall • Baton Rouge • Louisiana • 70803-3216 • 504/388-2855 • FAX 504/388-6400