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INVENTORY OF TETRAPOD VERTEBRATES OF CHICKASAW NATIONAL RECREATION AREA

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ABSTRACT. —We detected 153 species of tetrapod vertebrates in the Chickasaw National Recreation Area using 9 sampling methods over a 3-month period in the summer of 2003. Most of these were birds (84), followed by reptiles (37), mammals (23), and amphibians (9). We estimate that we detected over 80% of all tetrapod vertebrates present during summer. Further sampling effort for snakes, non-breeding birds, and spring-active amphibians would be most likely to detect more species. We did not detect several species of particular interest including Texas horned lizard and spotted skunk. We recommend monitoring the success of fire management and reducing the impacts of feral cats in the recreation area.

As part of its biological inventory program the National Park Service (NPS) contracted with the Oklahoma Natural Heritage Inventory to conduct a formal and comprehensive mammal, bird, and herpetological inventory of Chickasaw National Recreation Area (CNRA), Oklahoma. The objective of the inventory was to positively identify 90% of the tetrapod vertebrates that inhabit CNRA. Pre-inventory lists of vertebrates suspected to occur in Murray County or south central Oklahoma were compiled (Appendix 1). Although these lists undoubtedly contain more species than actually occur on the National Recreation Area, they were used to gauge inventory progress. We were particularly interested in locating species of conservation concern. In particular the ONHI assigns each species a state rank ranging from S1 through S5 with S1 indicating a species is very rare in the state and S5 indicating the species is common.

STUDY SITE

The Platt District of the Chickasaw National Recreation Area (CNRA) was originally protected as Sulfur Springs Reservation in 1902 and then as Platt National Park in 1906. In 1976 the Platt National Park was connected with the federally owned land surrounding Lake of the Arbuckles (Arbuckle District) and designated the CNRA. The CNRA is currently 4002 ha in area and hosted 1.5 million visitors in 2001. The area is situated approximately 120 km south of Oklahoma City adjacent to the town of Sulphur, in Murray County, Oklahoma. The three major creeks in the area, Rock, Buckhorn, and Guy Sandy Creek all flow into Lake of the Arbuckles Reservoir, which is formed by a dam on Rock Creek.

The CNRA resides at the northern edge of the Arbuckle Mountains and primarily in the Osage Plains section of the Central Lowlands Physiographic Province (Rich et al. 2004). The CNRA is located in the Sub-tropical climatic zone with average July temperature of 28 C and January temperature of 3 C. Precipitation averages 98 cm per year. The vegetation of the CNRA was recently mapped by Hoagland et al. (2000), indicating that the CNRA is dominated by forest (29% of area), herbaceous (19%) and woodland (17 %) vegetation types. The dominant woody species are post oak (*Quercus*) and eastern red cedar (*Juniperus*) and the dominant herbaceous cover is bluestem prairies. About 16 % of the area is covered by the Lake of the Arbuckles an additional 11% is in urban and rural development. We made an effort to inventory all of these land cover types.

METHODS

Three biologists worked five d per week from 15 May through 14 August 2003 to trap, sight and record the locations of tetrapod vertebrates in the CNRA. A fourth biologist also worked in the field about one d per week on these surveys. In addition, two conservation interns spent several d in the spring of 2004 trapping in the recreation area and searching for species that were not detected in 2003. Unless otherwise noted, all observations are from 2003.

To accomplish our objective of detecting as many tetrapod vertebrates as occur in the CNRA, we sampled grasslands, juniper and oak woodlands, riparian zones, transitions among these vegetation types, as well as developed sites (e.g., campgrounds and park facilities). However, we did not have the resources needed to quantify the vegetation composition and structure surrounding each sampling station. Each sampling location was geo-referenced and photographed so that future investigations of this type would be possible.

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Approximately 220 d of person effort (person day = 1 person x 8 hrs of effort) were invested in field inventories. This effort was divided among multiple sampling techniques and sites in an effort to encounter the maximum number of species. These techniques included: nocturnal mist-netting, drift fence sampling, mammal live-trapping, point-count surveys for birds, nocturnal road cruising, turtle live-trapping, visual encounter surveys, cover board sampling, and camera stations. While each sampling technique was used primarily to sample a particular taxon (see below) species of non-target taxa encountered during any survey were recorded.

Sample locations were chosen to cover the variety of habitats in the recreation area. Sampling in some areas was minimized to reduce interactions with the public (e.g., visitor's center and trails). Within large areas of similar vegetation, traps were sampled concurrently to decrease the travel time among sampling locations. Species not well-sampled by these methods were recorded as incidental observations when encountered. Because we were focused on maximizing the number of species detected, rather than estimating abundance, differences in number of detections of species are interpreted with caution. For example, fox squirrels (all scientific names of animals are given in Appendix 1) are common in the recreation area, yet they were not detected in our formal sampling methods. We did note their presence as an incidental encounter, but we made no effort to record the number of detections of this species. Similar undercounting of abundance likely occurs for most of the large common species we detected. Whenever possible photo vouchers were collected to verify the identity of encountered species and photographs were also taken at most sampling locations. Locations of all sampling sites were recorded with the Global Positioning System (GPS; Garmin GS 12 receivers). Because the United States Geological Survey Orthophoto Quadrat Maps for the CNRA use the 1927 North American Datum (NAD27), we recorded GPS locations using this projection.

Amphibian survey methods. The primary means of detecting amphibians was road cruising, which usually commenced at sunset or later and at times continued through the night. All cruising was done from an automobile. We recorded the start and end times, mileage driven, and route of the survey. All animals encountered were recorded. Road cruising occurred on 18 nights between 11 June and 6 August 2003; for a total of 54 hours and 59 min. During that time 1037 miles were driven including all accessible roads in the recreation area. When new taxa were encountered, an attempt was made to capture the animal and photograph it as a voucher.

A secondary method of detecting amphibian species was drift fence trap arrays. Drift fence trap arrays were established at 12 locations within CNRA. These arrays consisted of a single black plastic fence, with four small pitfall cups and four funnel traps. The primary objective of these arrays was to capture reptiles and amphibians. Drift fences were typically left at a given site for four days. A total of 141 fence nights of effort were used. The target list of reptiles from Murray County included 63 species of reptiles and 16 species of amphibians (Appendix 1).

In addition to road cruising, we also used cover-boards to sample amphibians. Cover-board stations were established in May and cover boards remained in place until early August. Species that prefer dry microhabitats have been shown to prefer cover-boards made of metal, and species that prefer wetter microhabitats have been shown to prefer cover-boards made of wood. At each station two plywood and two tin cover boards were placed within a 20m- diameter circle. Each cover board was 0.5m^2. Sampling was focused in three areas where public access was limited. These were the Upper Guy Sandy area, Buckhorn Lake area, and Goddard Road east and west of the youth camp. To reduce the disturbance to animals that use cover-boards and to ensure that cover boards are not disturbed by the larger animals drawn to bait, cover boards were located at least 50 meters away from the nearest trapping location, and at least 100 meters away from the nearest camera and tracking plate station. Because of low success of this sampling approach in these three areas, we did not establish cover board stations in additional areas.

Reptile survey methods. Visual encounter surveys were the primary means of detecting snakes and lizard. These surveys were active searches along transects. There were 106 visual encounter surveys conducted during the summer of 2003 throughout the recreation area with a total search time of 37.5 h. The starting and ending locations of transects were geo-referenced using GPS receivers. The starting and ending times of surveys were also recorded. Most visual encounter surveys were 100 m in length (61 of 106 were between 90 and 110 m; overall mean = 120 m). Because of variable terrain and ambient search conditions (i.e., temperature), however, some surveys were as short as 20 m and others were as long as a kilometer. The primary goal of these searches was to locate and positively identify species of reptiles and amphibians that were difficult to sample with other methods. Because species

encountered with this sampling method were usually not captured, they were more difficult to voucher. As the biologist moved along a transect s/he actively turned cover objects (e.g., logs, rocks, debris) to expose subterranean animals. The location of each uncommon (less than 10 previous encounters at the time of the survey) reptile and amphibian encountered was geo-referenced using a GPS receiver.

Turtle traps were also employed to sample ponds and creeks. A floating and two submerged turtle traps were placed in 16 pond and creek sites throughout the recreation area. Traps were baited with fish or other meat and were typically set at a given location for four d. Traps were checked daily throughout the trapping period. A total of 135 trap days of effort were used to capture turtles.

Mammal survey methods: Trapping. The objective of mammal trapping was to positively identify as many of the 25 mammal species previously collected from Murray County as possible (Caire et al. 1989; Appendix 1), in addition to any previously undocumented species. Toward this end, we used both Sherman and tomahawk live traps. Traps were set either in clusters of eight traps or spaced along transects. At each cluster there were four small Sherman traps (7.6 cm x 7.6 cm in x 22.9 cm) and two large Sherman traps (10.2 cm x 12.7 cm x 38.1 cm) baited with seeds, oats, and peanut butter. These traps were used to catch rodents and were placed within a 20 m radius of a central point in microhabitats likely to be used by rodents. Larger tomahawk traps (12.7 x 12.7 x 40.6 cm and 15.2 x 15.2 x 61.0 cm) were used to catch medium-sized mammals and were baited with fruit and meat. To reduce interference from meso-predators, such as raccoons, Sherman traps were separated from tomahawk traps by at least 50 m. Typically traps were operated for four nights at a location. Trapping areas were chosen to cover the variety of habitats in the recreation area. The number of traps used in each area depended on the acreage available for trapping (away from heavy public use areas). For this reason, the number of traps used varied among days (Fig. 1).

Traps were baited and set in the evening and were checked beginning at dawn. Captured mammals were identified, weighed, measured and released. Had there been uncertainty regarding the species identity of captured mammals that could not be resolved with photographic evidence, we were prepared to collect voucher specimens. The only individuals for which we were uncertain of species identity were clearly either *Peromyscus leucopus* or *P. maniculatus;* we did not collect these specimens. Trapping stations were operated at

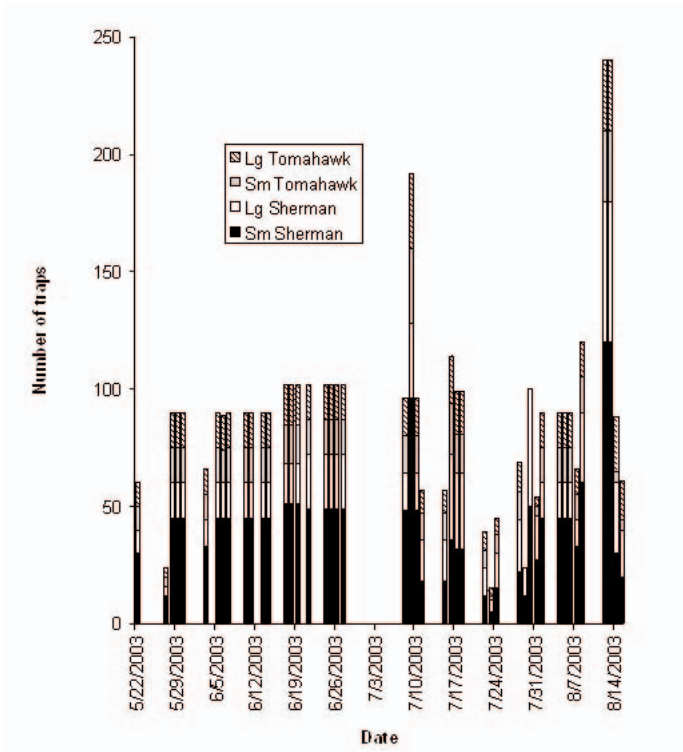

Figure 1. Number of mammal traps set per day in the summer of 2003 in the Chickasaw National Recreation Area, Murray County, Oklahoma. We employed four different trap types: large and small Sherman traps and large and small tomahawk traps.

208 locations for a total of 4359 trap nights within the CNRA between 20 May and 11 August 2003. Each mammal-trapping site was photographed to record the condition of the habitat at the time of sampling. These photographs are available through the Oklahoma Biological Survey.

For mammals that were too large or difficult to capture in mammal traps, we placed five infrared motion-trip cameras at 14 baited track stations to identify large mammals within the CNRA. Cameras were placed at a given location for 7 to 41 nights (21 nights on average) for a total of 285 camera nights. Locations of cameras were chosen based on habitat variation, logistical ease, and degree of public use. Tracking stations were comprised of a one-meter square piece of coated sheet metal. A 5-cm diameter hole was cut into the middle of the tracking plate, and PVC pipe (two inch diameter) was driven through the hole and into the ground to hold the tracking plate in place. Tracking plates were covered with a suspension of carpenter's chalk in alcohol. Cubes of raw meat were placed in top of the pipe at the center of the tracking plate, and other food items (primarily fruit) were placed around the base of the pipe for bait. Cameras were set up next to the tracking

plate with the bait in the viewfinder. When warm-blooded wildlife investigated the bait, an infrared sensor activated the camera. When animals walked across the plate they left track evidence. Photographs of tracks may then be used as vouchers. No species were identified solely by tracks and all animals whose tracks were identified were also captured on film.

Finally, to sample nocturnal flying mammals we used mist-nets. Mist nets were used in five locations to capture bats. At each location five nets were erected near or over water at sunset. Nets were operated from 4 to 8 hours per night. Netting occurred on a total of 13 nights in June and July of 2003. Captured bats were removed from the nets immediately, identified to species, photographed, weighed, measured, and released.

Bird sampling methods. The Date Guide to the Occurrences of Birds in Oklahoma (Oklahoma Bird Records Committee 2000) lists 152 species as occurring in the south-central region of Oklahoma between May and August (Appendix 1). The primary objective of point counts was to detect as many of these bird species as occur within the recreation area. Many of these species, however, breed in habitats that do not exist in the CNRA or are migrant waterbirds that make little use of Lake of the Arbuckles. Point counts were taken at 123 locations within the CNRA between 20 May and 15 July 2003. Each point was visited once for 8 minutes during which time all bird species seen or heard were recorded. The observer estimated distance from the point to each bird detection. Counts were made between dawn and 10 am. Points were at least 200 meters apart.

RESULTS

Overall we encountered 153 species of tetrapod vertebrates within the CNRA (Appendix 2). Over half of these species were birds (n = 84), followed by reptiles (n = 37), mammals (n = 23) and amphibians (n = 9; Fig. 2).

Amphibians. Relatively few species of amphibians were encountered (n = 9). All of these species were on the list of 16 species compiled prior to the inventory of species and expected in Murray County. These species were first detected during incidental observations (n = 4), road cruising (n = 3), visual encounter surveys (n = 1) or in drift fence samples (n = 1). None of these species is considered a species of concern by the ONHI (i.e. all were S4 or S5). ***Reptiles***. Reptiles were second only to birds in the number of species encountered. The 37 species of reptiles were comprised of 18 species of snakes, 10 species of lizards (including skinks) and 9

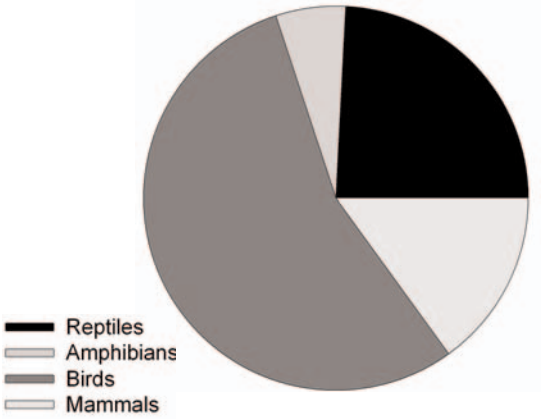

Figure 2. Proportions of taxa that comprised the 153 species detected in Chickasaw National Recreation Area, Murray County, Oklahoma during summer 2003.

species of turtles. The target list of reptiles that could occur in Murray County had 63 species. None of the reptiles encountered is tracked by the ONHI (S1-S3). A particular effort was made to find Texas horned lizards, but none were encountered. Most reptiles species were first encountered in incidental encounters (n = 24), with others being first encountered during visual encounter surveys (n = 5), turtle trapping (n=3), road cruising (n = 3), and mammal trapping (n = 2).

Mammals. A total of 23 species of mammals was detected. Most of these species were common within the CNRA. The most notable of these species was the marsh rice rat, which had not been recorded previously in Murray County (Fig. 3).

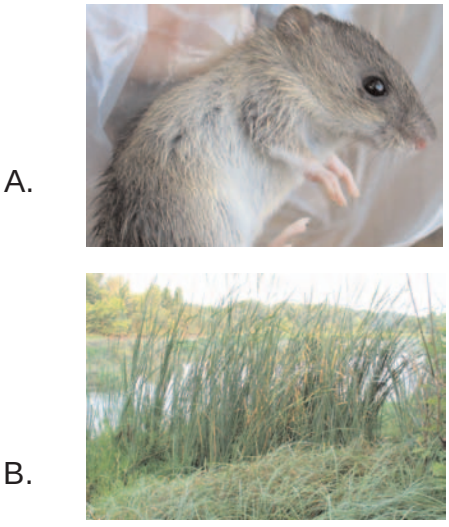

Figure 3. Marsh rice rat (*Oryzomys palustris*) (A) and vegetation in which it was captured (B) on 11 August 2003 at the Chickasaw National Recreation Area, Murray County Oklahoma.

This species was also the only mammal encountered that is considered to be uncommon in the state by the ONHI (ranked S2). Southeastern Oklahoma is the western edge of its range, however it is common throughout the southeastern US and is not a regional or national conservation concern. Of the 26 species with known records in Murray County (Caire et al 1989), we documented 18 in the CNRA area. We also recorded an additional five species that were not described from Murray County by Caire et al. (1989). The absence of these five species from the initial list almost certainly reflects lack of complete collecting activity in Murray County rather than a historic absence of these species (e.g., raccoon, feral cat, bobcat). Of the 23 species we recorded, four were first encountered in mist nets (3 bats and southern flying squirrel), 13 were first encountered during live trapping sessions, and 6 were encountered during road cruising.

Birds. A total of 84 species of birds was detected in the CNRA. The 152 species listed as possible in Murray County by the Oklahoma Bird Records Committee (2000) between May and August include many that breed in habitats that do not occur in the CNRA, or that are migrant waterbirds which make little use of Lake of the Arbuckles. Species tracked by the ONHI that were detected in the CNRA include, Black Vulture (S2), Canada Goose (S1), Cooper's Hawk (S2), Swainson's Hawk (S3), Spotted Sandpiper (S1), and Yellow Warbler (S3). Of these, only Black Vultures were relocated frequently. None of these species is thought to be of high regional or national concern. The low state ranks primarily reflect Oklahoma's position at the fringe of the breeding range for these species. Most birds were first detected on point counts (n = 67 species) with fewer being first encountered incidentally (n = 13), during visual encounter surveys (n = 3) or during mist netting (n = 1).

DISCUSSION

Overall we detected 153 species while the pre-inventory lists contained 247 species of potential regional occurrence (Appendix 1). The 62% of potential species on the pre-inventory list detected by our inventory does not reflect the completeness of the inventory, but rather the fact that the pre-inventory list were based on species lists generated from a larger region. In fact, there was often a fair amount of disagreement between the pre-inventory list and our results.

For example, it appears that we encountered very nearly the same number of mammals that were expected from our pre-inventory list of mammals that had been collected in Murray County based on Caire et al. (1989). However, of the 23 species we encountered only 18 of those are on the pre-inventory list of 26 target species. Species not on the pre-inventory list included armadillo, raccoon, southern flying squirrel and bobcat; none of which are unexpected or rare in the region. They did not appear on the pre-inventory list because they had not been collected in Murray County prior to the publication of Caire et al. (1989).

While it is impossible to say with certainty what percentage of species in the recreation area were detected, we re-evaluated species that were on the pre-inventory list but that we did not encounter. We evaluated these species based on our opinion as to whether they would be detected with further sampling (Appendix 1, Table 1). Overall we expect that we encountered 82% (153 of 192) of the vertebrates that were likely to be in the recreation area between May and August. The majority of under-detection occurred in snakes, birds and mammals. We suggest that an additional 13 species that were on the pre-inventory lists could be best detected in the recreation area by sampling in other seasons. Note that the pre-inventory bird list was confined to those species detected in the region between May and August. Additional bird species that are only present in migration and during winter would also be added. We also expect that 53 species on the list were either at the fringe of their ranges (18 species) or would find little suitable habitat within the recreation area (35 species). Finally, we suggest that if more sampling is to be done, it ought to focus on monitoring bat species, non-breeding birds, spring amphibian surveys, and targeted snake surveys. Auditory sampling of frogs and toads might be particularly productive for eastern species.

Species accumulation with sampling effort. The most efficient means of surveying were point counts for birds, incidental observations, and visual encounter surveys (Figures 4-7). Road cruising was also relatively efficient. Mist-netting and turtle trapping captured species that may not have been detected by other means, but produced relatively few species overall. Cover boards detected few species, and these were readily detected by other means (mammal traps and visual encounters). Mammal trapping was fairly productive up to approximately 1000 trap nights when the number of new species reached a plateau.

Relative abundance of species by sampling method. Species accumulation curves through the summer of 2003 indicate that the total number of species

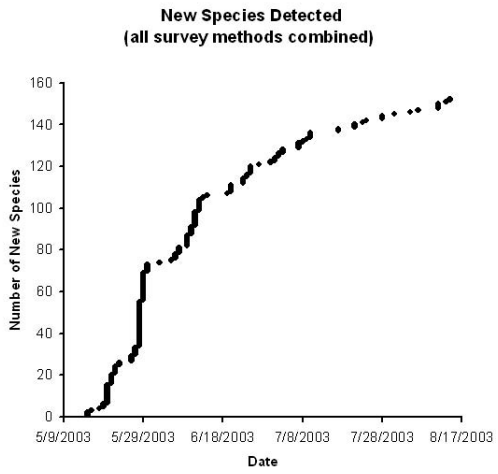

Figure 4. Cumulative number of tetrapod vertebrates species detected in the Chickasaw National Recreation Area, Murray County, Oklahoma. The abscissa is day of the year during the summer of 2003.

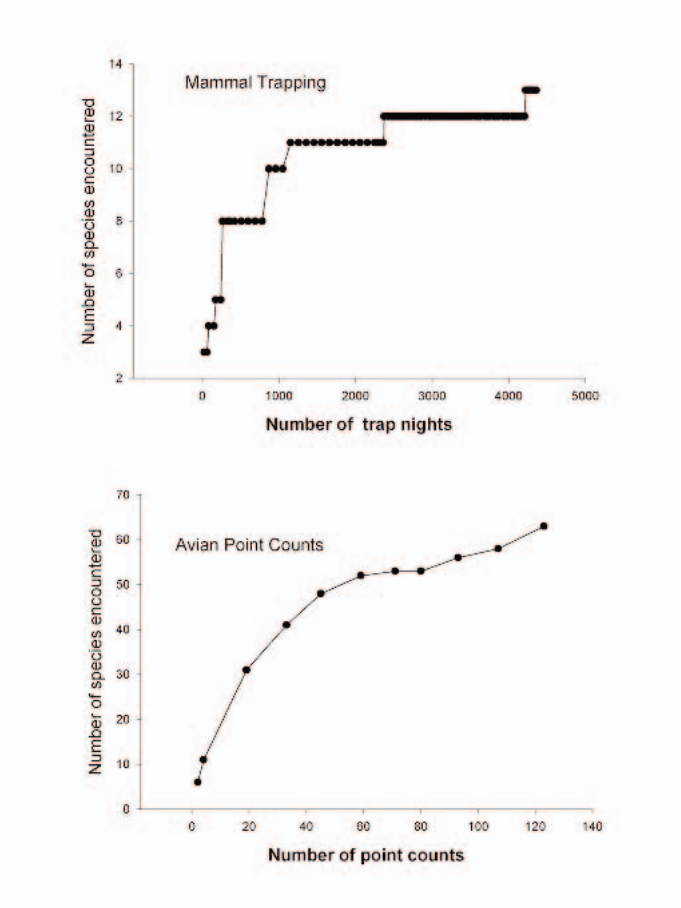

Figure 5. Number of mammal species encountered through trapping (top) and the number of bird species encountered during point counts (bottom) at Chickasaw National Recreation Area, Murray County, Oklahoma during the summer of 2003.

that would be detected with significantly more effort during this time period is approximately 160. Of course more species of birds could be detected by employing a multi-season sampling scheme (Appendix 1). For example, two winter counts done as part of the Oklahoma Winter Bird Atlas Project detected 26 bird species in the vicinity of the recreation area that were not detected in the recreation area during summer (pers. observ.). Most of these were winter residents. Of the species detected, several might be good target species for monitoring.

Possible target species for management and monitoring. We suggest developing management indicator species for two vegetation types within the recreation area. In bottomland and mature riparian zones, species such as Prothonotary Warbler, Louisiana Waterthrush, Northern Parula, and marsh rice rat are all indicative of healthy wetlands or streams in central Oklahoma. In contrast, uplands of central Oklahoma were historically characterized by grassland, savanna, and grassland-woodland ecotones. Restoring this vegetation composition and structure is a primary goal of fire management in the CNRA. Painted Buntings are found primarily in these grassland-woodland transition zones. While this species is very common in the recreation area and throughout central Oklahoma, it has been highlighted by Partners in Flight as a species of concern (Rich et al. 2004). Dickcissels and Grasshopper Sparrows are also indicative of quality grassland and savannas of the crosstimbers ecoregion, and have declined in abundance throughout their ranges. Consequently, they would make good indicator species for the efficacy of fire management. Similarly, the Northern Bobwhite uses these savanna habitats and is an important species in the multiple use mission of the recreation area. Restoration of spotted skunk and Texas horned lizards to the area would also be a progressive management target.

A feral cat control program would be a positive step for the CNRA. These exotic meso-predators likely compete with foxes, bobcats, and skunks for prey. A substantial portion of these prey are probably native herptofauna, mammals, and birds. Also, because feral cats freely use the urban interface of the recreation area they are likely to have substantial effects on both native meso-predators and their prey. At a minimum, research on the population biology and impacts of feral cats in the area are warranted.

ACKNOWLEDGMENTS

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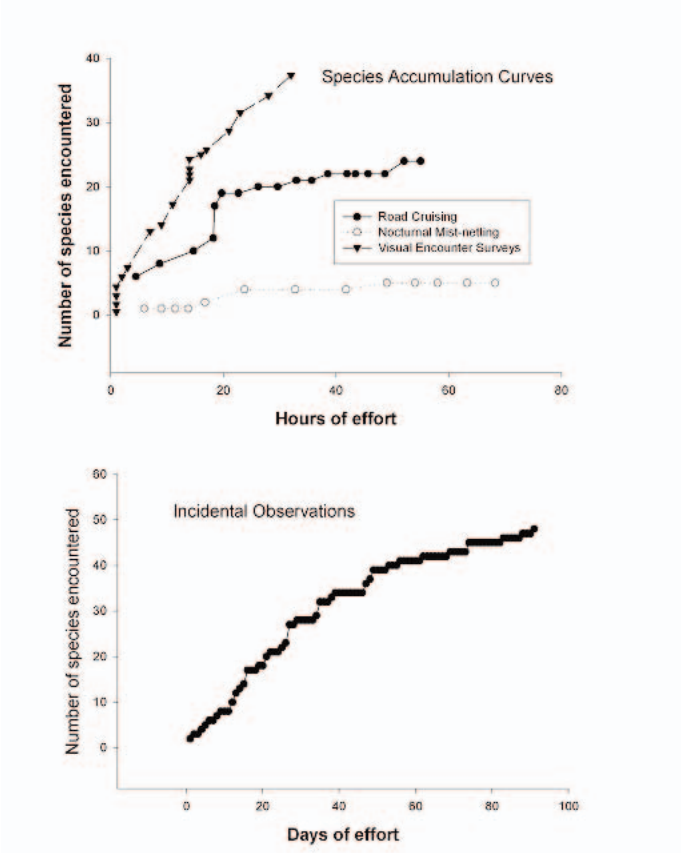

Figure 6. Number of tetrapod vertebrate species encountered plotted against effort spent road cruising, nocturnal mist-netting, and conducting visual encounter surveys (top) and the number of species encountered incidentally (bottom) at Chickasaw National Recreation Area, Murray County, Oklahoma during the summer of 2003.

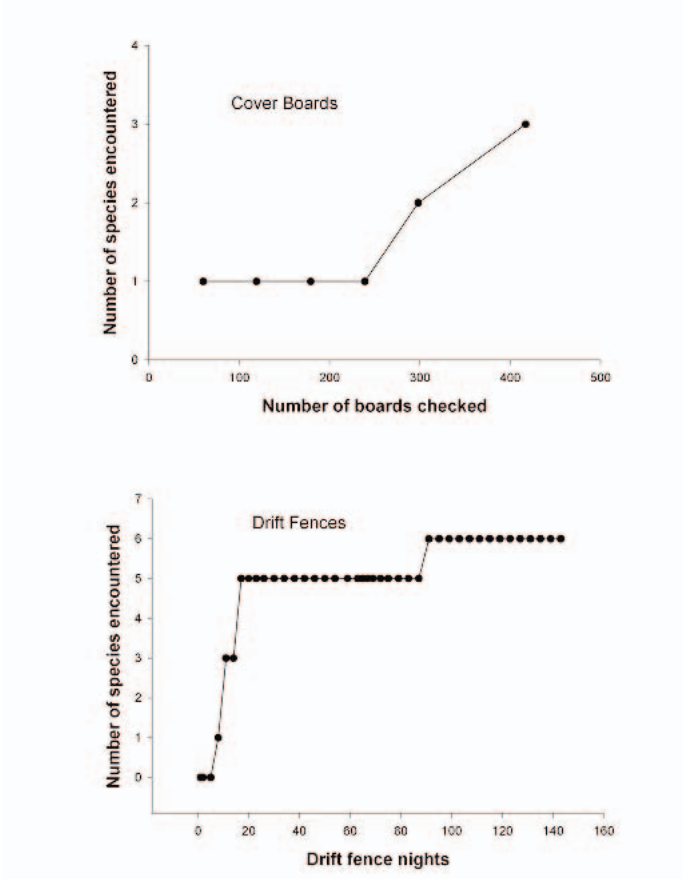

Figure 7. Number of tetrapod vertebrate species encountered at cover boards (top) and drift fences (bottom) at Chickasaw National Recreation Area, Murray County, Oklahoma during the summer of 2003.

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Table 1. Number of species on pre-inventory lists, number encountered in the Chickasaw National Recreation Area in 2003, number encountered during the inventory but not on the pre-inventory list, and number of species not detected (percent in parentheses) by reason that species were not encountered.

Taxon	Target List	Species Detected	Species Not Listed	Reason Species Not Encountered[a]			
				Range	Habitat	Season	Sampling
Salamanders	2	0	0	0 (0)	0 (0)	2 (100)	0 (0)
Frogs and toads	18	9	0	4 (22)	1 (6)	4 (22)	0 (0)
Turtles	13	9	0	3 (23)	0 (0)	0 (0)	1 (8)
Lizards and skinks	12	10	0	2 (17)	0 (0)	0 (0)	0 (0)
Snakes	32	18	0	4 (13)	0 (0)	0 (0)	10 (31)
Birds	144	84	1	2 (1)	33 (24)	7 (5)	18 (13)
Mammals	26	23	5	3 (12)	0 (0)	0 (0)	5 (19)
Total	247	153	6	18	35	13	34

[a] Reasons species were not encountered reflect authors' opinions as to whether further sampling would detect these species in the recreation area. Species that would likely be detected during the May through August period with more sampling are tallied under Sampling. Species that would likely be detected with sampling in a different season are listed under Season. Those not likely to be detected with further sampling are divided into those at the fringe of their ranges (Range), those within their range, but for which there is little appropriate habitat in the recreation area (Habitat).

Appendix 1. Species on pre-inventory lists and those encountered at Chickasaw National Recreation Area, Murray County, Oklahoma during summer 2003.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Salamanders			
Barred tiger salamander (*Ambystoma tigrinum*)	Y	N	Season
Small-mouth salamander (*Ambystoma texanum*)	Y	N	Season
Frogs and Toads			
Woodhouse's toad (*Bufo woodhousii*)	Y	Y	
American toad (*Bufo americanus*)	Y	Y	
Green toad (*Bufo debilis*)	Y	N	Little habitat
Red spotted toad (*Bufo punctatus*)	Y	N	Fringe of range
Plains spadefoot (*Scaphiopus bombifrons*)	Y	N	Season
Couch's spadefoot (*Scaphiopus couchii*)	Y	N	Season/Fringe of range
Hurter's spadefoot (*Scaphiopus Holbrookii*)	Y	N	Season/Little habitat
Great Plains narrowmouth toad (*Gastrophryne olivacea*)	Y	Y	
Gray treefrog complex (*Hyla versicolor* and *H. chrysoscelis*).	Y	Y	
Blanchard's cricket frog (*Acris crepitans blanchardi*)	Y	Y	
Western chorus frog (*Psuedacris triseriata*)	Y	N	Season

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Spotted chorus frog (*Pseudacris clarkii*)	Y	Y	
Strecker's chorus frog (*Psuedacris streckeri*)	Y	N	Season
Bullfrog (*Rana catesbeiana*)	Y	Y	
Crawfish frog (*Rana areolata*)	Y	N	Fringe of range/Little habitat
Green frog (*Rana clamitans*)	Y	N	Fringe of range
Plains leopard frog (*Rana blairi*)	Y	Y	
Southern leopard frog (*Rana utricularia*)	Y	Y	
Turtles			
Common snapping turtle (*Chelydra serpentina*)	Y	Y	
Alligator snapping turtle (*Macroclemys temminckii*)	Y	N	Fringe of range
Common musk turtle (*Sternotherus odoratus*)	Y	N	Fringe of range
Razorback musk turtle (*Sternotherus carinatus*)	Y	N	Fringe of range
Yellow mud turtle (*Kinosternon flavescens*)	Y	Y	
Mississippi mud turtle (*Kinosternon subrubrum*)	Y	Y	
Ouachita map turtle (*Graptemys ouachitensis*)	Y	Y	
Red-eared slider (*Trachemys scripta elegans*)	Y	Y	
Missouri river cooter (*Pseudemys concinna metteri*)	Y	Y	
Three-toed box turtle (*Terrapene carolina carolina*)	Y	Y	
Ornate box turtle (*Terrapene ornata ornata*)	Y	Y	
Midland smooth softshell (*Apalone mutica*)	Y	N	Incomplete sampling
Eastern spiney softshell (*Apalone spinifera spinifera*)	Y	Y	
Lizards and Skinks			
Eastern collared lizard (*Crotaphytus collaris collaris*)	Y	Y	
Fence lizard (*Sceloporus undulatus*)	Y	Y	
Texas horned lizard (*Phrynosoma cornutum*)	Y	N	Extirpated
Texas spotted whiptail (*Aspidoscelis gularis gularis*)	Y	Y	
Prairie lined racerunner (*Aspidoscelis sexlineatus sexlineatus*)	Y	Y	
Ground skink (*Scincella lateralis*)	Y	Y	
Southern coal skink (*Eumeces anthracinus*)	Y	N	Fringe of range
Five-lined skink (*Eumeces fasciatus*)	Y	Y	
Great Plains skink (*Eumeces obsoletus*)	Y	Y	
Southern prairie skink (*Eumeces septentrionalis obtusirostris*)	Y	Y	
Broadhead skink (*Eumeces laticeps*)	Y	Y	

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Western slender glass lizard (*Ophisarius attenuatus*)	Y	Y	
SnakesBlind snake (*Leptotyphlops dulcis*)	Y	Y	
Prairie ringneck snake (*Diadophis punctatus arnyii*)	Y	Y	
Rough earth snake (*Virginia striatula*)	Y	Y	
Western earth snake (*Virginia valeriae*)	Y	N	Fringe of range
Flathead snake (*Tantilla gracilis*)	Y	Y	
Ground snake (*Sonora semiannulata*)	Y	Y	
Rough green snake (*Opheodrys aestivus*)	Y	Y	
Eastern yellowbellied racer (*Coluber constrictor flaviventris*)	Y	Y	
Coachwhip (*Masticophis flagellum*)	Y	Y	
Blotched watersnake (*Nerodia erythrogaster transversa)*	Y	Y	
Northern watersnake (*Nerodia sipedon*)	Y	N	Fringe of range
Diamond-backed watersnake (*Nerodia rhombifer*)	Y	N	Incomplete sampling
Western hognose snake (*Heterodon nasicus*)	Y	N	Incomplete sampling
Eastern hognose snake (*Heterodon platirhinos*)	Y	N	Incomplete sampling
Great Plains rat snake (*Elaphe guttata emoryi*)	Y	Y	
Black rat snake (*Elaphe obsoleta obsoleta*)	Y	Y	
Texas night snake (*Hypsiglena torquata*)	Y	N	Fringe of range
Bullsnake (*Pituophis melanoleucus*)	Y	N	Incomplete sampling
Prairie kingsnake (*Lampropeltis calligaster calligaster*)	Y	Y	
Speckled kingsnake (*Lampropeltis getula*)	Y	N	Incomplete sampling
Milk snake (*Lampropeltis triangulum*)	Y	N	Incomplete sampling
Graham's crayfish snake (*Regina grahamii*)	Y	N	Incomplete sampling
Northern scarlet snake (*Cemophora coccinea*)	Y	N	Fringe of range
Brown snake (*Storeria dekayi*)	Y	Y	
Lined snake (*Tropidoclonion lineatum*)	Y	N	Incomplete sampling
Western ribbon snake (*Thamnophis proximus proximus*)	Y	Y	
Common garter snake *(Thamnophis sirtalis*)	Y	N	Incomplete sampling
Western cottonmouth (*Agkistrodon piscivorous leucostoma*)	Y	Y	
Copperhead (*Agkistrodon contortix*)	Y	Y	
Western pygmy rattlesnake (*Sistrurus miliarius)*	Y	N	Incomplete sampling
Timber rattlesnake *(Crotalus horridus)*	Y	Y	
Western diamondback rattlesnake (*Crotalus atrox*)	Y	Y	

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Birds			
Pied-billed Grebe (*Podilymbus podiceps*)	Y	Y	
American White Pelican (*Pelecanus erythrorhyncos*)	Y	N	Season
Neotropic Cormorant (*Phalacrocorax brasilianus*)	Y	N	Little habitat
Double-crested Cormorant (*Phalacrocorax auritus*)	Y	N	Incomplete sampling
Great Blue Heron (*Ardea herodias*)	Y	Y	
Least Bittern (*Ixobrychus exilis*)	Y	N	Little habitat
Great Egret (*Ardea alba*)	Y	Y	
Snowy Egret (*Egretta thula*)	Y	N	Incomplete sampling
Little Blue Heron (*Egretta caerulea*)	Y	Y	
Cattle Egret (*Bubulcus ibis*)	Y	Y	
Green Heron (*Butorides virescens*)	Y	Y	
Yellow-crowned Night-heron (*Nycticorax violacea*)	Y	Y	
Black-crowned Night-heron (*Nycticorax nycticorax*)	Y	N	Incomplete sampling
White Ibis (*Eudocimus albus*)	Y	N	Little habitat
White-faced Ibis (*Plegadis chihi*)	Y	N	Little habitat
Black Vulture (*Coragyps atratus*)	Y	Y	
Turkey Vulture (*Cathartes aura*)	Y	Y	
Wood Stork (*Mycteria americana*)	Y	N	Fringe of range
Canada Goose (*Branta canadensis*)	Y	Y	
Wood Duck (*Aix sponsa*)	Y	Y	
Mallard (*Anas platyrhynchos*)	Y	N	Fringe of range
Mississippi Kite (*Ictinia mississippiensis*)	Y	Y	
Cooper's Hawk (*Accipiter cooperii*)	Y	Y	
Red-shouldered Hawk (*Buteo lineatus*)	Y	Y	
Broad-winged Hawk (*Buteo platypterus*)	Y	N	Incomplete sampling
Swainson's Hawk (*Buteo swansonii*)	Y	Y	
Red-tailed Hawk (*Buteo jamaicensis*)	Y	N	Incomplete sampling
American Kestrel (*Falco sparverius*)	Y	N	Incomplete sampling
Wild Turkey (*Meleagris gallopavo*)	Y	Y	
Northern Bobwhite (*Colinus virginianus*)	Y	Y	
King Rail (*Rallus elegans*)	Y	N	Little habitat/Fringe of range
Common Moorhen (*Gallinula chloropus*)	Y	N	Incomplete sampling

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
American Coot (*Fulica americana*	Y	N	Incomplete sampling/Season
Killdeer (*Charadrius vociferous*)	Y	Y	
Greater Yellowlegs (*Tringa melanoleuca*)	Y	N	Little habitat/Season
Lesser Yellowlegs (*Tringa flavipes*)	Y	N	Little habitat/Season
Willet (*Catoptrophorus semipalmatus*)	Y	N	Little habitat/Season
Solitary Sandpiper (*Tringa solitaria*)	Y	N	Little habitat/Season
Spotted Sandpiper (*Actitis macularia*)	Y	Y	
Upland Sandpiper (*Bartramia longicauda*)	Y	N	Little habitat/Season
Marbled Godwit (*Limosa fedoa*)	Y	N	Little habitat/Season
Sanderling (*Calidris alba*)	Y	N	Little habitat/Season
Semipalmated Sandpiper (*Calidris pusilla*)	Y	N	Little habitat/Season
Western Sandpiper (*Calidris mauri*)	Y	N	Little habitat/Season
Least Sandpiper (*Calidris minutilla*)	Y	Y	
White-rumped Sandpiper (*Calidris fuscicollis*)	Y	N	Little habitat/Season
Baird's Sandpiper (*Calidris bairdii*)	Y	N	Little habitat/Season
Pectoral Sandpiper (*Calidris melanotos*)	Y	N	Little habitat/Season
Stilt Sandpiper (*Calidris himantopus*)	Y	N	Little habitat/Season
Short-billed Dowitcher (*Limnodromus griseus*)	Y	N	Little habitat/Season
Long-billed Dowitcher (*Limnodromus scolopaceus*)	Y	N	Little habitat/Season
Wilson's Phalarope (*Phalaropus tricolor*)	Y	N	Little habitat/Season
Laughing Gull (*Larus atricilla)*	Y	N	Little habitat
Franklin's Gull (*Larus pipixcan*)	Y	N	Little habitat/Season
Ring-billed Gull (*Larus delawarensis*)	Y	N	Little habitat/Season
Caspian Tern (*Sterna caspia*)	Y	N	Little habitat/Season
Forster's Tern (*Sterna forsteri*)	Y	N	Little habitat/Season
Least Tern (*Sterna antillarum*)	Y	N	Little habitat
Black Tern (*Childonias niger*)	Y	N	Little habitat/Season
Mourning Dove (*Zenaida macroura*)	Y	Y	
Rock Dove (*Columba livia*)	Y	Y	
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Y	N	Fringe of range
Yellow-billed Cuckoo (*Coccyzus americanus*)	Y	Y	
Greater Roadrunner (*Geococcyx californianus*)	Y	Y	
Barn Owl (*Tyto alba*)	Y	N	Little habitat

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Eastern Screech-Owl (*Otus asio*)	Y	Y	
Great Horned Owl (*Bubo virginianus*)	Y	Y	
Barred Owl (*Strix varia*)	Y	Y	
Common Nighthawk (*Chordeiles minor*)	Y	Y	
Chuck-will's–widow (*Caprimulgus carolinensis*)	Y	Y	
Chimney Swift (*Chaetura pelagica*)	Y	Y	
Ruby-throated Hummingbird (*Archilochus colubris*)	Y	Y	
Belted Kingfisher (*Ceryle alcyon*)	Y	Y	
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	Y	Y	
Red-bellied Woodpecker (*Melanerpes carolinus*)	Y	Y	
Downy Woodpecker (*Picoides pubescens*)	Y	Y	
Hairy Woodpecker (*Picoides villosus*)	Y	Y	
Northern Flicker (*Colaptes auratus*)	Y	Y	
Pileated Woodpecker (*Dryocopus pileatus*)	Y	Y	
Eastern Wood-Pewee (*Contopus virens*)	Y	Y	
Eastern Phoebe (*Sayornis phoebe*)	Y	Y	
Western Kingbird (*Tyrannus verticalis*)	Y	Y	
Eastern Kingbird (*Tyrannus tyrannus*)	Y	N	Incomplete sampling
Great Crested Flycatcher (*Myiarchus crinitus*)	Y	Y	
Scissor-tailed Flycatcher (*Tyrannus forficatus*)	Y	Y	
Loggerhead Shrike (*Lanius ludovicianus*)	Y	N	Little habitat/Fringe of range
White-eyed Vireo (*Vireo griseus*)	Y	Y	
Bell's Vireo (*Vireo bellii*)	Y	N	Incomplete sampling
Warbling vireo (*Vireo gilvus*)	Y	N	Incomplete sampling
Red-eyed Vireo (*Vireo olivaceus*)	Y	Y	
Blue Jay (*Cyanocitta cristata*)	Y	Y	
American Crow (*Corvus brachyrhynchos*)	Y	Y	
Horned Lark (*Eremophila alpestris*)	Y	N	Little habitat
Purple Martin (*Progne subis*)	Y	Y	
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	Y	Y	
Bank Swallow (*Riparia riparia*)	Y	N	Fringe of range
Cliff Swallow (*Petrochelidon pyrrhonota*)	Y	Y	
Barn Swallow (*Hirundo rustica*)	Y	Y	

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Carolina Chickadee (*Poecile carolinensis*)	Y	Y	
Tufted titmouse (*Baeolophus bicolor*)	Y	Y	
White-breasted Nuthatch (*Sitta carolinensis*)	Y	Y	
Carolina Wren (*Thryothorus ludovicianus*)	Y	Y	
Bewick's Wren (*Thryomanes bewickii*)	Y	Y	
Blue-gray Gnatcatcher (*Polioptila nigriceps*)	Y	Y	
Swainson's Thrush (*Catharaus ustulatus*)	N	Y	
Wood Thrush (*Hylocichla mustelina*)	Y	N	Fringe of range
American Robin (*Turdus migratorius*)	Y	Y	
Eastern Bluebird *(Sialia sialis*)	Y	Y	
Gray Catbird (*Dumetella carolinensis*)	Y	Y	
Northern Mockingbird (*Mimus polyglottus*)	Y	Y	
Brown Thrasher (*Toxostoma rufum*)	Y	Y	
European Starling (*Sturnus vulgaris*)	Y	Y	
Northern Parula (*Parula americana*)	Y	Y	
Yellow Warbler (*Dendroica petechia*)	Y	Y	
Black-and-white Warbler (*Mniotilta varia*)	Y	Y	
Prothonotary Warbler (*Protonotaria citrea*)	Y	Y	
Louisiana Waterthrush (*Seiurus motacilla*)	Y	Y	
Yellow-throated Warbler (*Dendroica dominica*)	Y	Y	
Kentucky Warbler (*Oporornis formosus*)	Y	N	Fringe of range
Common Yellowthroat (*Geothylpis trichas*)	Y	N	Incomplete sampling
Yellow-breasted Chat (*Icteria virens*)	Y	N	Incomplete sampling
Summer Tanager (*Piranga rubra*)	Y	Y	
Cassin's Sparrow (*Aimophila cassinii*)	Y	N	Little habitat/Fringe of range
Rufous-crowned Sparrow (*Aimophila ruficeps*)	Y	N	Little habitat/Fringe of range
Chipping Sparrow (*Spizella passerina*)	Y	N	Little habitat
Field Sparrow (*Spizella pusilla*)	Y	Y	
Lark Sparrow (*Chodestes grammacus*)	Y	Y	
Grasshopper Sparrow (*Ammodramus savannarum*)	Y	N	Incomplete sampling
Northern Cardinal (*Cardinalis cardinalis*)	Y	Y	
Blue Grosbeak (*Guiraca caerulea*)	Y	N	Incomplete sampling
Indigo Bunting (*Passerina cyanea*)	Y	Y	

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Painted Bunting (*Passerina ciris*)	Y	Y	
Dickcissel (*Spiza americana*)	Y	Y	
Red-winged Blackbird (*Agelaius phoeniceus*)	Y	Y	
Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)	Y	N	Fringe of range
Brown-headed Cowbird (*Molothrus ater*)	Y	Y	
Eastern Meadowlark (*Sturnella magna*)	Y	Y	
Common Grackle (*Quiscalus quiscula*)	Y	Y	
Great-tailed Grackle (*Quiscalus major*)	Y	Y	
Orchard Oriole (*Icterus spurius*)	Y	N	Incomplete sampling
Baltimore Oriole (*Icterus glabula*)	Y	N	Incomplete sampling
American Goldfinch (*Carduelis tristis*)	Y	Y	
House Finch (*Carpodacus mexicanus*)	Y	N	Incomplete sampling
House Sparrow (*Passer domesticus*)	Y	Y	
Mammals			
Virginia Opossum (*Didelphis virginianus*)	Y	Y	
Elliot's Short-tailed Shrew (*Blarina hylophaga*)	Y	N	Incomplete sampling
Eastern Mole (*Scalopus aquaticus*)	Y	N	Incomplete sampling
Eastern pipistrel (*Pipistrellus subflavus*)	Y	Y	
Red Bat (*Lasiurus borealis*)	Y	Y	
Evening Bat (*Nycticeus humeralis*)	Y	Y	
Seminole Bat (*Lasiurus seminolus*)	Y	N	Fringe of range
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)	Y	N	Incomplete sampling
Armadillo (*Dasypus novemcinctus*)	N	Y	
Eastern Cottontail (*Sylvilagus floridanus*)	Y	Y	
Swamp Rabbit (*Sylvilagus aquaticus)*	Y	N	Fringe of range
Raccoon (*Procyon lotor*)	N	Y	
Striped Skunk (*Mephitis mephitis*)	Y	Y	
Gray Squirrel (*Sciurus carolinensis*)	Y	N	Fringe of range
Fox Squirrel (*Sciurus niger*)	Y	Y	
Southern Flying Squirrel (*Glaucomys volans*)	N	Y	
Plains Pocket Gopher (*Geomys bursarius*)	Y	N	Incomplete sampling
Beaver (*Castor canadensis*)	Y	Y	
Fulvous Harvest Mouse (*Reithrodontomys fulvescens)*	Y	Y	

Appendix 1. Continued.

Common Name (*Scientific name*)	On List?[a]	Detected?[b]	Reason Not Detected[c]
Texas mouse (*Peromyscus attwateri*)	Y	Y	
White-footed mouse (*Peromyscus leucopus*)	Y	Y	
Deer mouse (*Peromyscus maniculatus*)	Y	Y	
Rice rat (*Oryzomys palustris*)	N	Y	
Hispid cotton rat (*Sigmodon hispidus*)	Y	Y	
Eastern woodrat (*Neotoma floridana*)	Y	Y	
Woodland vole (*Pitymys pinetorum*)	Y	N	Incomplete sampling
Coyote (*Canis latrans*)	Y	Y	
Gray fox (*Urocyon cinereoargenteus*)	Y	Y	
White-tailed deer (*Odocoiles virginianus*)	Y	Y	
Bobcat (*Lynx rufus*)	N	Y	
Domestic cat (*Felis catus*)	Y	Y	

[a] Was the species on the pre-inventory target list? (Yes or No)

[b] Was the species detected during the inventory? (Yes or No)

[c] Our interpretation of the reason why the species was not detected. Fringe of range implies the species is unlikely to occur in the CNRA, little habitat implies that the recreation area was within the species' range but there was not appropriate habitat in the CNRA, incomplete sampling implies that we suspect that the species occurs in the CNRA and could be detected with more and focused sampling.

Appendix 2. Number of encounters by species and survey method at Chickasaw National Recreation Area, Murray County, Oklahoma during summer 2003.

	Number of Detections by Survey Method[a]								
Common Name (*Scientific name*)	MT	PC	MN	VES	DF	TT	IN	CB	RC
Frogs and Toads									
Woodhouse's toad (*Bufo woodhousii*)	0	0	0	0	0	0	1	0	1
American toad (*Bufo americanus*)	0	0	0	0	0	0	0	0	3
Great Plains narrowmouth toad (*Gastrophryne olivacea*)	0	0	0	1	0	0	1	0	0
Gray treefrog complex (*Hyla versicolor* and *H. chrysoscelis*)	0	0	0	0	0	0	0	0	1
Blanchard's cricket frog (*Acris crepitans blanchardi*)	0	0	0	4	0	0	0	0	2
Spotted chorus frog (*Pseudacris clarkii*)	0	0	0	0	0	0	0	0	1
Bullfrog (*Rana catesbeiana*)	0	1	0	0	1	0	1	0	0

Appendix 2. Continued.

Common Name (*Scientific name*)	Number of Detections by Survey Method[a]								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Plains leopard frog (*Rana blairi*)	0	0	0	1	0	0	0	0	0
Southern leopard frog (*Rana utricularia*)	0	0	0	7	42	0	1	0	0
Turtles									
Common snapping turtle (*Chelydra serpentina*)	0	0	0	0	0	7	0	0	0
Yellow mud turtle (*Kinosternon flavescens*)	0	0	0	0	0	0	1	0	0
Mississippi mud turtle (*Kinosternon subrubrum*)									
Ouachita map turtle (*Graptemys ouachitensis*)	0	0	0	1	0	0	0	0	0
Red-eared slider (*Trachemys scripta elegans*)	0	0	0	4	0	39	0	0	0
Missouri river cooter (*Pseudemys concinna metteri*)	0	0	0	2	0	0	1	0	0
Three-toed box turtle (*Terrapene carolina carolina*)	13	0	0	3	0	0	0	0	0
Ornate box turtle (*Terrapene ornata ornata*)	1	0	0	0	0	0	0	0	0
Eastern spiney softshell (*Apalone spinifera spinifera*)	0	0	0	1	0	2	0	0	0
Lizards and Skinks									
Eastern collared lizard (*Crotaphytus collaris collaris*)	0	0	0	0	0	0	1	0	0
Fence lizard (*Sceloporus undulatus*)	0	0	0	0	0	0	2	0	1
Texas spotted whiptail (*Aspidoscelis gularis gularis*)	0	0	0	4	0	0	0	0	1
Prairie lined racerunner (*Aspidoscelis sexlineatus sexlineatus*)	0	0	0	2	0	0	0	0	1
Ground skink (*Scincella lateralis*)	0	0	0	13	4	0	0	0	0
Five lined skink (*Eumeces fasciatus*)	0	0	0	1	1	0	2	0	0
Great Plains skink (*Eumeces obsoletus*)	0	0	0	0	0	0	2	0	0
Southern prairie skink (*Eumeces septentrionalis obtusirostris*)	0	0	0	0	0	0	1	0	0
Broadhead skink (*Eumeces laticeps*)	0	0	0	0	0	0	1	0	0
Western slender glass lizard (*Ophisarius attenuatus*)	0	0	0	0	0	0	1	0	1

Appendix 2. Continued.

	Number of Detections by Survey Method[a]								
Common Name (*Scientific name*)	MT	PC	MN	VES	DF	TT	IN	CB	RC
Snakes									
Blind snake (*Leptotyphlops dulcis*)	0	0	0	0	0	0	1	0	0
Prairie ringneck snake (*Diadophis punctatus arnyii*)	0	0	0	2	0	0	2	0	0
Rough earth snake (*Virginia striatula*)	0	0	0	0	0	0	1	0	0
Flathead snake (*Tantilla gracilis*)	0	0	0	0	0	0	1	0	0
Ground snake (*Sonora semiannulata*)	0	0	0	1	0	0	3	0	0
Rough green snake (*Opheodrys aestivus*)	0	0	0	0	0	0	1	1	0
Eastern yellowbellied racer (*Coluber constrictor flaviventris*)	0	0	0	0	0	0	2	0	0
Coachwhip (*Masticophis flagellum*)	0	0	0	0	0	0	3	0	0
Blotched watersnake (*Nerodia erythrogaster transversa)*	0	0	0	2	0	0	0	0	0
Great Plains rat snake (*Elaphe guttata emoryi*)	0	0	0	0	0	0	1	0	1
Black rat snake (*Elaphe obsoleta obsoleta*)	0	0	0	0	0	0	1	0	1
Prairie kingsnake (*Lampropeltis calligaster calligaster*)	0	0	0	0	0	0	1	0	1
Brown snake (*Storeria dekayi*)	0	0	0	1	0	0	1	0	3
Western ribbon snake (*Thamnophis proximus proximus*)	0	0	0	1	0	0	2	0	0
Western cottonmouth (*Agkistrodon piscivorous leucostoma*)	0	0	0	0	0	0	1	0	0
Copperhead (*Agkistrodon contortix*)	0	0	0	1	1	0	2	0	8
Timber rattlesnake (*Crotalus horridus*)	0	0	0	0	0	0	1	0	0
Western diamondback rattlesnake (*Crotalus atrox*)	0	0	0	0	0	0	1	0	0
Birds									
Pied-billed Grebe (*Podilymbus podiceps*)	0	0	0	0	0	0	1	0	0
Great Blue Heron (*Ardea herodias*)	0	10	0	1	0	0	1	0	0
Great Egret (*Ardea alba*)	0	4	0	2	0	0	1	0	0
Little Blue Heron (*Egretta caerulea*)	0	0	0	0	0	0	1	0	0
Cattle Egret (*Bubulcus ibis*)	0	0	0	1	0	0	1	0	0
Green Heron (*Butorides virescens*)	0	0	0	3	0	0	0	0	0

Appendix 2. Continued.

	Number of Detections by Survey Method[a]								
Common Name (*Scientific name*)	MT	PC	MN	VES	DF	TT	IN	CB	RC
Yellow-crowned Night-heron (*Nycticorax violacea)*	0	0	0	0	0	0	1	0	0
Black Vulture (*Coragyps atratus*)	0	2	0	0	0	0	0	0	0
Turkey Vulture (*Cathartes aura*)	0	10	0	0	0	0	0	0	0
Canada Goose (*Branta canadensis*)	0	0	0	0	0	0	1	0	0
Wood Duck (*Aix sponsa*)	0	2	0	1	0	0	0	0	0
Mississippi Kite (*Ictinia mississippiensis*)	0	6	0	0	0	0	1	0	0
Cooper's Hawk (*Accipiter cooperii*)	0	0	0	0	0	0	1	0	0
Red-shouldered Hawk (*Buteo lineatus*)	0	2	0	0	0	0	1	0	0
Swainson's Hawk (*Buteo swansonii*)	0	1	0	0	0	0	0	0	0
Wild Turkey (*Meleagris gallopavo*)	0	0	0	1	0	0	1	0	0
Northern Bobwhite (*Colinus virginianus*)	0	14	0	0	0	0	0	0	0
Killdeer (*Charadrius vociferous*)	0	0	0	0	0	0	1	0	0
Spotted Sandpiper (*Actitis macularia*)	0	1	0	0	0	0	0	0	0
Least Sandpiper (*Calidris minutilla*)	0	0	0	1	0	0	0	0	0
Mourning Dove (*Zeniada macroura*)	0	0	0	0	0	0	1	0	0
Rock Dove (*Columba livia*)	0	0	0	0	0	0	1	0	0
Yellow-billed Cuckoo (*Coccyzus americanus*)	0	46	0	0	0	0	1	0	0
Greater Roadrunner (*Geococcyx californianus*)	0	0	0	0	0	0	3	0	0
Eastern Screech-Owl (*Otus asio*)	0	0	0	0	0	0	1	0	0
Great Horned Owl (*bubo virginianus*)	0	0	0	0	0	0	1	0	0
Barred Owl (*Strix varia*)	0	4	0	1	0	0	1	0	1
Common Nighthawk (*Chordeiles minor*)	0	1	0	0	0	0	1	0	0
Chuck-will's-widow (*Caprimulgus carolinensis*)	0	0	1	0	0	0	0	0	0
Chimney Swift (*Chaetura pelagica*)	0	3	0	0	0	0	0	0	0
Ruby-throated Hummingbird (*Archilochus colubris*)	0	3	0	0	0	0	0	0	0
Belted Kingfisher (*Ceryle alcyon*)	0	1	0	2	0	0	1	0	0
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	0	0	0	0	0	0	1	0	0
Red-bellied Woodpecker (*Melanerpes carolinus*)	0	29	0	0	0	0	0	0	0
Downy Woodpecker (*Picoides pubescens*)	0	9	0	0	0	0	0	0	0
Hairy Woodpecker (*Picoides villosus*)	0	2	0	0	0	0	0	0	0

Appendix 2. Continued.

	Number of Detections by Survey Method[a]								
Common Name (*Scientific name*)	MT	PC	MN	VES	DF	TT	IN	CB	RC
Northern Flicker (*Colaptes auratus*)	0	4	0	0	0	0	1	0	0
Pileated Woodpecker (*Dryocopus pileatus*)	0	5	0	1	0	0	0	0	0
Eastern Wood-Pewee (*Contopus virens*)	0	1	0	0	0	0	0	0	0
Eastern Phoebe (*Sayornis phoebe*)	0	5	0	0	0	0	0	0	0
Western Kingbird (*Tyrannus verticalis*)	0	1	0	0	0	0	0	0	0
Great Crested Flycatcher (*Myiarchus crinitus*)	0	37	0	0	0	0	0	0	0
Scissor-tailed Flycatcher (*Tyrannus forficatus*)	0	1	0	0	0	0	1	0	0
Blue Jay (*Cyanocitta cristata*)	0	35	0	0	0	0	0	0	0
American Crow (*Corvus brachyrhynchos*)	0	69	0	0	0	0	0	0	0
Purple Martin (*Progne subis*)	0	6	0	0	0	0	0	0	0
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	0	1	0	0	0	0	1	0	0
Cliff Swallow (*Petrochelidon pyrrhonota*)	0	0	0	0	0	0	1	0	0
Barn Swallow (*Hirundo rustica*)	0	5	0	0	0	0	0	0	0
Carolina Chickadee (*Poecile carolinensis*)	0	67	0	0	0	0	0	0	0
Tufted Titmouse (*Baeolophus bicolor*)	0	73	0	0	0	0	0	0	0
White-breasted Nuthatch (*Sitta carolinensis*)	0	0	0	0	0	0	1	0	0
Carolina Wren (*Thryothorus ludovicianus*)	0	28	0	0	0	0	1	0	0
Bewick's Wren (*Thryomanes bewickii*)	0	10	0	0	0	0	1	0	0
Blue-gray Gnatcatcher (*Polioptila nigriceps*)	0	60	0	0	0	0	1	0	0
Swainson's Thrush (*Catharaus ustulatus*)	0	0	0	0	0	0	1	0	0
American Robin (*Turdus migratorius*)	0	9	0	0	0	0	0	0	0
Eastern Bluebird *(Sialia sialis*)	0	0	0	0	0	0	1	0	0
Gray Catbird (*Dumetella carolinensis*)	0	1	0	0	0	0	1	0	0
Northern Mockingbird (*Mimus polyglottus*)	0	1	0	0	0	0	0	0	0
Brown Thrasher (*Toxostoma rufum*)	0	7	0	0	0	0	0	0	0
European Starling (*Sturnus vulgaris*)	0	3	0	0	0	0	1	0	0
White-eyed Vireo (*Vireo griseus*)	0	22	0	0	0	0	0	0	0
Red-eyed Vireo (*Vireo olivaceus*)	0	30	0	0	0	0	0	0	0
Northern Parula (*Parula americana*)	0	1	0	0	0	0	0	0	0
Yellow Warbler (*Dendroica petechia*)	0	2	0	0	0	0	0	0	0
Black-and-white Warbler (*Mniotilta varia*)	0	8	0	0	0	0	0	0	0
Prothonotary Warbler (*Protonotaria citrea*)	0	1	0	0	0	0	0	0	0

Appendix 2. Continued.

Common Name (*Scientific name*)	Number of Detections by Survey Method[a]								
	MT	PC	MN	VES	DF	TT	IN	CB	RC
Louisiana Waterthrush (*Seiurus motacilla*)	0	1	0	0	0	0	0	0	0
Yellow-throated Warbler (*Dendroica dominica*)	0	1	0	0	0	0	0	0	0
Summer Tanager (*Piranga rubra*)	0	11	0	0	0	0	0	0	0
Field Sparrow (*Spizella pusilla*)	0	56	0	0	0	0	0	0	0
Lark Sparrow (*Chodestes grammacus*)	0	2	0	0	0	0	0	0	0
Northern Cardinal (*Cardinalis cardinalis*)	0	157	0	0	0	0	0	0	0
Indigo Bunting (*Passerina cyanea*)	0	42	0	0	0	0	0	0	0
Painted Bunting (*Passerina ciris*)	0	80	0	0	0	0	0	0	0
Dickcissel (*Spiza americana*)	0	3	0	0	0	0	0	0	0
Red-winged Blackbird (*Agelaius phoeniceus*)	0	12	0	0	0	0	0	0	0
Brown-headed Cowbird (*Molothrus ater*)	0	59	0	0	0	0	0	0	0
Eastern Meadowlark (*Sturnella magna*)	0	3	0	0	0	0	0	0	0
Common Grackle (*Quiscalus quiscula*)	0	9	0	0	0	0	0	0	0
Great-tailed Grackle (*Quiscalus major*)	0	1	0	0	0	0	0	0	0
American Goldfinch (*Carduelis tristis*)	0	0	0	0	0	0	1	0	0
House Sparrow (*Passer domesticus*)	0	2	0	0	0	0	0	0	0
Mammals									
Armadillo (*Dasypus novemcinctus*)	1	0	0	0	0	0	0	0	7
Virginia opossum (*Didelphis virginianus*)	20	0	0	0	0	0	0	0	6
Raccoon (*Procyon lotor*)	11	0	0	1	0	0	0	0	9
Eastern pipistrel (*Pipistrellus subflavus*)	0	0	11	0	0	0	0	0	0
Red bat (*Lasiurus borealis*)	0	0	8	0	0	0	0	0	0
Evening bat (*Nycticeus humeralis*)	0	0	14	0	0	0	0	0	0
Eastern cottontail (*Sylvilagus floridanus*)	1	0	0	0	0	0	0	0	6
Striped skunk (*Mephitis mephitis*)	3	0	0	0	0	0	0	0	3
Fox squirrel (*Sciurus niger*)	0	0	0	0	0	0	11	0	0
Southern flying squirrel (*Glaucomys volans*)	0	0	1	0	0	0	0	0	0
Beaver (*Castor canadensis*)	0	0	0	0	0	0	1	0	1
Fulvous harvest mouse (*Reithrodontomys fulvescens)*	4	0	0	0	0	0	0	0	0
Texas mouse (*Peromyscus attwateri*)	195	0	0	0	0	0	0	2	0
White-footed mouse (*Peromyscus leucopus*)	15	0	0	0	0	0	0	0	0
Deer mouse (*Peromyscus maniculatus*)	15	0	0	0	0	0	0	0	0

Appendix 2. Continued.

	Number of Detections by Survey Method[a]								
Common Name (*Scientific name*)	MT	PC	MN	VES	DF	TT	IN	CB	RC
Rice rat (*Oryzomys palustris*)	2	0	0	0	0	0	0	0	0
Hispid cotton rat (*Sigmodon hispidus*)	145	0	0	0	0	0	0	1	0
Eastern woodrat (*Neotoma floridana*)	65	0	0	0	0	0	0	0	0
Coyote (*Canis latrans*)	0	0	0	0	0	0	0	0	1
Gray fox (*Urocyon cinereoargenteus*)	0	0	0	0	0	0	0	0	9
White-tailed deer (*Odocoiles virginianus*)	0	0	0	0	0	0	0	0	4
Bobcat (*Lynx rufus*)	0	0	0	0	0	0	1	0	0
Domestic cat (*Felis catus*)	4	0	0	0	0	0	0	0	3

[a] Survey methods were: Mammal trapping = MT; point counts = PC; mist-netting = MN, visual encounter surveys = VES; drift fences = DF; turtle traps = TT; incidental observations =IN, cover boards = CB; and road cruising = RC.