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HERPETOLOGICAL INVENTORY OF THE
UPLAND/TERRRESTRIAL HABITATS OF THE
SAVANNA ARMY DEPOT
(Final Report)

Presented to:

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Herpetological Inventory of the Upland/Terrestrial Habitats of the Savanna Army Depot

The Savanna Army Depot (SAD) resides on the border between Carrol and Jo Daviess Counties in northwestern Illinois. It lies primarily in the Mississippi River Sand Areas Division and borders the Wisconsin Driftless Division of Illinois. This area is characterized by scrub-oak savanna, flood plain forest, sand prairie, and marsh. Smith (1961) included this region in his "sand" and "upper Mississippi" herpetofaunal divisions.

Large sand areas are relatively rare in Illinois and are typically associated with major rivers and with Lake Michigan. The fauna of such areas is of special interest as it often includes relict populations of more western species. Such relicts were derived from a "Prairie Peninsula" fauna that pushed through Illinois during the dry xerothermic period around 9,000 years ago (Smith, 1957).

To date the depot has received little attention herpetologically because it is usually closed to the public. E.O. Moll collected there briefly in 1971 and 1972 and found 8 species -- common snapping turtle (Chelydra serpentina), western painted turtle (Chrysemys picta belli), six-lined racerunner (Cnemidophorus sexlineatus), Blandings turtle (Emoidea blandingi), true map turtle (Graptemys geographic), false map turtle (G. pseudogeographica), ornate box turtle (Terrepene ornata), and the common garter snake (Thamnophis sirtalis).

The goal of our study was to identify species that are

present in the upland/terrestrial habitats of the SAD and estimate population size of each species.

Materials and Methods

Sampling techniques included hoop traps, drift fences, and search-hand capture methods. Drift fences were deployed in a 60-acre, a 12-acre and a 1-acre enclosure (Fig. 1) to examine the effectiveness of different sized enclosures in preserving the herpetofaunal community. A fourth drift fence was set up in the wildlife area at the north end of the base to compare populations in ungrazed habitat to those surrounded by grazed habitat. A fifth drift fence was positioned parallel to the shore of Primms Pond to sample amphibians moving into and away from the pond. A sixth drift fence was deployed at the wet prairie on the north end of the base (fig. 1). Amphibians and reptiles, in their wanderings, run into a fence and follow it one way or the other where they fall in a bucket. Here they can be easily collected, marked and released (Gibbons & Semlitsch, 1981).

Two hand-made hoop traps (Legler, 1960) were deployed in Primms Pond for one three day trapping period. Traps were baited with chicken livers suspended from the top of the trap in a bait container.

Seining and dipnet sampling was performed at Primms Pond and at the wet prairie. CPU was estimated in tadpoles/manhour & tadpoles/m squared.

Twenty-five minnow traps were deployed in Primms Pond to sample amphibian larvae. They were left in the pond for 24

hours. Afterwards, they were retrieved and captures tabulated.

Transect searches were performed at Primms Pond, the wet prairie, in H-area, outside & inside each enclosure, near the "woodpile" and at other selected locations (fig. 1). Transect data was recorded as individuals/m or individuals/man-hour.

Road cruising at slow speeds is an effective method of censusing herps (Heyer, et al., 1994). Road cruising was performed every day and night.

Primms Pond was scanned for basking turtles with binoculars at five minute intervals from 1:00 to 2:30 pm on July 11, 1994.

Squamates and anurans were individually marked by toe-clipping (Twitty, 1986). All snakes were individually marked by clipping abdominal scutes (Jones, 1987). Capture-recapture data was documented for each individual.

Herpetological Attractant Panels (HAPS) were deployed uniformly outside of the Restricted Area. There were also three HAPS associated with each trifold drift fence assembly while only one HAP was placed with the drift fence at Primms Pond. HAPS were 60 cm x 90 cm sections of corrugated tin. Amphibians and reptiles are attracted to these for the warmth and protection they provide (Grant, et.al., 1992).

Frog calls were surveyed throughout the study. At 10:00 pm each night, I traveled the length of the base on

Q Rd. If frogs were calling, the car engine was turned off and I got out of the car. I listened for a few minutes to identify species calling. The size of the chorus was coded according to the Wisconsin Frog and Toad Survey Call Index (Heyer, et.al., 1994) as follows: Code 1 --Individuals can be counted, there is space between calls; Code 2 -- Calls of individuals can be distinguished but there is some overlapping of calls (intermediate between 1 and 3); Code 3 -- Full Chorus, calls are constant, continuous and overlapping.

Most animals were released within 24 hours of being captured. State threatened species were vouchered by photograph. Photographs and specimens were deposited in the Illinois Natural History Survey collection on the campus of the University of Illinois.

Results

Sixteen species (Table 1) were identified in the upland/terrestrial habitats of the SAD. These included 9 species of Anurans, 4 Squamates (1 state threatened), and 2 testudines. The testudine species, unlike the others, were transient members of the herpetofaunal community. These migrated into the sand prairie to nest, then returned to the river.

Species composition and relative abundance (RA) based on search data, hoop trap and drift fence captures, and Anuran maximum calling numbers are given for the entire SAD in Table 2, and for each sampling location in Tables 3-10.

Call monitoring is a productive method to inventory frogs. No marked frogs were recaptured. Gray treefrogs (Hyla versicolor) were present at the wet prairie (code 3) and at Primms Pond (code 3) from May 24 - June. They could also be heard calling in the forest at the north end of the base. Gray treefrogs from Iowa usually call between April and the close of June. About 25 males called in a 15 m. transect. 55 males were mark-released during the chorus, but none were recaptured at the wet prairie. No gray treefrogs were captured elsewhere. Tadpole population was estimated at 0.008 tadpoles/sec at the wet prairie. Gray treefrog tadpoles were not collected elsewhere on the Depot.

Western chorus frogs (Pseudacris triseriata) were calling (code 3) at the wet prairie on March 24 through April. They were heard north of Primms Pond April 9-10. None called elsewhere in the uplands. Spring peepers (Pseudacris crucifer) were heard calling (code 3) at the the wet prairie, and north of Primms Pond from April 9-10. They were heard at Code 1 on May 13 at the same areas. Both spring peepers and western chorus frogs in Iowa normally call between mid-February and late May. A single western chorus frog was captured in the drift fence in the wildlife area. A single premetamorphic spring peeper tadpole was captured while dipnetting in the wet prairie in June.

The american toad (Bufo americanus) was calling at Primms Pond and at the wet prairie (both code 2) on May 16, through July. This species normally calls between April and

leopard frogs were found in a small sand pond near igloo 420 (F400) on July 13. These were nearly metamorphic. Although the pond was small, the population was large (0.83 tadpoles/sec.). 12 adult northern leopard frogs were censused on this pond (0.24 frogs/m).

Leopard frogs were taken in the drift fence at the wet prairie (0.09 frogs/m of fence/day). They outnumbered all other anuran species 108 : 1 according to hand captures on transects at the wet prairie (1.16 leopard frogs/m). No other herps were captured at this drift fence. A single leopard frog was found approximately 1 mile southwest of Primms Pond, under a HAP. Leopard frogs were not otherwise found far from water at the depot.

Four species of Squamates were captured on the base. The most common squamate was the six-lined racerunner (Cnemidophorus sexlineatus). This species was identified in every sand prairie habitat on the base. This species was captured in drift fences at the 60-A enclosure (0.007 lizards/m of fence/day), the 12-A enclosure (0.014 lizards/m of fence/day, the 1-A enclosure (0.01 lizards/m of fence/day), and at the wildlife area (0.006 lizards/m of fence/day). HAPS indicated a population of 0.001 lizards/HAP/day. Searches revealed populations of 0.008 lizards/m at the 12-A enclosure, 0.005 lizards/m at the 1-A enclosure, 0.005 lizards/m at the wildlife area, 0.005 lizards/m at the woodpile, and 0.003 lizards/m in the field around the 1-A enclosure. No lizards were found in the

fields adjacent to the 60-A enclosure or the 12-A enclosure despite extensive searching.

The most populous species of snake was the common garter snake (Thamnophis sirtalis). Four specimens were taken; one from under a HAP near Primm's Pond, and the other three while searching.

Bullsnakes (Pituophis melanoleucus) were found basking on the roads of SAD. Of the 3 specimens found, 2 were road kill. Bullsnake captures were confined to the sand prairie habitats of the SAD.

Blue racers (Coluber constrictor) were sighted on the base four times; twice at the wildlife area, once near Primms Pond, and once in H-area. These were the subspecies C. c. flaviventris.

The western hognose snake (Heterodon nasicus) was identified on the SAD. It is a state threatened species (Herkert, 1992) and is extremely uncommon on the depot. The western hognose snake was also a county record for Jo Daviess County. It was vouchered by color slide and deposited at the Illinois Natural History Survey, Champaign, Illinois. Its number is INHS (color slide) 1994-1.

Two species of turtles were found in the uplands of SAD: painted turtle Chrysemys picta, and the map turtle Graptemys geographica. These were transient members of the upland fauna. Painted turtles and map turtles migrate into the sand prairie to lay their eggs. Adult painted turtles were not observed in the sand prairie. Adult female map turtles were

observed migrating into the sand prairie at the end of May. Hatchling painted and map turtles were found in the sand prairie, migrating to the river, from May 14 to the end of May. While walking through the sand prairie along river road, hardly a step can be taken without stepping on egg shells. An especially attractive nesting area is between building 938 & 939. No other turtles were identified on the sand prairie.

The Illinois Mud Turtle does not appear to be present at SAD despite special efforts to find them in desired habitat.

Discussion

This inventory of herptiles at the SAD identified 12 species not previously recorded in the upland habitats of the depot. This was a significant addition to our knowledge of the herpetofauna of the SAD.

Strong populations of gray treefrogs, due to their arboreal nature, were found calling from groves of trees near water. Large tracts of sand prairie appear to act as a barrier for this species. This would explain the absence of gray treefrogs from the 12-A enclosure. The 12-A enclosure had some arboreal habitat but was completely surrounded by sand prairie that these frogs appear not to cross. Without a water source for breeding at the 12-A enclosure, gray treefrogs can not sustain a population.

Call monitoring indicated a large population of western chorus frogs at the SAD. This species is known to occur in sand prairies of Illinois. At Braidwood Dunes in Will

County, O'Connell (1992) found such large numbers migrating from breeding ponds, that he couldn't count them all. Why call monitoring indicated such a large population, while only a single male was captured at the wildlife area is a mystery. The drift fences located in the wet prairie and at Primms Pond should have picked up large numbers of migrating juveniles. The paucity of migrating juveniles may indicate a nonreproducing population. The cause of this problem needs to be investigated.

A possible contributor to the absence of chorus frog tadpoles and juveniles at Primms Pond is the large population of fish there. Hylid tadpoles are not known for their ability to retard fish predation. Often when fish are introduced, the amphibian population in general experiences a significant reduction.

Spring peepers were not encountered on the base in large numbers though call monitoring indicated a large population. These were not captured in drift fences because their toe pads allow them to climb out of the pitfalls. The lack of appropriate habitat (forests with a large percentage of the floor covered with rotting fallen logs) probably explains the low numbers of spring peepers identified on the depot after breeding had ceased.

The american toad population appears strong and healthy. A number of juveniles were captured in drift fences, tadpoles were obviously abundant in Primms Pond, and adults were encountered in good numbers. Toads are especially adapted to

living in xeric habitats such as sand prairies. Their thick warty skin prevents desiccation and allows them to survive with minimal levels of moisture.

Wood frogs, like spring peepers, are not classically "sand prairie species". These normally occur in forested areas. It is possible that the few wood frogs encountered were forced out of the lowland forests during the flooding in the early spring. After the flood waters receded, the woodfrogs probably retreated back to the lowland forests, but in lower numbers. Earlier call monitoring (January & February) may reveal woodfrogs to be more common.

Bullfrog populations were extremely large at Primms Pond. Individuals appeared fairly small (seldom larger than 4-5") relative to the usual large size these animals are known to attain (6-8")(Christianson & Bailey, 1991). This may indicate that Bullfrogs are overpopulated on Primms Pond and need to be reduced. This frogs reputation for eating other frogs may help explain the lack of chorus frogs.

Greenfrog populations at the wet prairie appear stable. The lack of captures of this frog was probably influenced by the dense vegetation at the wet prairie. The willows and tall grass made it extremely difficult to sample near the shoreline where greenfrogs are commonly encountered.

Pickerel frogs are extremely rare on the depot. The fact that this species often calls from under water, in combination with their apparent low numbers probably explains why no calling males could be captured. Pickerel frogs

normally occur in cold springs and trout streams, though scattered populations do occur along the Mississippi River (Christianson & Bailey, 1991). This species probably migrated down the cold-water stream feeding the wet prairie from the bluffs to the east. The pickerel frogs were probably cut off from original populations in the bluffs and only persist in very low numbers. This species is not a normal resident of sand prairies, or any of the other habitats at SAD.

Northern leopard frogs were extremely abundant at the wet prairie. The presence of bullfrogs on Primms Pond is a likely reason for the low numbers of leopard frogs recorded there. Bullfrogs have been shown to significantly reduce leopard frog populations where the two species are sympatric (Christianson & Bailey, 1991).

The six-lined racerunner is a classic sand prairie resident and is seldom found outside of the habitat. This lizard's numbers have probably been suppressed by cattle grazing on the depot. Pianka (1986) has shown that grazing can, in fact, have drastic effects on lizard populations. Grazing mammals such as sheep and cattle destroy patches of cover that would be utilized by lizards to escape predators. These mammals also change the plant community structure. This change in plant structure likely results in different insect assemblages. Cnemidophorus sexlineatus is insectivorous, and has evolved with the insect assemblage present on a healthy sand prairie. Altering this assemblage

will alter the diet of these lizards and possibly the nutrition derived from this diet. The poor nutrition resulting, ultimately from cattle grazing, can result in a less competitive species. With a loss in competitiveness it is only a matter of time before the animal is removed from the habitat. Six-lined racerunners are near the bottom of the food chain and are probably important prey items for many small birds and mammals (Bury & Raphael, 1983). These small birds & mammals are important prey items for large birds of prey as well as carnivores. HAPS should have picked up large numbers of racerunners. Outside of exclosures, they did not. This may indicate that cattle grazing is depressing racerunner populations. This could have an important effect on other species on the base.

Snakes, bullsnakes in particular, are under extreme predation pressure at SAD. Cattle grazing is likely affecting their numbers in the same way as it is affecting the numbers of racerunners. Furthermore, there is a problem with auto-induced mortality at SAD. There is a prevailing notion among some security guards (to quote one) that "the only good snake is a dead snake". In fact, snakes account for up to 50% of some raptors' diets. The red-shouldered hawk in particular is known for feeding largely on herpetofauna, especially snakes (Millsap, 1981). In order to prevent more road kills, it would be beneficial to post signs warning people not to run over wildlife, including snakes & turtles. It would also be beneficial to give some form of

educational seminar to inform security guards of the importance, and relative harmlessness of snakes on the base. As a final measure, to protect snakes, it may be beneficial to post a fine for running over snakes. Bullsnares are not dangerous, and are important predators of rodents.

Carelessness and lack of care should not be excuses for people to go out of their way to kill them. One security guard admitted that he missed the five-foot long bullsnake on river road the first time, but hit on the second try! Is this the way we want wildlife protected?

The sand prairie is an important nesting area for turtles migrating from the Mississippi River. The entire length of the east side of River Road was covered with turtle shells that had hatched, or been uncovered by nighttime scavengers. The eggs of turtles are an important food for many small mammals such as Mustelids, Procyonids, and Canids. The preservation of these nesting beaches is important to maintain the balance of the sand prairie. Without turtle eggs to prey upon, skunks & raccoons in particular, will turn to other foods. This could endanger other types of wildlife through competition, disruption, &/or predation. It could also cause maintenance problems for the depot, since these animals will likely rummage through garbage, etc.. more than they already do!

Two species, blanding's turtle (Emoidea blandingii) and ornate box turtles (Terrepenne ornata), were identified by Moll in 1971 & 1972, but were not found during this survey.

Blandings turtle is a semi-aquatic turtle inhabiting natural marshes and river sloughs that seldom get more than 4 ft deep (Christiansen & Bailey, 1988; Johnson, 1981). If this species is still present on the SAD, it is extremely rare.

Blandings turtle is, as are most wetland species, experiencing population reductions state-wide with the draining and degradation of Illinois wetlands. The management of this turtle requires conservation of appropriate habitats. It would also be beneficial to restrict grazing from the wet prairie.

The absence of the ornate box turtle from our results may indicate a decaying community at SAD. The ornate box turtle is a typical sand prairie species. Two factors have likely impacted the status of this species at SAD. The first is cattle grazing, as before. Cattle grazing has been shown to significantly reduce tortoise populations through competition for food, and through disruption (Bury & Marlow, 1973). Cattle rutting and general movements over the range can destroy nests and eggs of box turtles. The cattle can also kill & injure these turtles by stepping on them as the herd moves over the prairie. If grazing could be restricted to only those areas where absolutely necessary, then there may be a resurgence in this "prairie peninsula" fauna.

The second factor likely contributing to the decline in the ornate box turtle is the use of off-road vehicles by the army reserves. Off-road vehicle use was obvious over much of

the prairie exterior to the restricted area. The damage to the prairie induced by this activity can be readily observed at SAD. The destruction of habitat as a result of this activity has been shown to significantly reduce tortoise populations (Bury, 1978). The box turtle population would undoubtedly benefit from a suspension or restriction of this activity at SAD.

Reintroductions of ornate box turtles may also be useful, but should be done with great care and the advice of an expert in the field. The reintroduction of this species would only be advisable if the problems listed above are corrected (or at least a majority of them). Reintroduction would not likely be successful otherwise.

Primms Pond could be a nice little habitat with some alterations. The fish in Primms Pond should be eradicated, preferably by temporarily draining the pond. All grazing activities should be suspended from Primms Pond to a distance determined by a land manager in order to prevent accelerated eutrofication of the pond by cattle excrement in runoff. In this way Primms Pond could be managed as a healthy, naturally occurring sand pond would exist.

A final recommendation is to continue monitoring the populations at SAD. It is of vital importance to keep an ongoing record of the status of herptile populations (Heyer, et.al.). A good program may be to solicit graduate students from universities to conduct surveys. If a student were hired every five years and was given two summers of sampling

mid-June in Iowa. Adult and juvenile american toads were found over the entire base. They were found in drift fences at Primms Pond (0.009 toads/m of fence/day), the wildlife area (0.004 toads/m of fence/day), H-area (.03 toads/m searched), the 12-acre exclosure (0.003 toads/m of fence/day), the 60-acre exclosure (0.006 toads/m of fence/day). No drift fence captures were found at the 1-acre exclosure or at the wet prairie. Walked transects at the wet prairie returned only a single american toad (0.004 toads/m). Only 2 were found while walking transects during the day. These were both found about .5 miles south of Primms Pond, west of Q Rd. Tadpole populations were large at Primms Pond (120/square meter).

Five Ranids were identified by calls: Wood frog (Rana sylvatica), bullfrog (Rana catesbeiana), greenfrog (Rana clamitans), pickerel frog (Rana paulustrus), and the northern leopard frog (Rana pipiens). Wood frogs were heard calling (code 1) on April 8. Wood frogs in Iowa normally call from the end of Febuary to the beginning of May (Christiansen & Bailey, 1991). It appears that the wood frog's main calling period on the base is sometime prior to this.

Bullfrogs called from June through July at the wet prairie (code 1) and at Primms Pond (code 2). Iowa bullfrogs usually call from mid-May through mid-July. A census of bullfrogs on Primms Pond was performed by walking the entire shoreline and counting the bullfrogs present. 558 bullfrogs were counted on this pond. Bullfrogs outnumbered the next

most populous frog at Primms Pond 7.44 : 1. Bullfrogs were captured at the wet prairie, but were rare (0.004/m).

Tadpole populations were estimated using tadpoles/sec at Primms Pond over a 5 min. dipnet collecting period. In May the population was estimated at 0.17 tadpoles/sec. By July the population decreased to 0.045 tadpoles/sec. Bullfrog tadpoles were captured in minnow traps as well. CPU for tadpoles were estimated as 0.58 tadpoles/trap/day.

Greenfrogs were only heard calling (code 3) at the wet prairie. They called from mid-May through July. Although this frog called in apparently large numbers at night, it was difficult to find because of thick vegetation at the wet prairie. Transects revealed 0.004 frogs/m. A single greenfrog was captured in a minnow trap at Primms Pond (0.04 frogs/trap/day).

Pickerel frogs were a rare species on the base. Their deep snore-like call could be heard at code 1 in May. Iowa populations of these frogs normally call between mid-march & mid-June. No specimens of Pickerel frog were captured.

Leopard frogs called at Primms Pond and along its northwest feeder stream. They also called at the wet prairie. They called at code 2 during the first week in April. They were not heard above code 1 in the uplands after this date. Leopard frogs normally call between mid-March & mid-June. 75 leopard frogs were counted along the perimeter of Primms Pond. They were outnumbered 7.44 : 1 by bullfrogs. No leopard frog tadpoles were found there. Tadpoles of

the base could be adequately monitored 2 out of every five years at modest cost. A graduate student could use this job as a thesis, so there would be little difficulty in finding a party to do the job. This program would provide valuable information about the changes in amphibian and reptile populations over the long term and provide for better management of the herpetofauna at SAD. To adequately manage the wildlife populations at SAD it is imperative that all taxa be considered in the final plan (Scott & Seigel, 1992).

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Table 1. Criteria used in determining the relative abundance (RA) of amphibians and reptiles at the Savanna Army Depot as modified from O'Connell (1992).

RA	Amphibia	Reptilia
	Anura	Serpentes
++++	75+ calling *OR* >.0075 adults/m of fence/day. *OR* >.75 adults/search day	>0.008 ind./m of fence/day *OR* >.33 ind./search day
+++	50-74 calling *OR* .005-.0074 adults/m of fence/day *OR* .50-.74 adults/search day	.005-.007 adults/m of fence/day *OR* .22-.32 ind./search day
++	25-49 calling *OR* .25-.49 adults/search day.	.0025-.0049 ind./m of fence/day *OR* .011-.021 ind./search day
+	all others	all others

Table 2. Species present with their relative abundances (RA) at the Savanna Army Depot (SAD). Relative abundance is denoted subjectively as Most common (MC), common (C), rare (R).

Species	RA
Anura	
American toad	C
Bullfrog	MC
Gray Treefrog	MC
Greenfrog	C
Leopard frog	MC
Pickerel frog	R
Spring Peepers	C
Western Chorus Frog	C
Woodfrog	R
Squamata	
Six-lined Racerunner	MC
Bullsnake	C
Blue Racer	C
Garter Snake	C

Table 3. Herptiles present with relative abundance at the 60-acre enclosure (fig.1). (+) = least common, (++++) = most common (see table 1).

Species	Relative Abundance
Anura	
American Toad	+++
Squamata	
Six-lined Racerunner	+++

Table 4. Herptiles present with relative abundance at the 12-acre enclosure (fig.1). (+) = least common, (++++) = most common (see table 1).

Species	Relative Abundance
Anura	
American Toad	++
Squamata	
Six-lined Racerunner	++

Table 5. Herptiles present with relative abundance at the 1-acre enclosure (fig.1). (+) = least common, (++++) = most common (see table 1).

Squamata	
Six-lined Racerunner	++

Table 6. Herptiles present with relative abundance at the Wildlife Area (fig.1). (+) = least common, (++++) = most common (see table 1).

Anura

American Toad	++
Western Chorus Frog	+

Squamata

Blue Racer	+
Six-lined Racerunner	+++

Table 7. Herptiles present with relative abundance at the H-Area (fig.1). (+) = least common, (++++) = most common (see table 1).

Anura

American Toad	+++
Northern Leopard Frog	+++

Squamata

Blue Racer	+++
Bull Snake	+++

Table 8. Herptiles present with relative abundance at the Woodpile (fig.1). (+) = least common, (++++) = most common (see table 1).

Squamata

Six-lined Racerunner	+++
Common Garter Snake	+
Bullsnake	+

Table 9. Herptiles present with relative abundance at the Wet prairie (fig.1). (+) = least common, (++++) = most common (see table 1).

Anura

American Toad	++
Northern Leopard Frog	++++
Bullfrog	++
Greenfrog	+++
Gray Treefrog	++++
Pickerel frog	+
Woodfrog	+
Western Chorus Frog	++++
Spring Peeper	++++

Table 10. Herptiles present with relative abundance at the Primms Pond (fig.1). (+) = least common, (++++) = most common (see table 1).

Anura

Bullfrog	++++
Leopard Frog	+++
American Toad	++
Green Frog	+
Gray Treefrog	++++
Western Chorus Frog	++++
Spring Peeper	++++

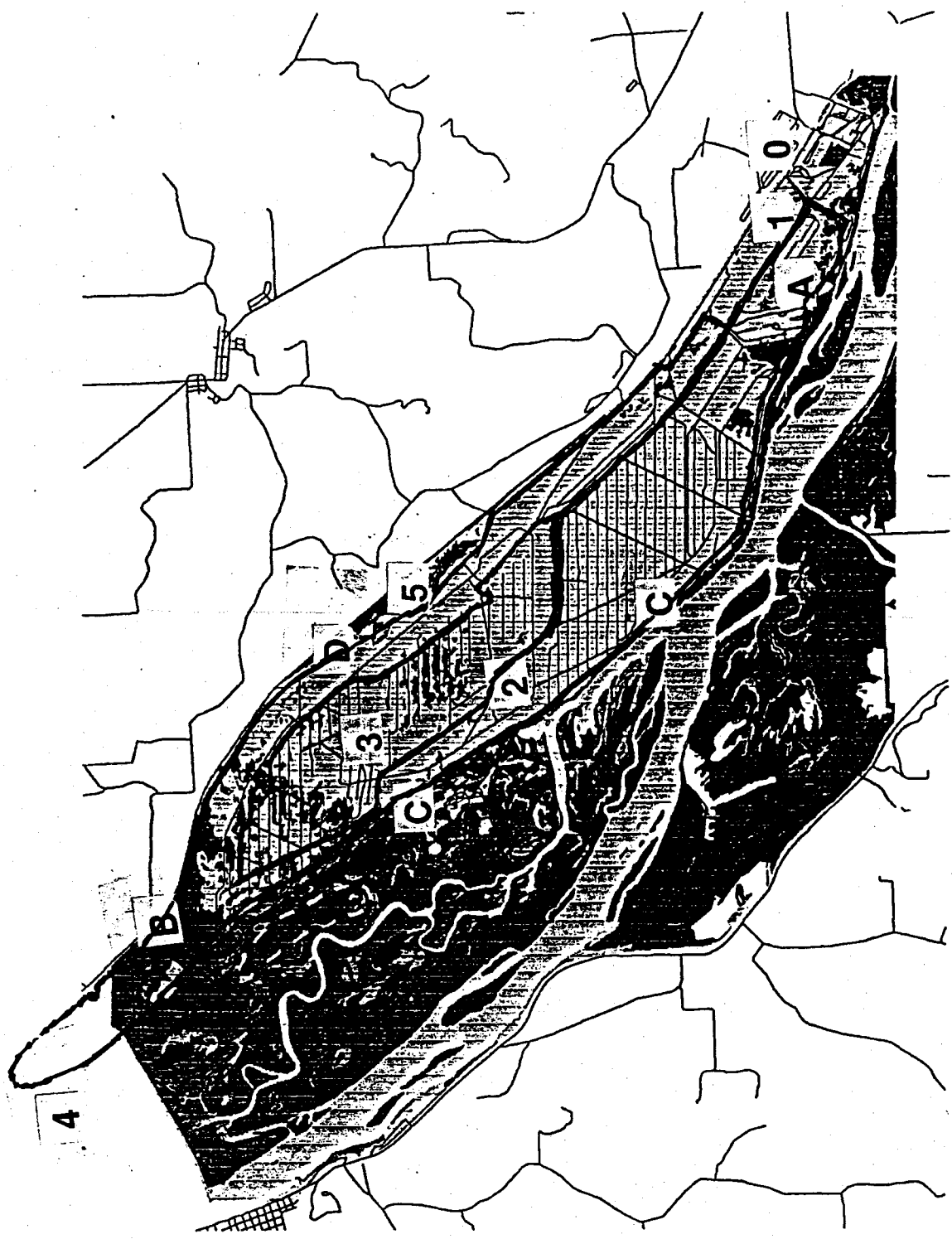
Squamata

Common Garter Snake	+
Blue Racer	+

Figure 1. GIS map of the Savanna Army Depot. Sampling localities and landmarks are depicted by numbers and letters. 1) 60-acre enclosure containing one drift fence & 3 HAPS. 2) 12-A enclosure containing 1 drift fence and 3 HAPS. 3) 1-A enclosure containing 1 drift fence and 3 HAPS. 4) Wildlife Area containing 1 drift fence and 4 HAPS. 5) Primms Pond, 1 drift fence parallel to the west shore and one 3 HAPS nearby. O) H-area, hand search capture methods only. A) Woodpile, 25 HAPS. B) Wet Prairie, 1 drift fence with 3 HAPS. C) River Road. D) Q Road. (HAPS were distributed along River & Q Roads). Road cruising route is shown as a bold line. This route varied slightly from day to day.

- LAKE CHARLES
1991
- 1 OPEN WATER
 - 2 BARREN
 - 3 MARSH/SCOTER P. LAKE
 - 4 MARSH/SCOTER P. LAKE/POUCH
 - 5 SCOTER P. LAKE
 - 6 SCOTER P. LAKE/IMPACT
 - 7 SWAMP
 - 8 IMPACT/RAISED EMBANKMENT
 - 9 MARSH/SCOTER P. LAKE
 - 10 MUD/SCOTER P. LAKE
 - 11 WOODY TERRESTRIAL
 - 12 OPEN FLAT
 - 13 PRAIRIE/BLVD
 - 14 CROPPED
 - 15 BARREN

Roads
Higher ground



Scale: 0 2.50 5 mi