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HERPETOLOGICAL INVENTORY OF THE
LOWLAND/AQUATIC HABITATS OF THE
SAVANNA ARMY DEPOT
(Final Report)

Presented to:

United States Department of the Interior
Fish and Wildlife Service
Rock Island Field Office
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present in the lowland/aquatic habitats of the SAD and estimate population size of each species.

Materials and Methods

Sampling techniques included hoop traps, trammel and fyke nets, drift fences, and search-hand capture methods. Figure 1 shows locations where hoop traps, nets and the drift fence were assembled.

One 100 yd x 6 ft trammel net was deployed in the main channel of crooked slough (site "A" on fig. 1) to capture turtles. The net was situated on the river bottom at a ninety degree angle to the east shore. It was deployed for six hours.

One fyke net was deployed once in May and a second time in July at site "B" on figure 1. The net was positioned in about four feet of water near a log that might act as a basking site. The net had one 60 ft leader that was run at about 30 degrees to the shoreline. The net was baited with fish to help attract turtles.

Four commercial hoop traps (Legler, 1960) were used continuously to trap turtles throughout the study. Hoop traps were stationed for two separate 1-week trapping period in any one location. Traps were baited with chicken livers or fish. Bait was suspended in a hardware cloth bait container. Trapped turtles were individually shell notched according to Cagle (1939).

One drift fence array was situated on the island south of Washout Plant Rd. (site "C" on fig. 1). This array had

three 20" x 25' "wings" that radiated from a single central bucket at 120 degrees from each other (fig. 3). Five gallon buckets were buried at the distal ends of the wings.

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).

Transects, 50 m in length, were walked (fig. 1) from June 28 through July 14, 1994. Previously the lowlands were flooded and could not be walked. Anurans captured were individually marked by toe-clipping (Twitty, 1966). Routes were driven along River Rd., on the dam, down Burning Grounds Rd., and Washout Plant Rd. for basking turtles. Basking turtles were counted and identified with binoculars.

Herpetological Attractant Panels (HAPS) were deployed on the turn-around at the end of Washout Plant Rd. HAPS were 80 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 River Rd., driving down Washout Plant Rd. and Burning Grounds 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.

Populations were estimated using herps/m and herps/trap-hour. A Lincoln-Peterson estimate with a Baily modification for low recapture numbers was used where possible to estimate population size.

Relative abundance (RA) is a subjective measure used to compare the population size of each species to other members of its order (Turtles are compared to turtles, frogs to frogs, etc.). RA was denoted using a plus system (O'Connell, 1992). The most common species were given four pluses (++++), while species that were least common were given one plus (+). Species that fell between these extremes were given two, or three pluses respectively. Criteria used to estimate RA is listed on Table 1.

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

Species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling numbers are given for the entire SAD in Table 2, and for each

sampling location in Tables 3-5.

Call monitoring is a productive method to inventory frogs. Of the seven Anuran species identified in the lowland/aquatic habitats, five were represented by call alone. No marked frogs were recaptured.

The only frog captured on the floodplain was the northern leopard frog (Rana pipiens). Both adults and juveniles were present between the north end of the trailer storage facility and Washout Plant Rd. (fig. 2). No leopard frogs were sighted south of the trailer storage facility or north of Washout Plant Rd. This frog called at code 2 the length of River Rd. between Burning Grounds Rd. and the dam (fig. 2) during the first week of April.

Gray treefrogs (Hyla versicolor) were present the entire length of Crooked Slough. These frogs called at Code 1 at the trailer storage facility and Code 3 north and south of this facility from June through July (fig. 2). No gray treefrogs were captured in the aquatic/lowland habitats.

Cope's treefrog (Hyla chrysocelis) was heard calling at Code 2 at the Commandants Boat Launch (in oxbow) on July 12 (fig. 2). This frog was not captured or identified elsewhere on the base.

Western chorus frogs (Pseudacris triseriata) were calling at Code 3 immediately north of the junction of Burning Grounds Rd. and River Rd. May 14 (fig. 2). They had not called there earlier.

Bullfrogs (Rana catesbeiana) called at Code 1 near the

trailer storage facility between May 12 and May 15. They called throughout the floodplain at Code 1 from June through July. No larvae or frogs were collected.

The American toad (Bufo americanus) called at code 1 throughout the floodplain from May 14 through July 6. It called at code 2 at Washout Plant Rd. from May 16 through May 21. A single female was captured in the swamp north of, and midway down, Washout Plant Rd. She was marked but never recaptured.

A single male cricket frog (Acris crepitans) called at the junction of the dam and River Rd. on July 14. This species was not observed elsewhere on the base.

Common garter snakes (Thamnophis sirtalis) were collected under HAPS at the turn around on Washout Plant Rd. Two were marked and on recaptured. Another garter snake was sighted about 100 m south and 50 m east of "the tube" (Burning Grounds Rd.). Gartersnakes were first collected on the base on May 15.

The northern water snake (Nerodia sipedon) was sighted basking along the east shore of crooked slough between Burning Grounds Rd. and the commadant's boat launch. Watersnakes were commonly encountered on sunny days (.8 snakes/man-hour). None were observed on cloudy, overcast days. At about 8:00 pm these snakes could be observed swimming into shore on the main channel of Crooked Slough. Anywhere from 2 to 7 snakes were observed swimming to shore from 8:00 to 8:30 pm at the trailer storage facility (8.5

snakes/man-hour over about 100 m of shoreline). The first watersnake was observed May 17 basking on a log.

Six-lined racerunners were observed on three occasions basking near the gate on Burning Grounds Rd. They were not seen elsewhere in the lowland/aquatic habitats of SAD.

Racerunners were first observed on the base May 14.

Five species of turtles were identified on SAD (Table 2). A Fyke net baited with fish was set for two 24 hour sessions, and a trammel net for one 6 hour session. Neither net resulted in any captures. Turtles were active on warm, sunny days, but rarely observed when overcast and rainy (only 3 turtles caught with hoop traps during rain).

Hoop traps are effective devices for sampling turtles (Moll, pers. comm.). Only one species (false map turtle) was identified but not caught in hoop traps. Relative abundances of turtle species based on hoop trap captures are listed on table 2.

Western painted turtles (Chrysemys picta belli) were present on SAD in large numbers. They were observed throughout the floodplain and in the main channel. Based on basking turtle counts, these turtles out-number the next most populous species 5:1. Although painted turtles are most numerous, only one hatchling was found migrating to the river versus 11 true map hatchlings. The population estimate of painted turtles in the slough using a Lincoln-Peterson estimate with a Bailey modification for low recapture numbers is $N=390$ turtles with a standard error of 149.61 in the areas

sampled. (The areas sampled are shown on fig. 3). Catch per unit effort (CPU) for painted turtles was estimated as .014 turtles/trap-hour. A number of injuries/deformities were observed in these turtles including: club feet (3), double vertebral scute row (1), and minor scute deformities (such as extra scutes or unusual shapes) (5). Three painted turtles were observed with motor boat prop injuries. The sex ratio of painted turtles was 2.5 males to each female. The first painted turtles were sighted basking on April 9.

True map turtles (Graptemys geographica) were observed basking with painted turtles as early as April 9. Based on basking data, there was one map turtle for every five painted. Knowing the Peterson estimate for painted turtles is $N=390$ we can estimate the map turtle population as 78 turtles in the areas sampled. The population was estimated as 80 turtles based on capture ratios (4.9 painted turtles:1 map turtle caught in hoop traps). CPU for map turtles was .004 turtles/trap hour. Map turtles were observed basking the entire length of the slough but they were only captured in hoop traps at sites "2" and "4" on figure 1. Hatchling map turtles were found crossing River Rd. beginning May 16 through May 21. Females were captured crossing the road to lay eggs throughout this period as well. The sex ratio of map turtles observed at SAD was 1 male to every 1.4 females.

The common snapping turtle (Chelydra serpentina) in both the backwaters of and the main channel of Crooked Slough. The first snapping turtles were observed May 16. No snapping

turtles were recaptured. Their population size was estimated by capture ratios (8.2 painted : 1 snapper) as 72 turtles in the areas trapped (fig. 1). CPU for snapping turtles was .0018 turtles/trap-hour. Snapping turtles were captured both north and south of Burning Grounds Rd. (site "2" on fig. 1) and south of the dam (site "4" on fig. 1).

Spiny softshells (Apalone spinifer) were observed the entire length of crooked slough. The first softshells were sighted May 14 on the north side of Washout Plant Rd. (site 3 on fig. 1). Softshells were captured with hoop traps at Burning Grounds Rd. (site 2 on fig. 1), and south of the dam (site 4 on fig 1). The population of spiny softshells was estimated based on capture ratios (16 painted : 1 softshell) as 49 turtles. CPU for softshells was .0008 turtles/trap-hour. The sex ratio of spiny softshells was 1.5 males : 1 female.

False map turtles were identified exclusively by basking counts. These turtles were observed along the west shore of Crooked Slough. Two false maps were observed on the north side of the dam. Whether these turtles were Graptenys pseudogeographica or G. ouachitensis could not be determined through binoculars. These two species can only be discerned through close inspection of a few inconspicuous diagnostic characters.

Discussion

Two species, blanding's turtle (Emoidea blandinii) and ornate box turtles (Terrepene ornata), were identified by

Moll in 1971 & 1972, but were not found during this survey. The absence of these species may be a result of increased disturbance in the wetlands and elsewhere on the base. (The ornate box turtle is discussed in the terrestrial report).

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.

Several factors may have contributed to reduce blandings turtle numbers. The opening of the north end of Crooked Slough may have altered the habitat enough to depress populations of this species. Much of what was before backwater wetlands is now a main river channel and unsuitable for blandings turtles. The onset of recent floods probably helped to reduce their numbers on the SAD. 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 lowlands. Grazing negatively effects other turtle populations (Bury & Marlow, 1973; Marlow, 1974).

It would be further desirable to restrict turtle hunters from the base. It is rumored that turtle hunters from Iowa enter the slough to collect turtles for sale in Iowa. It is likely that their activities in the slough could

damage the recovery of blanding's turtle at SAD. Presently the sloughs restricted status is not enforced. Both fisherman and joy seekers frequent these waters. Excluding the use of outboard motors from the slough would help turtle populations considerably. Nearly 45% of map turtles showed injuries similar to those caused by motor boats. Restricting the use of these motors to the main channel of the slough except by authorized parties in favor of trolling motors would reduce instances of these type of injuries.

Many species commonly bask on River Rd. Large numbers of turtles cross this road searching for nest sites in the nearby sand. Hatchlings and returning adults also traverse this road. Of the hatchlings collected on River Rd. nearly 75% were killed by vehicles. Posting signs warning motorists to "beware of wildlife on roads" could decrease vehicle related mortality in amphibians and reptiles as well as other wildlife.

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 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 herpetofaunae 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 compared with the Braidwood Dunes (Will Co.) and Savanna Nature Preserve (Will Co.). (exerpted from O'Connel, 1992)

Amphibia		Reptilia	
RA	Anura	Serpentes	Testudines
++++	30+ calling *OR* >2.35 adults/ 7.5 m trap-day (x100) *OR* >0.5 adults/ search day	>2.35 ind./ 7.5 m trap-day (x100) *OR* >.45 ind./ search day	>.011 ind./ turtle trap- hour *OR* >.45 ind./ search day
+++	18-29 calling *OR* 1.57-2.34 adults/7.5 m trap-day (x100) *OR* .25-.49 adults/ search day	1.57-2.34 adults/7.5 m trap-day (x100) *OR* .30-.44 ind./ search day	.006-.010 ind./turtle trap-hour *OR* .30-.44 ind./ search day
++	5-17 calling *OR* .78-1.56 adults/7.5 m trap-day (x100) .10-.24 adults/ search day	.78-1.56 ind./7.5 m trap-day (x100) *OR* .15-.29 ind./ search day	.001-.005 ind./turtle trap-hour *OR* .15-.29 ind./ search day
+	all others	all others	all others

Table 2. Savanna Army Depot (SAD): species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling number.

species	CPU: Turtles/ trap-hour	CPU: searches; Ind./ search day	Max. # calling	rel. abun.

Amphibia				
Anura				
<u>Hyla versicolor</u>	N/A	0	>100	++++
<u>Rana pipiens</u>	N/A	20.4	>100	++++
<u>Psuedacris triseriata</u>	N/A	0	>50	++++
<u>Bufo americanus</u>	N/A	0.07	25	+++
<u>Hyla chrysocelis</u>	N/A	0	15	++
<u>Rana catesbeiana</u>	N/A	0	6	++
<u>Acris crepitans</u>	N/A	0	1	+
Reptilia				
Squamata				
<u>Nerodia sipedon</u>	N/A	8.25	N/A	++++
<u>Thamnophis sirtalis</u>	N/A	0.29	N/A	++
<u>Cnemidophorus sexlineatus</u>	N/A	0.24	N/A	+
Testudines				
<u>Chrysemys picta</u>	0.014	57.3	N/A	++++
<u>Graptemys geographica</u>	0.004	11.4	N/A	++
<u>Chelydra serpentina</u>	0.0018	0.06	N/A	++
<u>Apalone spinifer</u>	0.0008	0.17	N/A	+
<u>G. pseudogeograpica &/ouachitensis</u>	N/A	0.71	N/A	+

Table 3. Savanna Army Depot (SAD): species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling number at Washout Plant Road.

species	CPU: Turtles/ trap-hour	CPU: searches; Ind./ search day	Max. # calling	rel. abun.
Amphibia				
Anura				
<u>Bufo americanus</u>	N/A	0.06	7	+
<u>Hyla versicolor</u>	N/A	N/A	>100	++++
<u>Rana pipiens</u>	N/A	10.2	25	++++
<u>Rana catesbeiana</u>	N/A	N/A	3	
Reptilia				
Squamata				
<u>Nerodia sipedon</u>	N/A	0.37	N/A	+++
<u>Thamnophis sirtalis</u>	N/A	0.13	N/A	+
Testudines				
<u>Chrysemys picta</u>	0.009	1.24	N/A	+++
<u>Graptemy geographica</u>	N/A	0.06	N/A	+
<u>Apalone spinifer</u>	N/A	0.12	N/A	+
<u>Chelydra serpentina</u>	N/A	0.06	N/A	+

Table 4. Savanna Army Depot (SAD): species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling number at Burning Grounds Road.

species	CPU: Turtles/ trap-hour	CPU: searches; Ind./ search day	Max. ft calling	rel. abun.
Amphibia				
Anura				
<u>Rana pipiens</u>	N/A	6.8	25	++++
<u>Hyla versicolor</u>	N/A	N/A	>100	++++
<u>Bufo americanus</u>	N/A	N/A	5	+
<u>Pseudacris triseriata</u>	N/A	N/A	>50	++++
<u>Rana catesbeiana</u>	N/A	N/A	2	+
Reptilia				
Squamata				
<u>Nerodia sipedon</u>	N/A	0.1	N/A	+
<u>Thamnophis sirtalis</u>	N/A	0.07	N/A	+
<u>Cnemidophorus sexlineatus</u>	N/A	0.13	N/A	++
Testudines				
<u>Chrysemys picta</u>	1.78	9.33	N/A	++++
<u>Graptemys geographica</u>	0.14	0.4	N/A	++++
<u>Chelydra serpentina</u>	0.29	N/A	N/A	++++
<u>Apalone spinifer</u>	0.21	N/A	N/A	++++

Table 5. Savanna Army Depot (SAD): species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling number at Dam.

species	CPU: Turtles/ trap-hour	CPU: searches; Ind./ search day	Max. # calling	rel. abun.
Amphibia				
Anura				
<u>Hyla versicolor</u>	N/A	N/A	>100	++++
<u>Acris crepitans</u>	N/A	N/A	1	+
Reptilia				
Testudines				
<u>Crysemys picta</u>	1.07	4.2	N/A	++++
<u>Graptemys geographica</u>	0.57	2.3	N/A	++++
<u>Chelydra serpentina</u>	0.14	N/A	N/A	++++
<u>Apalone spinifer</u>	N/A	0.03	N/A	++++

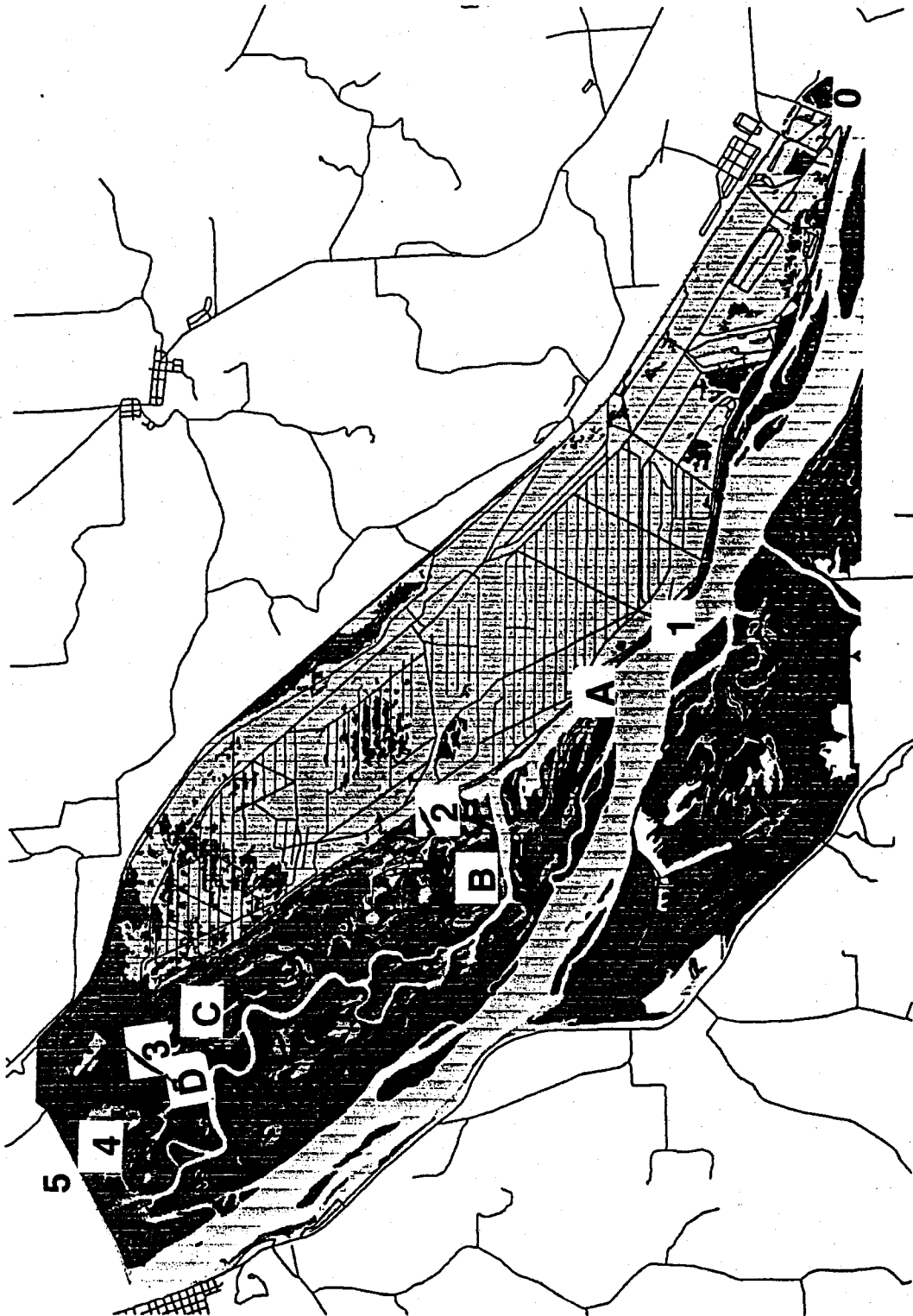
Table 6. Savanna Army Depot (SAD): species composition and relative abundance (RA) based on search data, hoop trap captures, and Anuran maximum calling number on the island south of Washout Plant Rd.

species	CPU: Turtles/ trap-hour	CPU: searches; Ind./ search day	Max. # calling	rel. abun.
Amphibia				
Anura				
<u>Rana pipiens</u>	N/A	13.4	N/A	++++

Figure 1. GIS map of the Savanna Army Depot (SAD). Sampling localities are depicted by numbers and letters: 1) Four commercial hoop traps set along sand bank of Mississippi River for 96 hours; 2) One commercial hoop trap set in pond north of Burning Grounds Rd. and two others set in slough south of this road for 2 1-week trapping periods; 3) Two hoop traps set north of Washout Plant Rd. for 2 1-week long trapping periods; 4) One hoop trap set in pond south of the Dam for 2 1-week long trapping periods; 5) Two commercial hoop traps set in lilly pads (east of Mississippi R.) for 2 1-week trapping periods; A) Trammel Net; B)Fyke Net; C) Drift Fence (Island is outlined); D) HAPS.

- LAND COVER USE**
(1977)
- OPEN WATER
 - BURMESE ROCHES
 - SUMMERO-ROOTED PLANT
 - SUMMERO-ROOTED PLANT AND FLOWERS
 - ROOTED PLANT
 - ROOTED PLANT AND FLOWERS
 - EMERGENTS
 - EMERGENTS-GALSENIP/PODS
 - GRASS/FORM
 - WOODY TERRESTRIAL
 - CULTIVATED
 - URBAN/DEVELOPED
 - SHRUBLAND

Roads
Higher ground



Scale: 0 2.50 5 mi

Figure 2. Landmarks used in text to show ranges of each species on the Savanna Army Depot (SAD): A) Trailer storage facility; B) Dam; C) River Road (Runs the entire length of slough); D) Crooked Slough; E) Commandant's Boat Launch; F) Washout Plant Rd.; G) Burning Grounds Rd.

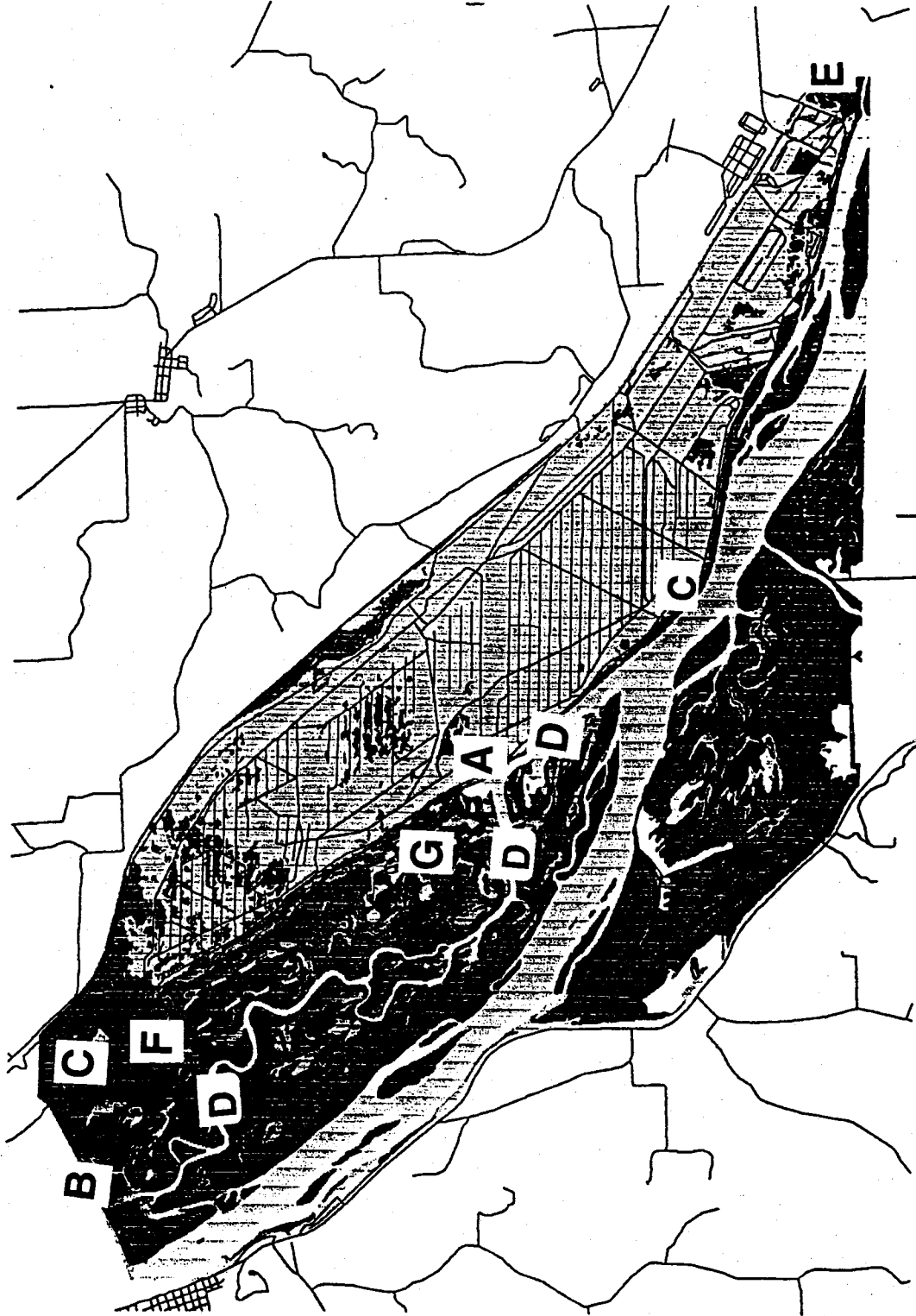
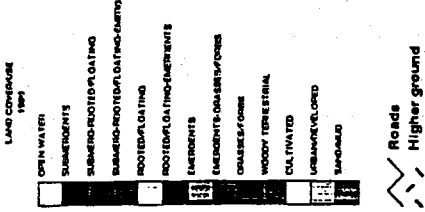
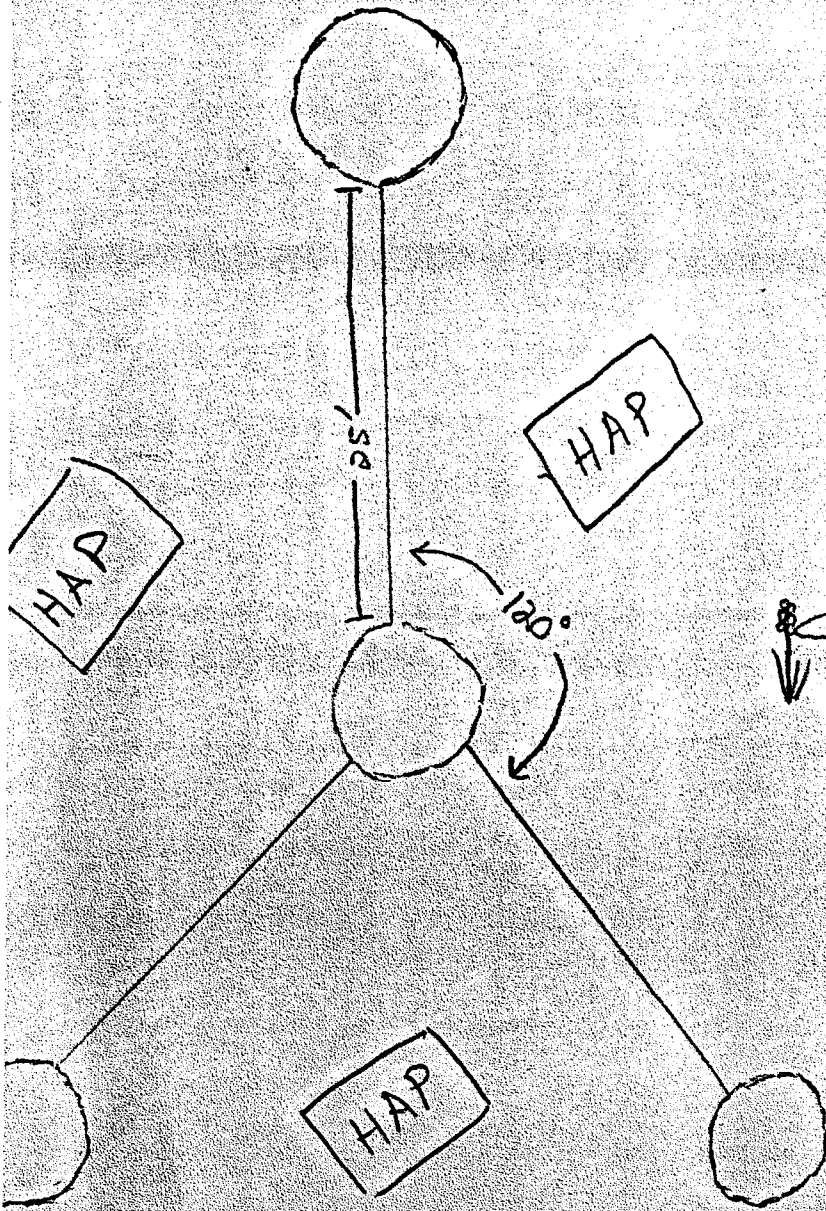
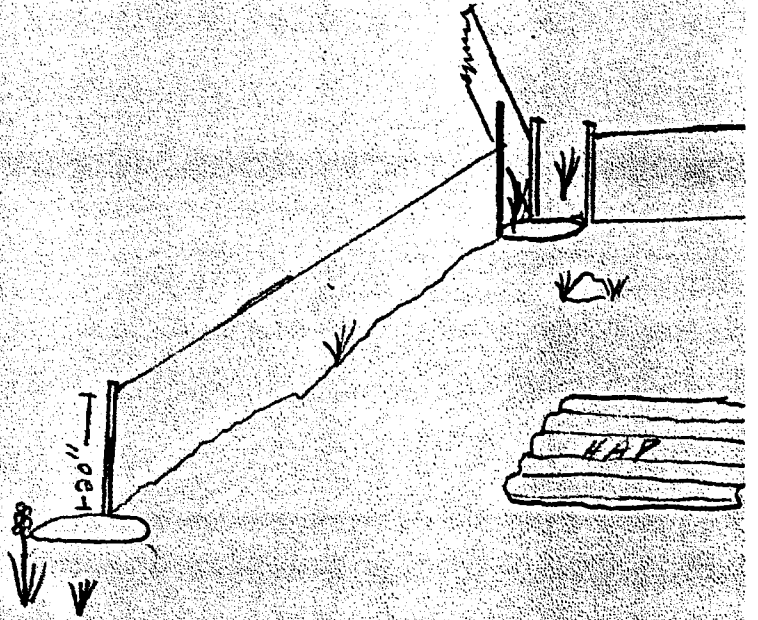


Figure 3. Drift fence used at the Savanna Army Depot to collect Amphibians and Reptiles.



Aerial View



Side View