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Inverts
and details re
verts/plants
(ie. habitat, community
etc for specific
species)

Fish
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birds
mammals
plants

Plant and Animal Basic Resources Inventory of Horseshoe Bend National Military Park

1 November 1974

HOBE-0005-All in except inverts.
Also could enter
detail info for
other groups
such as community type etc...

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CONTENTS

LIST OF FIGURES 3

INTRODUCTION 4

PLANT LIFE 5

Successional Trends 7

Primary Succession 7
Secondary Succession 9
Secondary Mesarch Succession 9
Secondary Hydrarch Succession 10

The Vegetational Map 11

Regularly Mowed Fields 14
Aster-Goldenrod-Broomsedge 15
Shrubs-Small Pines 15
Pine Dominance - Little Hardwood Understory 18
Pine Dominance - Moderate to Dense Hardwood Understory 19
Bottomland Hardwoods and Transition Hardwoods 19
Upland Hardwoods 28
Beaver Swamp 28

ANIMAL LIFE 30

Vertebrate Life 30

Mammals 31
Birds 34
Reptiles and Amphibians 36
Fishes 37

Vertebrate Composition by Terrestrial Habitat 37

Regularly Mowed Fields 38
Aster-Goldenrod-Broomsedge 39
Shrubs-Small Pines 40
Pine Dominance - Little Hardwood Understory 42
Pine Dominance - Moderate to Dense Hardwood Understory 42
Upland and Transition Hardwoods 44
Bottomland Hardwoods 45

Vertebrate Composition by Aquatic Habitat 47

Tributary Streams 48
Beaver Swamp 49
Rocky Shoals 51
River Channel 52

Invertebrate Life 53
CONCLUSIONS 59
APPENDIX I. Checklist of Vascular Plant Species 61
APPENDIX II. Checklist of Vertebrate Species 74
APPENDIX III. Checklist of Common Insect Families 86
REFERENCES 93

LIST OF FIGURES

1. Copy of 1967 ASCS aerial photograph of Horseshoe Bend National Military Park, indicating areas sampled in the vegetational analysis 6

2. Vegetational Map of Horseshoe Bend National Military Park 12

3. Aerial view of regularly mowed areas (upper left) in developed portion of park 16

4. Aerial view of old field dominated by small pines and shrubs (center) south of the Tallapoosa River at the eastern park boundary. Small areas of aster-goldenrod-broomsedge occur at places in this field 17

5. Aerial view of pine-dominated forest with moderate hardwood understory (center-right) near the Cotton Patch Hill pavillion ... 20

6. Aerial view of areas south of developed portions of park: bottomland hardwoods (center); transition hardwoods (slopes of hills in background); and upland hardwoods (crests of hills in background at right) 22

7. Aerial view of bottomland hardwoods along banks of the Tallapoosa River 23

8. Overhead aerial view of frequently mowed fields (Barricade Site) with hardwood-dominated forest on island and Alabama Highway 49 bridge (at right)..... 24

9. Aerial view of the beaver swamp area (center) surrounded by bottomland hardwoods 25

10. Aerial view of the beaver swamp with expanse of transition hardwoods on hills in background (upper left)..... 26

INTRODUCTION

This inventory of the biota of Horseshoe Bend National Military Park was conducted during the period from mid-June through mid-September, 1974. The methods used to evaluate various groups are discussed under the appropriate headings. The status of the various plant communities is discussed and mapped, and their potential development is indicated. The information presented includes lists of species of animals one can expect to find at one time or the other in the various habitats present within the park boundaries. This information is based partially upon the literature concerning habitat preferences and known ranges; species actually collected and observed within the limited time-frame of this study are indicated in the checklists. This approach was considered necessary because of the fact that no sampling procedure could guarantee to represent completely the plant or animal life of an area such as Horseshoe Bend on the sole basis of species observed and collected during the summer months.

It is the conviction of the project personnel that the area within the present park boundaries has been as thoroughly and carefully studied as any other area of comparable size in the Southeastern United States. It is hoped, furthermore, that the results presented herein will have prolonged usefulness to the National Park Service which supported the research.

PLANT LIFE

Plant community data were derived from quadrats and transects randomly placed in various habitat types. Locations of these sample areas are indicated in Figure 1. Description of the quadrat sample areas and their locations are as follows:

1. SE ¼ sec of SW ¼ sec. of Sec. 22 (Transition Hardwoods)
2. SE ¼ sec of SW ¼ sec of Sec. 22 (Bottomland Hardwoods)
3. NW ¼ sec of NW ¼ sec of Sec. 22 (Bottomland Hardwoods)
4. SE ¼ sec of NW ¼ sec of Sec. 14 (Bottomland Hardwoods)
5. SW ¼ sec of NW ¼ sec of Sec. 14 (Pine Dominance - Little Hardwood Understory
6. SW ¼ sec of SE ¼ sec of Sec. 14 (Shrubs-Small Pines)
7. NW ¼ sec of NE ¼ sec of Sec. 14 (Upland Hardwoods)
8. NW ¼ sec of NE ¼ sec of Sec. 22 (Transition Hardwoods)
9. NW ¼ sec of SW ¼ sec of Sec. 15 (Bottomland Hardwoods)
10. NE ¼ sec of SE ¼ sec of Sec. 22 (Upland Hardwoods
11. SE ¼ sec of SW ¼ sec of Sec. 15 (Aster-Goldenrod-Broomsedge)
12. NW ¼ sec of NE ¼ sec of Sec. 14 (Pine Dominance-Moderate Hardwood Understory)
13. NE ¼ sec of NE ¼ sec of Sec. 14 (Bottomland Hardwoods)
14. NE ¼ sec of NE ¼ sec of Sec. 14 (Bottomland Hardwoods)
15. SE ¼ sec of NE ¼ sec of Sec. 22 (Regularly Mowed Field)
16. NW ¼ sec of SW ¼ sec of Sec. 15 (Transition Hardwoods)

These quadrats were 20' X 100'. Trees and shrubs over 20' tall and 2" DBH were recorded as overstory. Both the number of individuals of each species and the DBH of each overstory plant were counted to determine an importance value for each species. Woody perennials less than 20' tall and 2" DBH



Figure 1. Copy of 1967 ASCS aerial photograph of Horseshoe Bend National Military Park, indicating areas sampled in the vegetational analysis.

were defined as woody understory. A list-count sampling technique was used for the woody vines, herbaceous understory, and woody understory.

Two line transects placed perpendicular to the contour of the land were used to determine community composition and changes associated with elevational differences. These transects were run near the location of Quadrat 10. Transect 1 comprised seven quadrats measuring 50' X 6', making the total length 350'. Transect 2 included six 50' X 6' quadrats for 300' total length.

Since it was not possible to make new, low-level, overlapping aerial photographs of the park for stereoscopic study, mapping the community types was accomplished by spot-checking areas on foot and comparing them with sampled areas. Study of ASCS aerial photographs APC-1JJ-165, 166, and 167 helped considerably, nevertheless, in orienting various activities of both plant and animal study teams. Thus, access to remote sites via boundary lines, service roads, footpaths, animal trails, nature trails, tributary streams and uncharted walks through various sectors furnished first-hand experience with the plants, which forms the basis of the following analysis and discussion.

Successional Trends

Ecological succession is the orderly, progressive change in animal and plant communities in a given area, which culminates in a stabilized ecosystem. The stabilized, self-perpetuating ecosystem that is the end product of succession is known as the climax community. A seral stage is one of the several transitory stages that occurs before the climax is reached. Each seral stage may be identified by a characteristic group of organisms. There are three important successional trends now occurring in the park, and they are as follows:

Primary Succession.- Primary succession occurs on a terrestrial or aquatic bedrock surface that either has never been previously occupied by a community or, if so, the effects of the community have disappeared. Primary succession is occurring in limited areas throughout the park, particularly

on rock outcrops in the northwest corner and along the Tallapoosa River. The rock surface is initially invaded with crustose, thallose, and foliose lichens which are able to survive the extremes of temperature and moisture on the rock surface. With the addition of soil material from the organic remains of lichens and the decomposition of the rock surface, Several species of pioneer mosses usually 1/8" to 1/4" high are able to become established. These mosses are able to hold wind-blown particles of debris and add organic matter to the slowly forming soil. With further accumulation of soils in cracks and depressions, annual weeds such as crabgrass (Digitaria spp.) will be able to establish themselves. These may later be followed by biennials and perennials such as broomsedge (Andropogon virginicus), asters (Aster spp.) and goldenrods (Solidago spp.). The next seral stage to follow is usually composed of shrubs characteristic of dry areas, particularly sumac (Rhus spp.), hawthorn (Crataegus spp.) and blueberries (Vaccinium spp). As they gain in height, these are able to shade-out the asters and goldenrods. Taller growing trees that are common to dry areas are able to out-compete these shrubs. Included are southern red oak (Quercus falcata), post oak (Q. stellata), black jack oak (Q. marilandica) and long-leaf pine (Pinus palustris). Finally a mesic oak-hickory-pine subclimax community will be reached as litter accumulations make it possible for more mesic species to occur. The important species for this subclimax forest type are short-leaf pine (P. echinata), loblolly pine (P. taeda), white oak (Q. alba), post oak (Q. stellata), bitternut hickory (Carya cordiformis), pignut hickory (C. glabra), and flowering dogwood (Cornus florida). Other important species are sweetgum (Liquidambar styraciflua), long-leaf pine, southern red oak, black-jack oak, northern red oak (Quercus rubra var. borealis) and American beech (Fagus grandifolia). The pines disappear from the climax community because their seedlings are shade intolerant.

Even though primary succession is occurring in the park in only small isolated areas, it has been included here because it serves as a model with which all terrestrial succession may be compared. Although secondary mesarch or secondary xerarch succession may lack the initial stages of primary succession, both follow the annual-perennial-shrub-tree pattern, and all terminate in the climax community described earlier.

Secondary Succession.- Secondary succession occurs in an area that has had other organisms growing on it and which have modified the substratum by their activity (e.g., have contributed their remains to soil formation). If this type of succession begins in a wet habitat, it is termed hydrarch succession. If it begins in an area of moderate moisture, it is termed mesarch succession. Both hydrarch and mesarch forms of secondary succession are occurring in the park.

Secondary Mesarch Succession.- The clearing of hardwood forest for use as agricultural lands and the cutting of timber in the past has set back succession to some subclimactic seral stage in virtually all areas of the park. "Old-field succession" is a term referring to secondary mesarch succession that occurs on formerly agricultural lands which have been abandoned. Fields cultivated until the park was formed and thereafter abandoned have been undergoing this process and can be observed in various stages of community development. The typical successional trend following field abandonment is described below.

After one year of abandonment crabgrass and horseweed (Erigeron canadensis) dominate the old field. These species produce a thick mat of organic matter in which their own seeds germinate very poorly. Within 2-4 years other species such as broomsedge, goldenrods, and various asters appear. These species are shade intolerant, and usually within 4-20 years

shrubs and small trees such as sumac, wild plums (Prunus spp.), loblolly pine and short-leaf pine begin to dominate the area. Within 25-100 years after abandonment (which includes most old fields in HBNMP), pines dominate the overstory. The understory consists.of young hardwoods, including sweetgum, willow oak (Q. phellos), sourwood (Oxydendrum arboreum), flowering dogwood, and others. In the 100-200 year period, pines, which are unable to reproduce in dense shade, are replaced gradually by the hardwood-dominated climax forest previously described under primary succession. The formation of the mature climax community rarely occurs near any sizeable human population because of frequent setbacks from fires, timber harvesting, and other natural or man-made disturbances. Land in which timber has been harvested follows a pattern similar to that of old fields. Open areas formed by the removal of trees will usually begin at the broomsedge-goldenrod-aster stage or a later stage and progress forward.

Secondary Hydrarch Succession.- The final successional trend of importance occurring in the park is secondary hydrarch succession. This is occurring in a fairly large beaver swamp, near the apex of the river bend opposite the developed portion of the park area. A small creek flowing near an old field was dammed several years ago by beavers, forming a shallow pond. In the littoral zone of the pond, rooted submergent plants such as water milfoil (Myriophyllum sp.) and waterweed (Elodea sp.) were able to become established during the first few years of the pond's existence. Following these, rooted plants, whose leaves float on the water surface, are able to out-compete the shade intolerant submergent vegetation. Water shield (Brasenia schreberi) is still present in most of the deep areas of the swamp. This floating aquatic has been and will continue to be shaded-out

by emergent vegetation able to invade the area. Emergent plants now present in the swamp include common cattails (Typha latifolia), various sedges (Cyperus spp., Scirpus spp., etc), arrowhead (Sagittaria latifolia), lizard's tail (Saururus cernuus), and arrow-arum (Peltandra virginica). These plants build up additional sediments and add organic matter to the pond bottom. As the pond gradually fills, wetland shrubs and trees can invade and shade-out the emergent herbs. Thus, sweetbay magnolia (Magnolia virginiana), black willow (Salix nigra), button bush (Cephalanthus occidentalis), and tag alder (Alnus serrulata), now present at the edges of the swamp, will eventually grow at its center after enough sediments accumulate. After many years, the climax forest, consisting of ash (Fraxinus spp.), sycamore (Platanus occidentalis), sweetgum, red maple (Acer rubrum), etc. will prevail where presently a beaver swamp in the early stages of secondary hyrarch succession exists.

The Vegetational Map

The Vegetational Map (Fig. 2) includes nine major zones. Most of these zones represent different seral stages of "Old-Field Succession" as discussed above. Each seral stage is unique in the flora and fauna that composes it and in the way in which it affects the entire ecosystem of which it is only a part. Not only does the species composition of flora and fauna change in succession, but other fundamental ecological processes undergo modifications. Food chains in very young successional stages tend to be simple and linear. These food chains also are predominantly grazing food chains (i.e., plant-herbivore-carnivore). In mature ecosystems, food chains become diversified into more complex food webs, and most of the energy flow occurs along detritus pathways. In general, as succession progresses, species diversity

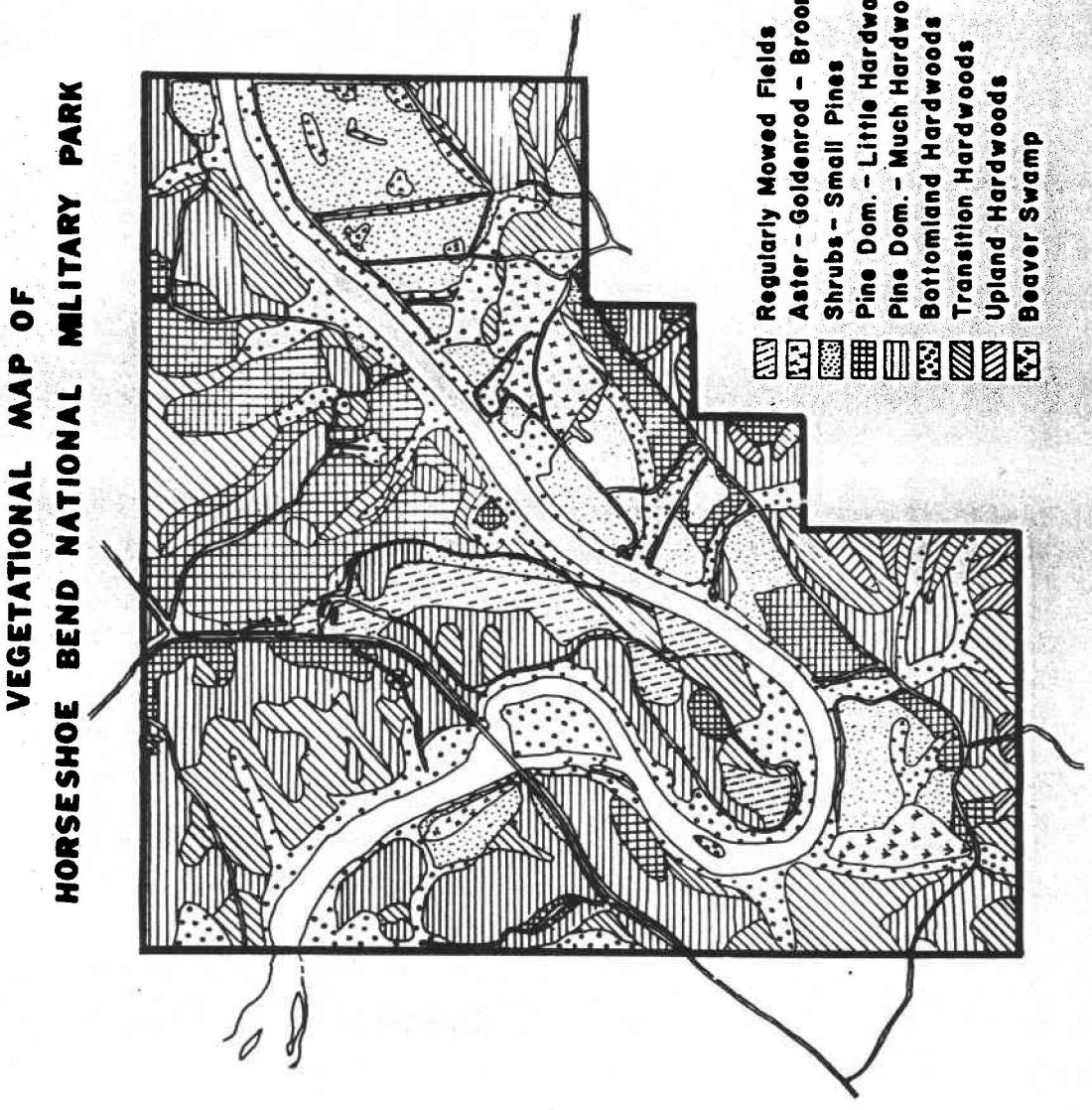

VEGETATIONAL MAP OF
HORSESHOE BEND NATIONAL MILITARY PARK
Regularly Mowed Fields
Aster - Goldenrod - Broomsedge
Shrubs - Small Pines
Pine Dom. - Little Hardwood Understory
Pine Dom. - Much Hardwood Understory
Bottomland Hardwoods
Transition Hardwoods
Upland Hardwoods
Beaver Swamp

Figure 2

increases, and the importance of any one species decreases. This leads to community homeostasis. For example, in the seral stage in which pine trees totally dominate the overstory a population of seed-eating animals such as the grey squirrel would suffer severe losses in case of a pine seed failure. In the more diversified oak-hickory forest, the failure of one species of tree to produce fruit would not as seriously affect the grey squirrel population because there are other species of seed producing trees which it can utilize for food. Communities with one overwhelmingly dominant species generally support very few animal species. Diversity tends to increase as succession occurs and declines only slightly as the climax is reached. Mature ecosystems, such as the oak-hickory forest are also better able than developing ones to hold nutrients, especially nitrogen, phosphorous, and calcium.

Because of these factors cited above, one particular seral stage may be more important than another in the ecosystem. Importance as used here refers to the ability to produce community homeostasis, nutrient conservation, etc. (i.e., those things that tend to reinforce the system and perpetuate it). Each zone represented on the vegetational map will either be discussed separately or related ones combined in small groups for discussion. Those plants which are good indicators of a particular area will be mentioned and the importance of each area will be discussed. Additional information on species to be expected in the various communities can be found in the checklist of plant species (cf. Appendix 1), in which the preferred habitats of non-weedy species are indicated.

It must be noted that the grouping of plants into distinct groups or associations is somewhat arbitrary. A community of plants can range in scope from an association of lichens on a rock outcrop to a deciduous forest

covering much of eastern North America. The associations shown in this report closely correspond to the seral stages of succession and are those we feel will be useful in formulating plans for Horseshoe Bend National Military Park. Furthermore, it must be realized that there is usually no marked change in vegetation as one travels from one area to another. Also, these gradual transitions (ecotones) become less pronounced as the later seral stages are reached. Although distinctive, community plots of only four or five acres were considered too small to indicate on the map scale used.

One must understand also that the park is located in and is a small part of a river basin ecosystem composed of the Tallapoosa River and its tributary streams. The Tallapoosa River itself is directly dependent on its surrounding drainage. The rate of water run-off, the vegetational types covering the river basin, and numerous other factors dictate to a large extent the flora and fauna and the productivity of the river. Since man depends on the river systems of this country for maintenance of living-standards, if not his own survival, management of the Tallapoosa catchment basin is of major importance to HBNMP.

Regularly Mowed Fields, Roadsides, and Other Areas.- The mowed fields of HBNMP include considerable area and may be regarded as an artificially maintained early seral stage comprising grasses as the dominant plant forms. When abandoned such areas proceed with the stages of old field succession represented in many formerly cultivated areas of the park. Little is known about the ability of regularly mowed areas to conserve nutrients, create stability in the ecosystem, etc., but it can safely be assumed that these areas are relatively non-productive biologically in comparison to the forested areas. The dominant species of the mowed fields include:

dallis grass (Paspalum dilatatum), smut grass (Sporobolus poirettii) Bermuda grass (Cynodon dactylon), johnson grass (Sorghum halepense), crabgrass (Digitaria sp.) and several others. These areas are shown in Fig. 3.

The grass fields serve as habitat and feeding grounds for several species of birds and small mammals. Besides this contribution to the wildlife of the park, the grass community stabilizes soil and prevents erosion very effectively.

Similar to the open fields are most of the roadsides and unpaved maintenance roads within the park area. Grasses remain as the dominant plant forms in all these areas because of periodic mowing. Otherwise, dicotyledonous weeds and tree seedlings would soon become established, and within a few years this community type would phase into later stages of secondary succession.

The Aster-Goldenrod-Broomsedge Stage.- The indicator species include various goldenrods, broomsedge, fleabanes (Erigeron spp.) and asters. This is an important seral stage in the park. There is a moderately diverse association of annuals and perennials during this stage which produce a dense growth of vegetation. Several of the wildlife species, including the bobwhite quail and many seed-eating songbirds, are directly dependent on this stage. Many of the species which live in the surrounding woods use this area for cover and concealment and as a supplementary food source, particularly in the fall and winter months. The grazing food chains that predominate produce a large standing crop of insects which also serve as a food source for many animals. Soil erosion appears to be minimal in these areas due to the thick growth of roots which bind the soil particles. (Cf. Fig. 4.)

The Shrub-Small Pine Stage.- The indicator species include winged sumac

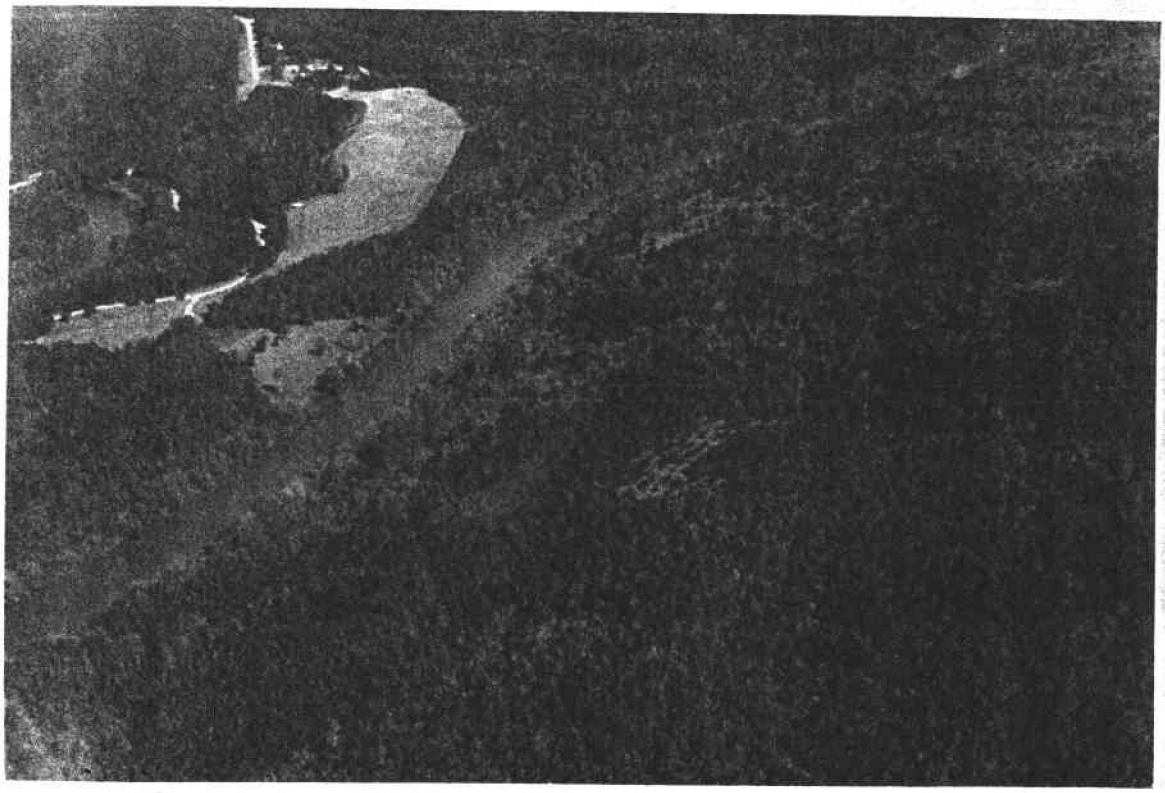


Figure 3. Aerial view of regularly mowed areas (upper left) in developed portion of park.

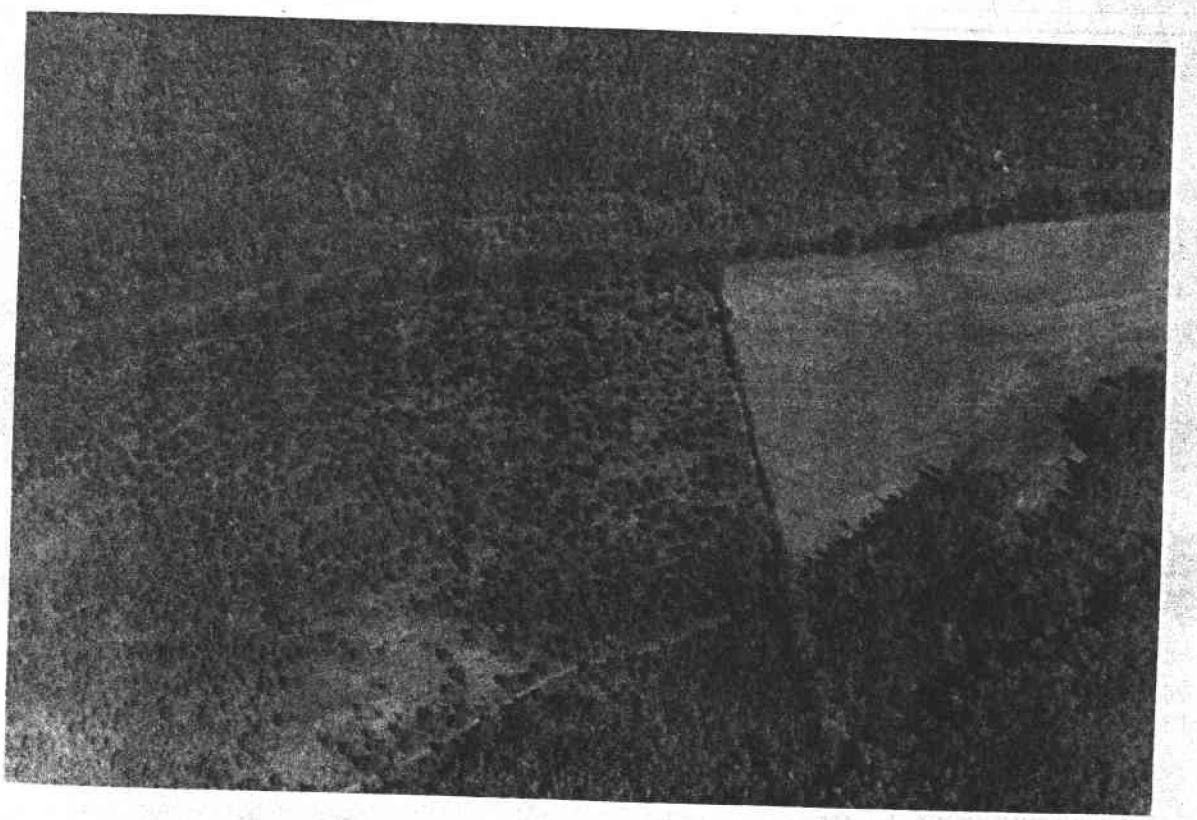


Figure 4. Aerial view of old field dominated by small pines and shrubs (center) south of the Tallapoosa River at the eastern park boundary. Small areas of aster-goldenrod-broomsedge occur at places in this field.

(Rhus glabra), chickasaw plum (Prunus augustifolia), wild black cherry (Prunus serotina), loblolly pine and short-leaf pine. These species are usually intermixed with the species mentioned above. When no pine seed-source is available, various hardwoods may be present. The discussion of the aster-goldenrod-broomsedge stage can be equally applied here. The presence of small pines and shrubs adds to the diversity of the area by supplying new food and cover for some species and an increase in breeding sites for some birds. The dominance of small pines is well illustrated in Fig. 4.

Pine Dominance-Little Hardwood Understory.- The indicator species are loblolly and short-leaf pines. These are areas in which fields were abandoned and, because of an abundance of seed from nearby woods, stands of pine of almost uniform age developed. These are at a stage of development in which there is practically no growth of hardwoods in the understory. The presence of few dominant species severely limits the number of animal species. Only a few insectivorous birds, such as the carolina chickadee, use the area. Only a few insect species are present but those present show high densities. The high density of the pines represents a situation conducive to epidemics of disease, insects, or fungal attacks. Any infection may spread quickly from one tree to another. In the case of insects, every tree acts both as a source of food and a breeding ground. Should an epidemic destroy the pines, the lack of an understory and the presence of only a thin layer of organic matter would accelerate run-off and cause rapid soil erosion. Such erosion has occurred in the park area where trees were formerly removed and is evident in nearby areas clear-cut in pulp and timber operations. The eroded soil is, of course, deposited in the Tallapoosa River and its tributaries, with subsequent damage to the river's ecology (cf. discussion of siltation under Bottomland Hardwoods). These occurrences

lead to instability and fluctuations in the plant community and adversely affect plant succession.

*The possibility of fire damage is another aspect. These young pine forests, because of the open canopy with good air circulation, tend to be hotter and drier than hardwoods and thus more highly combustible, particularly in the late summer months. The fallen pine needles also frequently contain oil residues and are very flammable. In contrast, a dense growth of hardwoods has a closed canopy that prevents the sub-canopy air from circulating well, and thus it is relatively humid. High rates of transpiration from leaves and the high moisture containing properties of the forest litter under hardwoods create a moister habitat which is less fire prone than that under pines. *This should be a major management consideration since the Southeastern region is especially fire-prone because of its climate.

Pine Dominance - Moderate to Dense Hardwood Understory.- The dominant species include loblolly and short-leaf pines. These woods are fairly productive with the maturing pines yielding a good seed supply and with some hardwoods, such as flowering dogwood, beginning to mature. Most oak species start producing seeds after about 20 years, and oaks are common in the understory and gradually assume dominance. This is a seral stage transitional between the pine forest with no hardwood understory and the subclimax mixed hardwood-pine forest. Most characteristics of this community are also intermediate between these extremes. Such woods are shown in Fig. 5.

Bottomland and Transition Hardwoods.- The bottomland hardwoods, occurring along the river and its tributaries and on their floodplains, are the most important vegetational type in the park in terms of their stabilizing effect on the ecosystem. The indicator species include river birch

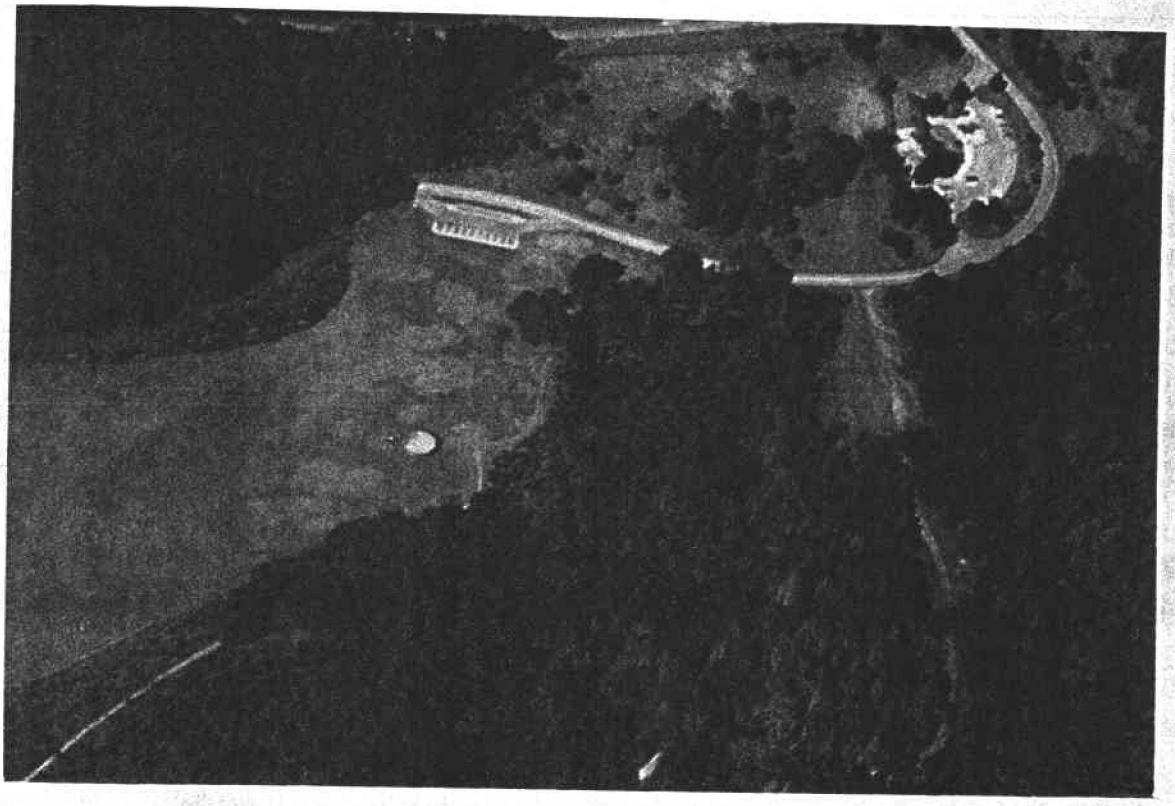


Figure 5. Aerial view of pine-dominated forest with moderate hardwood understory (center-right) near the Cotton Patch Hill pavillion.

(Betula nigra), sycamore (Platanus occidentalis), box elder (Acer negundo), red ash (Fraxinus pennsylvanica), tag alder (Alnus serrulata), and sweetbay magnolia (Magnolia virginiana). These woods are shown in Figs. 6-9.

The transition hardwoods, occurring in broad or narrow zones from the edges of floodplains to more upland habitats, are prevalent on gently sloping land not recently disturbed by agriculture or logging operations. Indicator species include sweetgum, black gum (Nyssa sylvatica), black oak (Quercus velutina), red oak (Q. rubra), winged elm (Ulmus alata), sourwood, tree sparkleberry (Vaccinium arboreum), highbush blueberry (V. elliottii), pignut hickory (Carya glabra), and mockernut hickory (C. tomentosa). This zone may intergrade with the upland hardwoods or earlier seral stages represented in the park, and species characteristic of these communities also may occur in this forest type. (Cf. Fig. 6 and also Fig. 10.)

Bottomland and transition hardwoods are treated together here because they form an integrated vegetational type which substantially affects the biota of the Tallapoosa River system. Allochthonous material in the river and its adjoining woodland streams is very important to the productivity of the system. Autumnal leaf-fall from bottomland hardwoods which overhang these streams contributes most of the foreign material. Besides the inorganic nutrients, fallen leaves also add large quantities of organic matter and serve as both substrate and shelter for many organisms indigenous to the small streams. Most small streams in the park are heavily shaded, and the leaves that fall into them serve as their major source of energy.

The leaf-packs that form in shallow portions of small streams and other accumulations of large organic particles constitute special habitats in which the detritus food-chains operate. These accumulations permit development of a specific fauna including craneflies (Tipulidae), stoneflies

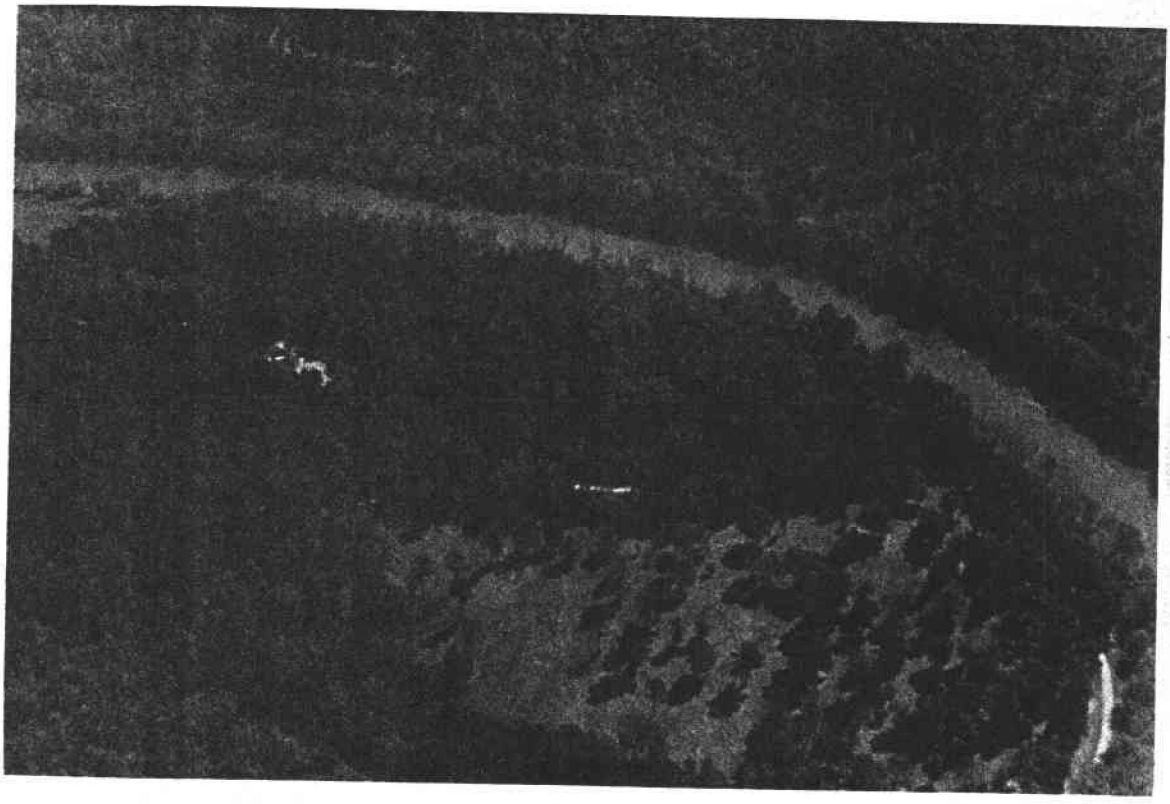


Figure 6. Aerial view of areas south of developed portions of park; bottomland hardwoods (center); transition hardwoods (slopes of hills in background); and upland hardwoods (crests of hills in background at right).

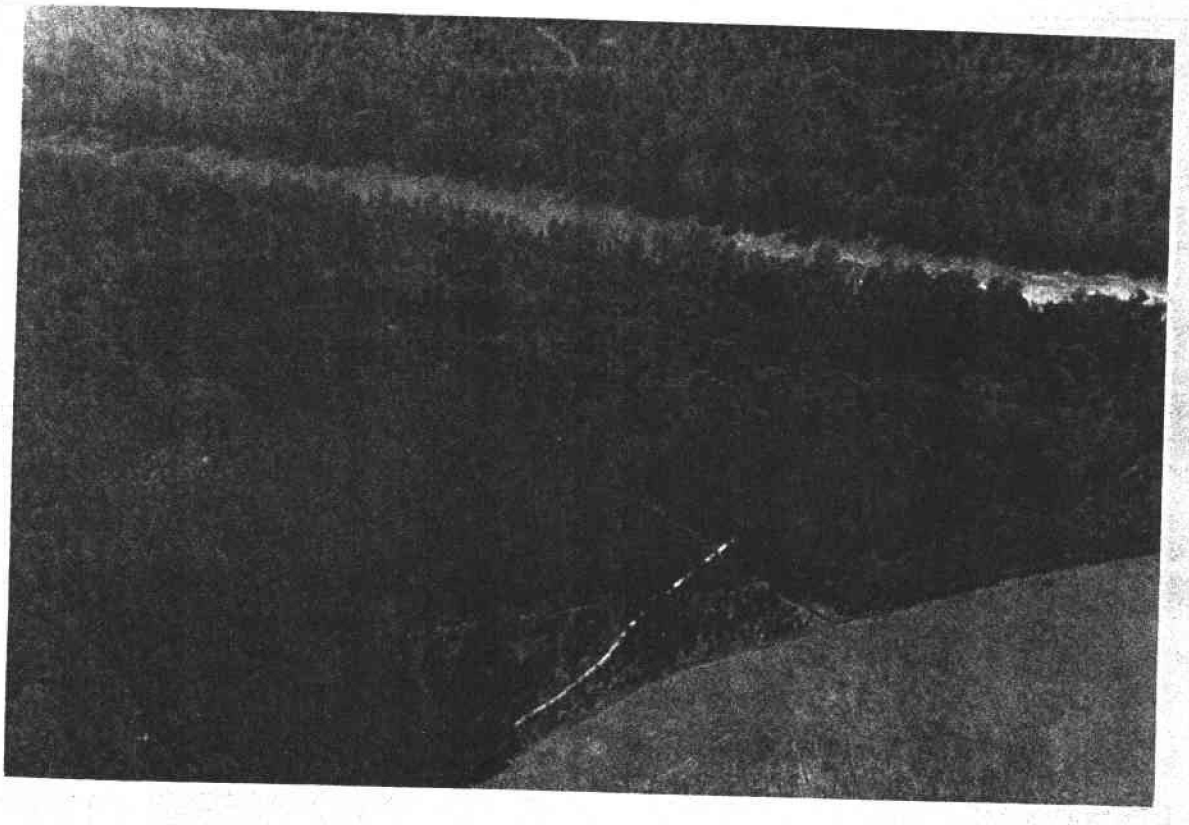


Figure 7. Aerial view of bottomland hardwoods along banks of the Tallapoosa River.



Figure 8. Overhead aerial view of frequently mowed fields (Barricade Site) with hardwood-dominated forest on island and Alabama Highway 49 bridge (at right).



Figure 9. Aerial view of the beaver swamp (center) surrounded by bottomland and hardwoods.



Figure 10. Aerial view of the beaver swamp with expanse of transition hardwoods on hills in background (upper left).

(Plecoptera) and caddisflies (Trichoptera). Mayflies (Ephemeroptera) and orthoclad midges may also be present and feed on the finer particulate matter. The overhanging branches of bottomland hardwoods not only provide energy inputs to the detritus food-chains but also shade the waters of the small woodland streams and thus maintain relatively constant water temperatures. Most of these streams are shallow, and the removal of vegetation would increase temperatures considerably causing concurrent reduction in the amount of dissolved oxygen. Significant faunal reductions could and would occur if bottomland hardwoods were removed.

The bottomland and transition hardwoods both regulate ground water and run-off water levels and prevent siltation of the streams. Relatively large accumulations of leaf-litter on the forest floor soak up rainfall and release it slowly to the woodland streams usually as underground seepage. Thus, sheet erosion from surface drainage is prevented. Also the slow release of gravitational water moderates changes in the water levels in the river. Rapidly fluctuating water levels are deleterious to detrivorous organisms and thus decrease the productivity of the river. Slow release of water also helps to reduce flooding along the floodplain during periods of high rainfall.

Siltation of waterways is an important destructive force in rivers, and a stable forest (usually hardwood) community is the major deterrent opposing siltation. Silt deposits in streams form a substratum that is very unstable. For this reason few benthic animals and plants are able to live in or on silty bottoms. Studies have shown that the removal of forest vegetation from a drainage basin causes multiplication of sediment yields in the rivers water and subsequent diminution of the biota of the river. The roots of trees growing along streams stabilize the banks and prevent the caving in of the sides. The importance of the forest litter

in maintaining water quality has already been mentioned.

The overhanging branches of trees are habitat for many insects that serve as food for the stream organisms, both vertebrate and invertebrate.

The hardwood forest in the river basin also serves as a trap for nutrients and pesticides. It supports a large and diverse microfauna which aids in the breakdown of pesticides and absorbs nutrients. It provides a large amount of fine particulate organic matter which can adsorb many nutrients, as well as pesticides that might arrive from surrounding farms. The bottomland and transitional hardwoods are clearly of great importance to the riparian ecosystem as regulatory and biological pollution control mechanisms.

Upland Hardwoods.- The upland hardwoods constitute only a minor portion of the park. They occupy the high, dry, long-undisturbed areas of the park. The indicator species are southern red oak (Quercus falcata), black jack oak (Quercus marilandica), sourwood (Oxydendrum arboreum), sassafras (Sassafras albidum), dwarf huckleberry (Gaylussacia dumosa) and bracken fern (Pteridium aquilinum).

The upland hardwoods play a role similar to the transition hardwoods discussed in the previous section. The major difference is that the upland hardwoods comprise fewer species and represent a smaller biomass than the transition hardwoods. One location with this forest type is shown in Fig. 6.

The Beaver Swamp.- The beaver swamp is in close association with bottomland hardwoods and the adjacent river. The beaver swamp is only a short distance from the river, and during floods it becomes connected to the river. No doubt considerable numbers of various kinds of aquatic life are added to the river at flood times. It has been shown that such swamps and oxbow lakes

adjacent to rivers greatly increase the carrying capacity of these rivers for aquatic life. When linked to the river the beaver swamp supplies plankton to the river and may be used as a spawning ground by some fish. The swamp also serves as resting and feeding grounds for migrating ducks in winter. It is an ideal habitat for many of the amphibians and reptiles present. The swamp also contains many plant species not found elsewhere within the park. Some common plants found in the beaver swamp include water-shield, arrowhead, lizard's tail, arrow-arum, buttonbush, tag alder, common cattail, and various sedges (Scirpus, Cyperus, Eleocharis, etc). The beaver swamp area is illustrated in Figs. 9 and 10.

ANIMAL LIFE

Vertebrate Life

Sampling of major habitat types in Horseshoe Bend National Military Park was conducted from mid-June to mid-September, 1974, to determine the numbers and species of animals occurring in the park and the habitats which they occupy.

Species diversity in both plant and animal communities is important ecologically and aesthetically. Ecologically it is important because it creates homeostasis in the community and reduces the impact of disease and predation. The aesthetic values, which unfortunately are often considered unimportant, are of major importance for our consideration, because the area being studied is a National Park. This is because a park visitor would probably find his visit more enjoyable if he saw a wide variety of native plant and animal species than if he saw only a patchwork of even-aged pine stands and mowed lawns and the few species of wildlife they are capable of supporting.

Success in collecting and observing animals varies with several factors: season, prevalent weather trends, collecting methods, and, to some degree, chance. Therefore, any study conducted during only one season is not likely to include all species present in an area, and our study certainly is no exception. For an area to yield truly representative data it should be studied through each season for at least a year and preferably longer. Included as Appendix II of this report is a checklist of the vertebrate species which occur in Horseshoe Bend National Military Park. This checklist has been compiled from actual collections or sightings by the research team, literature and museum records, and inferences drawn from knowledge

of species ranges and habitat requirements. Also included in the checklist is a status designation for each species within the park. That is, their relative abundance is designated as rare, uncommon, common, or abundant. These designations apply to the populations in the park area only and would not apply, for instance, to their status statewide or regionally.

For our study, we have divided the vertebrates into four major groups: mammals, birds, herptiles (amphibians and reptiles), and fishes. Each group is considered separately as to collecting techniques employed, and the species present in each habitat type are listed in the following text. The habitats we will consider include the terrestrial habitats previously discussed and defined under Plant Life and also the aquatic habitats found within the park. Although some repetition necessarily occurs as a result of this format, it is believed that maximum use can be made of our results when presented this way.

Mammals.- Most mammals in HBNMP are small, secretive and nocturnal. Two methods of collecting were utilized in our study: pitfall traps and snap traps. Pitfall traps are used for the small mammals not ordinarily attracted to baited snap traps and consist of one-gallon cans set in the ground along runways, logs, and bases of trees and stumps. If checked daily pitfall traps yield unharmed specimens, and a population density can be estimated. Snap-trap transects consist of fifty museum special traps baited with corn meal, peanut butter, and sevin (to keep fire ants off the bait and catch). Each transect has seventeen stations which are set ten feet apart, making the total transect 160 feet in length.

Three 12-can pitfall transects were established in an effort to collect certain insectivorous species. Two transects were established in bottomland hardwood situations for a 10-day period in the month of June. Both

transects were checked daily, and they yielded similar results. One transect north of the river yielded (3) short-tailed shrews (Blarina brevicauda) and seven (7) southeastern shrews (Sorex longirostris). The other transect on the south side of the river yielded three (3) short-tailed shrews and four (4) southeastern shrews. The third transect was established for a 10-day period in August along the border of a mowed field and an aster-goldenrod-broomsedge situation in an effort to collect the least shrew (Cryptotis parva). No least shrews were collected although one southeastern shrew was taken.

Some conclusions can be drawn from the results of our pit-fall trap transects. First we can conclude that the population density of the shrew populations is much greater in the lowland hardwood situation than in the upland field-edge situation. Secondly, we can conclude that the southeastern shrews outnumber the short-tailed shrews in the lowland hardwood situation. We cannot conclude that the least shrew is absent from the park just because none were captured, although the habitat sampled is considered its preferred habitat. We can only question the status of the least shrew and the efficiency of the trap transect. One possible factor affecting our trapping results would be predation upon the catch by common crows. Crows are very common in the park, particularly in the area of the third pit-fall trap transect, and they constitute an important predatory species on small mammals.

Four 50 snap-trap transects were established in the following habitat types: (1) hardwood floodplain, (2) even-aged pine forest with little or no understory, (3) mixed hardwood-pine hillside, and (4) an old field situation. The transects were established for the three-day period of July 8-10 and were checked daily. No specimens were taken in the hardwood floodplain or the pine stand. One Blarina brevicauda was taken in the mixed

hardwood-pine hillside probably as a result of chance. Blarina are insectivorous and are not attracted to bait, but the animal may have attempted to catch some insects (such as woods roaches) which were repeatedly observed feeding on the bait. The old field transect, however, yielded eight (8) cotton rats (Sigmodon hispidus) for the 150 trap-night period. As for age composition, there were six juveniles and two adults. These individuals included four males and four females.

Three 50-trap transects were established for three-day periods during the month of August. These were established in the following habitats: (1) low-lying, infrequently mowed field, (2) upland hardwood, and (3) along the border of a mowed field and shrub-small pine situation. No specimens were taken in the low-lying field or upland hardwood. At the mowed field's edge, however, six (6) cotton rats were taken for the 150 trap-night period. There were five juveniles and one adult, and equal numbers of males and females.

From trapping results it is clear that field situations rather than wooded situations are preferred by the cotton rat population in the park. The population is composed primarily of juveniles at this time of the year. Trapping during the other seasons of the year, particularly winter, would yield a more suitable population density determination. Although they were the only rodents captured in snap-traps, cotton rats are not the only rodents occurring in the park. In fact, other species were collected by hand or were identified by sight. Considering all collecting results for the study period, cotton rats are the most abundant rodents in the park. It should be noted that an early summer drought probably affected population density for this summer. As for our trapping success, loss of bait to fire ant predation and heavy rains during trapping periods limited our trapping

ability. These factors were of great importance in the pine stand, old field situation, and low-lying field situation.

As was stated earlier, some small mammals were collected by hand or identified by sight. Bat species were collected with firearms. Large mammals, both herbivores and carnivores, were identified by tracks, signs and actual sightings. For these mammals the population density determinations must be limited to their being classified as abundant, common, uncommon, and rare. These determinations are based on number of sightings and also on knowledge of the species ranges and habitat requirements.

It should be mentioned that signs of dogs are abundant within the park area, both north and south of the river. Dogs can be classified as tame, free-ranging, and feral, and, of course, their tracks are indistinguishable. Tame dogs were observed on numerous occassions. Free-ranging and feral dogs are distinguishable in that feral dogs often run in packs, show very aggressive behavior, and seldom, if ever, visit human habitations. Free-ranging dogs, however, may visit farm houses to feed, show only moderately aggressive behavior, and seldom, if ever, run in packs. One dog, apparently of German Shepherd stock, was observed just outside the northern park boundary in the vicinity of Emuckfaw Creek. This animal appeared to be scavenging alone rather than hunting in a pack, and would be best classified as free-ranging. The possibility of feral dogs occurring in the park, however, should not be dismissed.

Birds.- The avian population of any area is the most obvious and active wildlife element, and as such it is generally the most easily studied. Birds are the most favorably regarded wildlife forms and constitute the major attraction for a park lacking spectacular mammal species such as

bear, elk, and bison. Therefore, great emphasis should be placed upon their habitat needs in the overall park management plan. Though some species may become scarce or absent if the parks woodlands reach the climax stage, the loss will be far outweighed by the increase in and addition of species restricted to or heavily dependent upon mature hardwood communities with their old and dead trees-- a situation rapidly disappearing in Alabama.

Identification of species was made by sighting of birds, identification of distinctive songs and calls, and identification of nests and feathers. Singing male transects were run in mornings in varying habitat types, and spot identifications were made throughout the day. Nocturnal birds were identified mostly by their calls.

Criteria for determining breeding residents included 1) finding occupied nests, 2) finding nests distinct for certain species, and 3) sightings of immature birds attended by adults. Singing males of small passerines can be assumed to represent breeding birds within the park since their usual territory is a few acres at most. The vultures and red-tailed hawk may not be presently nesting within the park, but since it is within their feeding range and suitable nesting habitats exist, they are considered breeding species. Certain species that are included and cited as observed in the checklist probably do not represent breeding species. The sparrow hawk does not normally nest in the area and the specimen found was probably a vagrant individual. Only one meadowlark was sighted in the park, and the frequency of mowing would preclude any successful nesting. The great (American) egret nests only in large colonies of its own species or with other herons. There is not suitable feeding area for such numbers of herons near the park.

Many species, particularly small passerines, leave the area in winter

and are replaced by other species. Thus, the comprehensive checklist is one that includes winter species and probably additional species which may breed in the park at times. No abundance designations are given for these species. Certain species, notably water fowl, are probably rare within the area and stay only a day or so at most. Abundance designations for other species are for the birds observed in the park area by the study team during the summer 1974. These designations do not necessarily apply to the species in other areas and could well vary from year to year in the park itself.

Reptiles and Amphibians.- Reptiles and Amphibians, as a group, are probably the least appreciated of all the vertebrate animals that may occur in the park. Since even before Linnaeus referred to them as "foul and loathsome animals" there has been public antipathy toward the herptiles. However, they constitute an important group of animals occurring in the park, and an understanding of these animals and their habitat preferences is essential to a comprehensive park management plan.

For our study, trapping was not used for the collection of herptiles, although occassional lizards and salamanders were collected in the small mammal pitfall traps. Most identifications were the result of actual collecting in the field, sightings, or the identification of anuran vocalizations. Seining and fishing techniques were utilized in collecting aquatic forms.

In determining population densities we must restrict our determinations to that of relative abundance: abundant, common, uncommon, and rare. This, again, is based on the total collections of the research team and on knowledge of species ranges and habitat requirements.

Fishes.- Fishes are one of the most important groups from a recreational standpoint. From a zoological standpoint the ichthyofauna of the Tallapoosa River is extremely interesting and includes several endemic species.

Collections were made in the beaver swamp and rocky shoal areas with a twelve-foot nylon seine of one quarter inch mesh and with hook and line methods. Due to the difficulty of seining the small streams, these areas were sampled by dipnet and drophook. The nature of the bank and bottom made seining impractical in the main river but catches made by fishermen were examined. Certain species were identifiable without the necessity of capture (e.g., carp and nesting sunfish). Specimens captured were identified by use of Freshwater Fishes of Alabama (Smith-Vaniz, 1968). This publication also provided basis for probable additional species.

Due to difficulty in making truly representative collections, especially in the river, relative abundance designations are not given in the check-list. Also, some species (e.g., small mouth bass and shad) are introduced forms whose status has not been determined at the present time.

Vertebrate Composition by Terrestrial Habitat

In discussing the species of animals one would expect to find in certain habitats, it is necessary that we understand the importance of motility in animal species. The white-tailed deer, for instance, could be found in any terrestrial habitat in the park. However, one would expect to find white-tailed deer in heavily wooded areas during daylight hours and in more open areas during the hours of darkness. The evening bat flies over all areas of the park feeding in open areas and along old roads. However, the evening bat requires hollow trees or loose bark for roosting, and these are found primarily in the hardwood areas of the forest.

These two examples alone indicate that a listing of all species found in each habitat type would be far too general and essentially useless. We propose, therefore, two subheadings under each habitat type: 1) preferred and 2) secondary. Under "preferred" habitat we will list those species which specifically require that habitat for existence and species with a majority of individuals spending the major portion of each day in that habitat. Under "secondary" habitat we will list those species which frequent that habitat for certain activities (i.e., breeding, feeding, nesting, etc.) but do not occupy that area during most of their daily existence. In certain cases we will specify for what occassional activity a given habitat is required , if it is considered important.

For example, the river cooter (Pseudemys concinna) prefers the river for its daily existence. However, the aster-broomsedge fields and infrequently mowed areas are required for nesting sites, and would, therefore, be listed as "secondary" habitats. Some species show little preference between similar habitats, and some may exploit many "secondary" habitats. Therefore, it should be noted that some species will be listed under more than one preferred habitat and many will be listed under more than one secondary habitat.

Regularly Mowed Fields.- This habitat is not preferred by any vertebrates for any activity other than feeding. Certain species which would normally breed in a field situation (e.g., meadowlarks or cotton rats) are excluded from this activity due to the frequency of mowing. The frequency of mowing also precluded most seed production and thereby limits the food source for many seed eating birds and rodents. One small portion of the mowed area near the river below the New Youka Overlook is mowed less frequently and is utilized by bobwhite and harvest mice for breeding and other species for

feeding. These fields, as any other open areas, offer optimum feeding areas for bat species and some other insectivores. The following is a list of those vertebrate species which exploit these areas for food sources:

Preferred:

Sparrow Hawk
Barn Swallow
Common Crow
Eastern Meadowlark
Common Grackle
Red-wing Blackbird
Brown-headed Cowbird
Starling
House Sparrow
Kildeer
Woodchuck

Secondary:

Loggerhead Shrike
Bobwhite
Mourning Dove
Yellow Shafted Flicker
Eastern Kingbird
Mockingbird
Robin
Little Brown Myotis
Silverhaired Bat
Eastern Pipestrelle
Big Brown Bat
Red Bat
Seminole Bat
Hoary Bat
Evening Bat
Brazilian Freetailed Bat
Harvest Mouse
Eastern Cottontail
Spotted Skunk
Striped Skunk
Red Fox
Grey Fox
White-tailed Deer
Fowler's Toad
Eastern Slender Glass Lizard

Black Racer
Midland Brown Snake
Eastern Garter Snake
Hognose Snake

Aster-Goldenrod-Broomsedge.- This habitat, like the mowed fields, provides a food source for many animals. However, the taller vegetation provides cover and suitable breeding habitat for many more species, as well as nesting sites for turtles. Those animals which one would expect to frequent the regularly mowed fields would also be found in this habitat. The following species would utilize the area for feeding, nesting, or breeding sites:

Preferred:

Red-tailed Hawk
Sparrow Hawk
Bobwhite
Mourning Dove
Ruby-throated Hummingbird
Prairie Warbler
Indigo Bunting
American Goldfinch
Chipping Sparrow
Field Sparrow
Eastern Bluebird
Loggerhead Shrike
Harvest Mouse
Cotton Rat
Red Fox
Grey Fox
Six-lined Racerunner
Mole Snake

Secondary:

Great Horned Owl
Purple Martin
Blue Grosbeak
Yellow-shafted Flicker
Downy Woodpecker
Eastern Kingbird
Barn Swallow
Common Crow
Mocking Bird
Eastern Meadowlark
Short-tailed Shrew
Least Shrew
Little Brown Myotis
Silver-haired Bat
Eastern Pipistrelle Bat
Big Brown Bat
Red Bat
Seminole Bat
Hoary Bat
Brazilian Free-tailed Bat
Evening Bat
Eastern Cottontail
Cotton Mouse
Eastern Mole
Eastern Spotted Skunk
Striped Skunk
White-tailed Deer
Raccoon
Eastern Spadefoot Toad
Eastern Narrowmouth Toad
Southeastern Five-lived Skink
Ground Skink
Corn Snake
Coachwhip
Black Racer
Copperhead
Timber Rattlesnake
Pigmy Rattlesnake
Common Snapper (nesting)
Alligator Snapper (nesting)
River Cooter (nesting)
Yellow-bellied Pond Slider (nesting)
Eastern Box Turtle

Shrubs-Small Pine.- This habitat is a later successional stage, and, therefore, would support many of the same animal species as does the aster-goldenrod-broomsedge situation. The possible exceptions would be the woodchuck (Marmota monax) which prefers open fields or field edges rather

than an area with extensive growth and the turtle species which would not prefer this area for nesting. This habitat supports several species which are not normally associated with mowed fields or the early stages of old field succession.

Preferred:

Eastern Kingbird
Mockingbird
Indigo Bunting
American Goldfinch
Chipping Sparrow
Field Sparrow
Blue Grosbeak
Eastern Cottontail
Red Fox
Grey Fox
Short-tailed Weasel
White-tailed Deer
Eastern Spadefoot Toad
Eastern Slender Grass Lizard
Corn Snake
Coachwhip
Black Racer
Pygmy Rattlesnake

Secondary:

Red-tailed Hawk
Sparrow Hawk
Bobwhite
Mourning Dove
Screech Owl
Great Horned Owl
Barred Owl
Ruby-throated Hummingbird
Downy Woodpecker
Barn Swallow
Prairie Warbler
Catbird
Opossum
Short-tailed Shrew
Least Shrew
Eastern Mole
Little Broom Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Seminole Bat
Hoary Bat
Evening Bat
Brazilian Free-tailed Bat
Harvest Mouse
Cotton Mouse
Cotton Rat
Eastern Spotted Skunk
Striped Skunk
Raccoon
Bobcat
Narrowmouth Toad
Green Anole
Southeastern Five-lined Skink
Ground Skink
Six-lined Racerunner
Eastern Slender Glass Lizard
Rough Green Snake
Mole Snake
Copperhead
Timber Rattlesnake
Eastern Box Turtle

Pine Dominance-Little Hardwood Understory.- This habitat is essentially the least diverse of the park's habitats. It is preferred by no vertebrate species with the possible exception of the fence lizard. There is little available plant life upon which terrestrial animals may feed thus most species found in the area are insectivorous or predatory upon the insectivorous species. Other species either visit the area briefly to feed on pine mast (e.g., grey squirrel) or utilize it as an occasional resting area.

Preferred:

Fence Lizard

Secondary:

Cooper's Hawk
Sharp-Shinned Hawk
Red-tailed Hawk
Red-shouldered Hawk
Bobwhite
Mourning Dove
Screech Owl
Barred Owl
Great Horned Owl
Carolina Chicadee
Tufted Titmouse
Cardinal
Brown-headed Nuthatch
Opossum
Eastern Mole
Short-tailed Shrew
Grey Squirrel
Eastern Spotted Skunk
Striped Skunk
Bobcat
White-tailed Deer
Southeastern Five-lined Skink
Five-lined Skink
Ground Skink
Mole Snake
Coachwhip
Black Racer
Copperhead
Timber Rattlesnake
Pygmy Rattlesnake
Scarlet Kingsnake
Scarlet Snake
Eastern Box Turtle

Pine Dominance-Moderate to Dense Hardwood Understory.- An increase in

hardwood understory will tend to increase the vertebrate species diversity in a pine-dominant situation. This can easily be seen by comparing the species list of this habitat with that of the pine dominant-little hardwood understory situation. It is particularly important to note the number of species that might prefer this habitat.

Preferred:

Coopers Hawk
Sharp-shinned Hawk
Red-shouldered Hawk
Screech Owl
Barred Owl
Great Horned Owl
Ruby-throated Hummingbird
Yellow-shafted Flicker
Red-bellied Woodpecker
Downy Woodpecker
Red-headed Woodpecker
Hairy Woodpecker
Eastern Wood Pewee
Blue Jay
Common Crow (breeding)
Carolina Chicadee
Tufted Titmouse
Carolina Wren
Brown Thrasher
White-eyed Vireo
Red-eyed Vireo
Worm-eating Warbler
Kentucky Warbler
Yellow-breasted Chat
Summer Tanager
Cardinal
Rufous-sided Towhee
Wild Turkey
Brown-headed Nuthatch
Catbird
Pine Warbler
Hooded Warbler
American Redstart
Opossum
Silver-haired Bat
Red Bat
Seminole Bat
Hoary Bat
Eastern Chipmunk
Grey Squirrel
Fox Squirrel

Secondary:

Turkey Vulture
Black Vulture
Red-tailed Hawk
Mourning Dove
Pileated Woodpecker
Eastern Phoebe
Common Crow
Robin
Orchard Oriole
Common Grackle
Brown-headed Cowbird
Eastern Mole
Southeastern Shrew
Short-tailed Shrew
Little Brown Myotis
Eastern Pipistrelle
Big Brown Bat
Brazilian Free-tailed Bat
Evening Bat
Eastern Cottontail
Flying Squirrel
Wood Rat
Grey Fox
Red Fox
Raccoon
Bobcat
Long-tailed Weasel
Spotted Skunk
Striped Skunk
American Toad
Fowler's Toad
Narrow-mouthed Toad
Eastern Spadefoot-Toad
Slimy Salamander
Marble Salamander
Broad-headed Skink
Coal Skink
Eastern Hognose Snake
Mole Snake
Eastern Kingsnake
Green Snake

Preferred:

Cotton Mouse
Golden Mouse
Pine Vole
White-tailed Deer
Eastern Slender Glass Lizard
Green Anole
Ground Skink
Five-lined Skink
Southeastern Five-lined Skink
Scarlet Snake
Ringneck Snake
Southeastern Crowned Snake
Grey Rat Snake
Corn Snake
Black Racer
Midland Brown Snake
Red-bellied Snake
Copperhead

Secondary:

Smooth Earth Snake
Rough Earth Snake
Timber Rattlesnake
Pygmy Rattlesnake
Eastern Box Turtle

Upland and Transition Hardwoods.- These two habitat types are quite similar faunistically, although some reptile and amphibians may be more abundant on the slopes in the transition hardwoods. Both are more diverse faunistically than the pine-dominant situations. All provide equal cover, but the hardwoods have the added advantage of hardwood stumps, logs, and hollow trees which provide nest sites for many mammalian and avian species. The seeds produced by hardwoods are stored by several species and provide a winter and early spring food source for the species that stored them as well as other species occurring in the park. For example, acorns buried by grey squirrels may be uncovered by turkeys, skunks, raccoons, and white-tailed deer.

Preferred:

Coopers Hawk
Sharp-shinned Hawk
Red-shouldered Hawk
Screech Owl
Barred Owl
Great Horned Owl
Red-bellied Woodpecker
Red-headed Woodpecker
Downy Woodpecker
Hairy Woodpecker
Blue Jay
Carolina Chicadee
Tufted Titmouse
Blue-grey Gnatcatcher
White-eyed Vireo
Red-eyed Vireo
Kentucky Warbler
Summer Tanager

Secondary:

Turkey Vulture
Black Vulture
Red-tailed Hawk
Sparrow Hawk (nesting)
Chimney Swift (nesting)
Ruby-throated Hummingbird
Yellow-shafted Flicker
Eastern Phoebe
Common Crow (nesting)
Carolina Wren
Brown Thrasher
Robin
Wood Thrush
Worm-eating Warbler
Brown-headed Cowbird
Cardinal
Rufous-sided Towhee
Hooded Warbler

Preferred:

Wild Turkey
Purple Martin (nesting)
Brown-headed Nuthatch
Yellow-throated Vireo
Opossum
Short-tailed Shrew
Little Brown Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Seminole Bat
Hoary Bat
Evening Bat
Eastern Chipmunk
Grey Squirrel
Southern Flying Squirrel
Cotton Mouse
Golden Mouse
Wood Rat
Grey Fox
Red Fox
Raccoon
Long-tailed Weasel
Spotted Skunk
Striped Skunk
White-tailed Deer
American Toad
Narrow-mouthed Toad
Slimy Salamander
Zig-Zag Salamander
Green Anole
Five-lined Skink
Southeastern Five-lined Skink
Ground Skink
Scarlet Snake
Ringneck Snake
Southeastern Crowned Snake
Grey Rat Snake
Eastern Hognose Snake
Rough Green Snake
Brown Snake
Worm Snake
Smooth Earth Snake
Rough Earth Snake
Copperhead
Timber Rattlesnake
Eastern Box Turtle

Secondary:

Eastern Mole
Southeastern Shrew
Brazilian Free-tailed Bat
Eastern Cottontail
Fox Squirrel
Pine Vole
Fowler's Toad
Eastern Spadefoot Toad
Eastern Slender Glass Lizard
Broad-headed Skink
Coal Skink
Corn Snake
Mole Snake
Eastern King Snake
Coachwhip
Black Racer
Pygmy Rattlesnake

Bottomland Hardwoods.- Bottomland hardwoods are similar in many respects to

the upland habitat, but more abundant soil moisture creates suitable conditions for many additional species, particularly invertebrates and amphibians. Many animals prefer this habitat for as a food source. Streams associated with bottomland hardwoods are responsible for the occurrence of other species. Faunistically bottomland hardwoods must be considered the most important in the park because they support the greatest number of animal species. These areas must be maintained if some of the species are to continue to exist in the park.

Preferred:

Coopers Hawk
Sharp-shinned Hawk
Red-shouldered Hawk
Screech Owl
Barred Owl
Great Horned Owl
Pileated Woodpecker
Red-bellied Woodpecker
Hairy Woodpecker
Downy Woodpecker
Eastern Phoebe
Acadian Flycatcher (stream courses)
Robin
Wood Thrush
Blue-gray Gnatcatcher
White-eyed Vireo
Yellow-throated Warbler
Louisiana Waterthrush (stream courses)
Wild Turkey
Chimney Swift (nesting)
Opossum
Eastern Mole
Southeastern Shrew
Short-tailed Shrew
Little Brown Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Evening Bat
Swamp Rabbit
Grey Squirrel
Flying Squirrel

Secondary:

Turkey Vulture
Black Vulture
Red-tailed Hawk
Ruby-throated Hummingbird
Yellow-shafted Flicker
Blue Jay
Common Crow (nesting)
Carolina Chicadee
Tufted Titmouse
Carolina Wren
Red-eyed Vireo
Worm-eating Warbler
Kentucky Warbler
Brown-headed Cowbird
Cardinal
Rufous-sided Towhee
Red-headed Woodpecker
Purple Martin (nesting)
Hooded Warbler
Eastern Cottontail
Eastern Chipmunk
Fox Squirrel
Cotton Mouse
Fowler's Toad
Northern Cricket Frog
Southern Cricket Frog
Eastern Spadefoot Toad
Bullfrog
Bronze Frog
Three-lined Salamander
Fence Lizard
Southeastern Five-lined Skink
Black Racer
Corn Snake

Preferred:

Golden Mouse
Wood Rat
Grey Fox
Red Fox
Raccoon
Bobcat
Long-tailed Weasel
Mink
Eastern Spotted Skunk
Striped Skunk
White-tailed Deer
American Toad
Green Treefrog
Gray Treefrog
Mountain Chorus Frog
Eastern Narrow-mouthed Toad
Southern Leopard Frog
Spotted Salamander
Marbled Salamander
Four-toed Salamander
Red Salamander
Mud Salamander
Red-spotted Newt
Green Anole
Coal Skink
Five-lined Skink
Broad-headed Skink
Ground Skink
Worm Snake
Ringneck Snake
Eastern Hognose Snake
Eastern Kingsnake
Rough Green Snake
Brown Snake
Red-bellied Snake
Ribbon Snake
Garter Snake
Rough Earth Snake
Smooth Earth Snake
Copperhead
Timber Rattlesnake
Eastern Box Turtle

Secondary:

Coachwhip
Southeastern Crowned Snake
Pygmy Rattlesnake

Vertebrate Composition by Aquatic Habitat

The waters of the HBNMP cover approximately 10% of the park's area, including 178 acres of river alone. These aquatic habitats support an

abundant and varied fauna that adds greatly to the richness of the area. This fauna is primarily underwater and, unfortunately, is thus invisable to the casual park visitor. It is a major wildlife component, nevertheless, and a food source for many terrestrial forms.

The park's waters can be divided into four major habitats: tributary streams, beaver swamp, rocky shoals, and the river's main channel. Each of these habitats is discussed briefly below and the vertebrate animals present indicated according to the "Preferred" and "Secondary" designations used for terrestrial communities.

Tributary Streams.- Such streams are limited to several small, first order types having no major tributaries themselves. They are fed by rain run-off and underground seepages. Most appear to be permanent or semi-permanent streams that are biologically active the year around. They also provide dry weather refuge for populations that may periodically inhabit temporary tributaries and roadside ditches (e.g., creek chub).

These streams vary from 3½ to 4 feet in the deepest potholes and bank undercuts to an inch or less in some riffle areas. Rate of flow varies from swift in riffles to almost none in the largest pools. Turbidity varies with the rainfall, but the streams are usually quite clear. Most streams have rocky to sandy bottoms with leaf and silt accumulations in the pools. Many of the streams have eroded their channel to a level of 3 feet or more below the surrounding area. The resulting banks with their undercuts and exposed roots provide excellent habitat for several species of birds, snakes, and other vertebrates, as well as innumerable spiders, centipedes, insects, etc. Leaf litter accumulates in many shallow areas and along the bank and provides habitat for many invertebrates and amphibians. Crayfish

were abundant in most streams. Because of their relatively small size, the small stream habitats are more closely governed by the immediately surrounding land area than any of the park's other waters. Changes in the terrestrial habitats adjacent to streams of this size may cause a drastic alteration of its species composition within days or even hours.

Preferred:

Louisiana Waterthrush
Raccoon
Mink
Leopard Frog
Bronze Frog
Dusky Salamander
Seal Salamander
Two-lined Salamander
Three-lined Salamander
Queen Snake
Common Watersnake
Yellow-bellied Watersnake
Mud Turtle
Southern Brook Lamprey
Least Brook Lamprey
Stoneroller
Bluehead Chub
Rough Shiner
Striped Shiner
Creek Chub
Black Bullhead
Black Madtom
Speckled Madtom
Blackspotted Topminnow
Southern Studfish
Mosquitofish
Banded Sculpin
Warmouth
Green Sunfish
Redeye Bass
Blackbanded Darter

Secondary:

Bullfrog
Eastern Garter Snake
Common Snapping Turtle
Striped-neck Mask Turtle
Stinkpot
Silver stripe Shiner
Alabama Hogsucker
Yellow Bullhead
Flathead Catfish
Rock Darter
Speckled Darter
Log perch
Bronze Darter

Beaver Swamp.- The beaver swamp is of moderate size and is fed by one stream. It is unfortunate that this habitat is not more abundant in the park since it exhibits a blending of terrestrial and aquatic characteristics not equalled by any other area. It provides feeding area for many aquatic and wading birds, which is only sparsely available in the other aquatic habitats.

Depth varies to about 4 feet in the deepest portions, and submergent and emergent vegetation is abundant. This beaver swamp is the only breeding site of the green treefrog thus far known within the piedmont of Alabama. Left alone, the beaver pond will undergo typical marsh type succession as silt and plant debris accumulate and eventually become a terrestrial bottomland habitat. If it is desired to preserve this habitat, limited and careful partial dredging at intervals of several years may be necessary. Otherwise, management will be concerned primarily with the protection of the tributary stream.

Preferred:

Eastern Green Heron
Great Egret
Wood Duck
Prothonotary Warbler
Hooded Warbler
Beaver
Muskrat
Mink
Raccoon
Northern Cricket Frog
Southern Cricket Frog
Bullfrog
Leopard Frog
Gray Treefrog
Green Treefrog
Ribbon Snake
Common Watersnake
Yellow-bellied Watersnake
Common Snapping Turtle
Yellow-bellied Turtle
Mud Turtle
Stinkpot
Cypress Minnow
Black Bullhead
Yellow Bullhead
Brown Bullhead
Pirate Perch
Blackspotted Topminnow
Mosquitofish
Bluegill
Longear Sunfish
Spotted Sunfish

Secondary:

Coopers Hawk
Sharp-shinned Hawk
Red-tailed Hawk
Red-shouldered Hawk
Screech Owl
Barred Owl
Great Horned Owl
Ruby-throated Hummingbird
Belted Kingfisher
Yellow-shafted Flicker
Beaver Swamp
Pileated Woodpecker
Red-bellied Woodpecker
Hairy Woodpecker
Downy Woodpecker
Carolina Wren
Redwinged Blackbird
Eastern Garter Snake
Painted Turtle
River Cooter
Longnose Gar
Redfin Pickerel
Chain Pickerel
Silverey Minnow
Golden Shiner
Snubnosed Minnow
Bullhead Minnow
Southern Studfish
Warmouth
Redear Sunfish
Green Sunfish
Shellcracker

Secondary:

Redeye Bass
Largemouth Bass
Logperch

Rocky Shoals.- The rocky shoals are a valuable portion of the river. In addition to their scenic beauty, they are perhaps the pantry of the river, the abundant insect and molluscan life providing a large portion of the non-planktonic basis for many food chains. The shoals consist of several areas of exposed granitic bedrock which create a patchwork of gravel bottomed rapids and quiet pools. They also serve as a site for log and leaf litter accumulations. These provide additional habitat for many species. The gravel bottom is largely stabilized by a mat of riverweed (Podostemon ceratophyllum Michaux) which attaches to the individual pebbles and holds them together. This mat teems with insect life, helgramites and damsel fly niods being most abundant. The plant is probably the basic food source for the large population of river cooters in the park area. Snails (Goniobasis sp.) were very abundant, as were Asian clams (Corbicula manillensis). Native mussels were not found alive, and fragmentary remains of only three species were discovered.

The shoals in many places simulate medium and large stream conditions and provide habitat for several fish species not normally found in large river habitats (e.g., several darters and shinners). Moreover, many large-river species may enter the pools to feed or the rapids to spawn.

Preferred:

Belted Kingfisher
Mink
River Otter
Beaver
Muskrat
Beyer's Waterdog

Secondary:

Wood Duck
Bronze Frog
Longnose Gar
Gizzard Shad
Threadfin Shad
Stoneroller

Preferred:

Bullfrog
Common Watersnake
Yellow-bellied Watersnake
Queen Snake
Common Snapping Turtle
Alligator Snapping Turtle
Painted Turtle
River Cooter
Yellow-bellied Turtle
Mud Turtle
Stinkpot
Striped-neck Musk Turtle
Spiny Softshell
Redfin Pickerel
Chain Pickerel
Golden Shiner
Pretty Shiner
Alabama Shiner
Fluvial Shiner
Blacktail Shiner
Bandfin Shiner
Riffle Minnow
Bullhead Minnow
Creek Chubsucker
Alabama Hogsucker
Blacktail Redhorse
Yellow Bullhead
Brown Bullhead
Channel Catfish
Black spotted Topminnow
Rock Bass
Warmouth
Redear Sunfish
Bluegill
Longear Sunfish
Spotted Sunfish
Shellcracker
Redeye Bass
Spotted Bass
Rock Darter
Speckled Darter
Logperch
Bronze Darter
Walleye

Secondary:

Carp
Silverjaw Minnow
Silvery Minnow
Speckled Chub
Bigeye Chub
Bluehead Chub
Emerald Shiner
Striped Shiner
Tallapoosa Shiner
Silverstripe Shiner
Stargazing Shiner
Snubnosed Minnow
Quillback
Smallmouth Buffalo
Spotted Sucker
River Redhorse
Black Redhorse
Golden Redhorse
White Catfish
Blue Catfish
Black Bullhead
Flathead Catfish
Pirate Perch
Southern Studfish
Mosquitofish
White Bass
Green Sunfish
Largemouth Bass
White Crappie
Black Crappie
Freshwater Drum
Blackbanded Darter

River Channel.- The main channel of the Tallapoosa River within the park is in most places about 300 feet wide and varies to as much as 30 feet deep. There is little true shoreline habitat due to the relatively steep banks.

Water flow is moderate with turbidity varying greatly with the rainfall.

Preferred:

Belted Kingfisher
Mink
River Otter
Beaver
Muskrat
Beyer's Waterdog
Bullfrog
Yellow-bellied Watersnake
Common Watersnake
Common Snapping Turtle
Alligator Snapping Turtle
Painted Turtle
River Cooter
Yellow-bellied Turtle
Striped-neck Musk Turtle
Stinkpot
Spiny Softshell
Longnose Gar
Gizzard Shad
Threadfin Shad
Carp
Blacktail Shiner
Quillback
Smallmouth Buffalo
River Redhorse
Black Redhorse
Golden Redhorse
Blacktail Redhorse
Channel Catfish
Flathead Catfish
White Bass
Redear Sunfish
Shellcracker
Spotted Bass
Largemouth Bass
White Crappie
Black Crappie
Freshwater Drum
Walleye

Secondary:

Wood Duck
Bronze Frog
Redfin Pickerel
Chain Pickerel
Golden Shiner
Pretty Shiner
Alabama Shiner
Bondfin Shiner
Snubnosed Minnow
Bullhead Minnow
Alabama Hogsucker
White Catfish
Blue Catfish
Black Bullhead
Yellow Bullhead
Brown Bullhead
Blackspotted Topminnow
Southern Studfish
Rock Bass
Warmouth
Longear Sunfish
Spotted Sunfish
Logperch

Invertebrate Life

Although outside the primary objective of this study, some consideration of the invertebrate species, particularly insects, seems essential to a

comprehensive treatment of the animal life of HBNMP. Numerous forms were encountered in all areas of the park from mid-June through mid-September, and collections of particularly abundant, or unusual, or otherwise interesting species were made throughout the study. A more intensive effort to document the occurrences of common and showy invertebrate species that might easily be noticed by park visitors was made during the last month of the study through the addition to the study team of an assistant with training in systematic entomology.

Based upon studies in the Piedmont of North Carolina and other southeastern states, one might infer that more than 10,000 species of insects could well occur within HBNMP. Within one year's time, much less one summer's or one month's, a complete collecting survey for this many species is simply impossible! It was decided that some needed and useful information would result from a literature survey and listing of the insect families one could reasonably expect to occur within HBNMP, including as examples those species we were able to collect and identify. Special attention was given to: (1) insect species that are or could be harmful or beneficial to the various plant communities; (2) published records and museum collections for the HBNMP area; (3) very common and showy species; (4) aquatic species, and (5) species that annoy or are often sighted by humans in the park.

The major economic pests in the park are those that damage forest species. The diversity of tree species in hardwood-dominated areas reduces the probability of epidemic populations there, because most harmful insect species attack only a single species or a few closely related ones. Thus, any major problem is more likely to occur in the pine dominated stands. Major problems may develop locally due to populations of the southern pine

beetle (Dendroctonus frontalis Zimm.) and three engraver beetles in the genus Ips (I. avulsus Eichh., I. grandicollis Eichh., and I. calligraphus Germ.). Trees affected by these species are best removed and burned to prevent further increase and spread of these pests.

Other insects that might cause damage to pines are the conifer sawflies (Neodiprion sp.), but these seldom become abundant because of natural controls by parasitic insects and a polyhedral virus.

Other potentially troublesome species collected within HBNMP include the bagworm moth (Thyridopteryx ephemaeruliformis Haw.) and the fall webworm (Hyphantria cunea Drury). The bagworm moth prefers eastern redcedar or juniper but also may utilize pine, and the fall webworm usually occurs on persimmon but may be found on various other deciduous species.

None of these pests require treatment by insecticides. Chemical treatment intended to control only the pest species usually will prove harmful to the whole insect population in the area where applied. A possible exception is successful use of benzene-hexachloride in diesel fuel to control local infestations of pine beetles where cutting and burning is undesirable. This is due to the lack of diversity of insect species in the pine forests where epidemic populations develop.

Insects that disturb humans can usually be assigned to one of two categories: 1) stinging insects or (2) biting insects. Whereas most insects with chewing mouth parts will bite if held carelessly, relatively few types are capable of inflicting stings. Most stinging insects are members of the Order Hymenoptera (wasps, bees, and ants), but the larvae or caterpillars of some Lepidoptera (moths and butterflies) also may cause painful stings from glandular appendages.

The Hymenoptera include seven major families that a park visitor might encounter. Each of these is considered briefly below. The stings

inflicted by these insects can usually be treated with moistened baking soda or moistened tobacco to neutralize the poison and reduce pain. Severely allergic individuals should be treated by a physician.

The paper wasps (Vespidae) build unprotected or enclosed paper nests in various habitats. Common under overhangs and in thick brush are nests of the yellow and red wasps (Polistes canadensis L. and P. fuscatus Lepelitus). The bald-faced hornet (Vespula maculata Drury) builds enclosed nests housing as many as 10,000 individuals. Subterranean nests are built by yellow-jacket wasps (V. maculifrons Buysson). These wasps are usually non-aggressive unless the nests are disturbed or individuals molested, but their abundance in HBNMP will cause occasional painful encounters for visitors.

The mud daubers (Spheidae) build their nests under overhangs of shelters, bridges, or rock formations. Though known to sting, they rarely do so unless captured and handled.

Ants (Formicidae) are social insects living in colonies in the ground, rotted logs, or buildings. Most species are harmless, but the Argentine fireant (Solenopsis saevissima richteri Forel) is a particularly noxious pest. Colonies of this species are abundant in the open habitats in the park but disappear with the development of hardwood understory in old field succession. Local treatment of colonies with Mirex in areas of the park that must be kept from producing hardwood forest, might be justified to prevent injury to park visitors. General or broadcast application of Mirex is not recommended since this clorinated hydrocarbon persists in the environment and possibly could adversely affect other organisms.

The Apidae include the honeybee, bumblebee, and carpenter bee, which are commonly seen on flowers. The honey bee (Apis mellifera L.) nests in hollow trees, the bumble bees (Megabombus sp., Bombus sp.) usually in

burrows, and the carpenter bee in tunnels constructed in plant stems.

The cow-killer or velvet ant in the genus Chyphotes (Mutillidae) and scoliid wasp, Scolia dubia Say (Scoliidae), both occur in open fields. The wingless females inflict extremely painful stings and should be consciously avoided by barefoot individuals.

Sweat bees (Halictidae-Halictus sp.) commonly annoy perspiring people and will sting if swatted or pressed to the body. Insect repellents usually lessen the visits and accompanying annoyance caused by these insects.

The biting insects found in HBNMP are haemophagous members of the Order Diptera. Three families (Tabanidae, Culicidae, and Ceratopogonidae) include species that cause irritating, usually itchy, bites of humans. No human diseases are presently transmitted in the United States by any of these insects, but certain mosquitoes were formerly responsible for spread of malaria in the Southeast. Insect repellents and protective clothing will avoid trouble with these species.

Horseflies (Tabanus spp.) and deerflies (Chrysops spp.) are seasonally abundant in the park. Large populations of mosquitoes (Culicidae) representing several genera and species may be found near moist areas, such as the beaver swamp. "No-see-ums" are extremely small flies (Ceratopogonidae-Culicoides sp. and Leptoconops sp.) that may force visitors to leave the small sites where they abound within the park. Actually, these insects can usually be escaped by moving only a few yards from localities where biting occurs.

As illustrated by the "no-see-ums," each insect species occupies a specific microhabitat, the parameters of which may overlap, include, or exclude the major habitat types discussed elsewhere in this report. Some insects can be found only on a certain species of plant, others may require

sites within a narrow humidity range, etc. Since a listing of all insects by microhabitat was beyond the scope of our study and aside from our main objective, it was decided to construct a list of common orders and families according to whether the insects were primarily aquatic or primarily terrestrial. This list forms the content of Appendix III.

Insects classified here as aquatic must spend all or part of their lives within the water or at the water's edge. This category includes those insects that reproduce in an aquatic environment and spend their adult existence mainly on land. Within these limits are found a large number of niches and a great variety of forms.

The terrestrial insects are not necessarily associated with water in any way. These insects occupy the basic terrestrial vegetation types (cf. Plant Life) where an astronomical number of microhabitats are provided.

The species listed may or may not be representative of any period except late August to mid-September, 1974. Other species might be expected to be more common in other seasons; and population frequencies of species may vary greatly from year to year. The list is intended simply to serve as a guide by which the variety of insect life might be estimated.

CONCLUSIONS

The following general conclusions were drawn from the results of this study as a possible aid to the formulation of comprehensive management plans:

1. Various areas differentiated on the Vegetational Map will develop mature climax forest on the following timetable if left undisturbed:

   Aster-Goldenrod-Broomsedge--approximately 200 years

   Shrubs-Small Pines--approximately 190 years

   Pine Dominance-Sparse Hardwood Understory--approximately 175 years

   Pine Dominance-Moderate to Dense Hardwood Understory-- approximately 150 years

   Bottomland Hardwoods--0-100 years

   Transition Hardwoods--0-100 years

   Upland Hardwoods--0-100 years

   Beaver Swamp--175-200 years

2. Since climax hardwood forest was present throughout the area of HBNMP at the times when the Creek Indians established villages and were eventually conquered there, historical reasons would justify return of the area to its aboriginal state as nearly as possible through the process of natural plant succession.

3. Areas that require maintenance for display of the historical sites within the park area (such as New Youka Overlook, Tohopeka Village Site, Barricade Site Field, etc.) should be mowed on a schedule that permits maximum seed production. More wildlife food and greater wildlife abundance and diversity can only result from this.

4. Scattered trees in some regularly mowed areas (such as Tohopeka Village Site) will require replacement if current maintenance is followed. Only species native to the park area should be used for this purpose, as well as for other necessary landscaping within HBNMP.

5. No endangered species were discovered within the park area, but new geographical range information for uncommon species of both plants and animals was produced:

   Medeola virginiana, Indian cucumberroot - rare in Piedmont

   Amianthemum muscaetoxicum, Fly-poison - rare in Piedmont

   Habenaria cristata, Crested fringed-orchid - rare in Piedmont, northernmost Ala. locality

   Habenaria flava, Southern rein orchid - rare in Piedmont

   Malaxis unifolia, Green adder's mouth - rare in Piedmont

   Cimicifuga racemosa, Black cohosh - rare in Piedmont, southernmost Ala. locality

   Galax aphylla, Galax - rare in Piedmont, southernmost Ala. locality

   Hyla cinerea, Green treefrog - disjunct population in Piedmont

   Eumeces egregius, Northern mole skink - rare in Piedmont

   Carphophis amoenus helenae, Midwest worm snake - found south of Tallapoosa R. for first time.

   Marmota monax, Woodchuck - uncommon in Piedmont

6. If expansion of the park area to add more biotic diversity becomes feasible or desirable in the future, first priority should be given to annexation of the Emuckfaw Creek valley northwest of the present boundary. Addition of this major tributary stream of the Tallapoosa River would greatly enhance the recreational potential of HBNMP, as well as include within park boundaries a varied and rugged area occupied by many species of plants and animals not found within the present park area.

APPENDIX I

Checklist of Vascular Plant Species of Horseshoe Bend National Military Park

The order of taxonomic treatment in the following list is that of Radford, Ahles and Bell (1968), whose nomenclature is also generally adopted. Certain names for plants not included in their manual are derived from Small (1933), Rickett (1967), or articles in taxonomic journals.

All taxa listed were observed and those with reproductive stages were collected during the period 17 June - 15 September 1974. These taxa can be considered representative of the summer flora of HBNMP, but some species present were no doubt overlooked. Early spring and fall flowering species were necessarily excluded from collection because they lacked flowers and/or fruits during the study period. A tally of the taxa indicates approximately 390 species in 108 families in the summer flora of HBNMP. Jones (1974) found only 829 species representing 130 families in the Pine Mountain region of Georgia (450 sq. mi.) during the growing seasons of 1971 and 1972. Thus, the summer flora of HBNMP is apparently rather diverse for a small, non-mountanous area (only 3.187 sq. mi.) in the Piedmont of Alabama.

The list indicates the primary types of plant community in HBNMP in which the various species may be found. Terrestrial community types, according to the numerical system below, are cited parenthetically after the scientific names.

0 - Weedy places, roadsides, and other disturbed sites

1 - Regularly mowed fields

2 - Aster-goldenrod-broomsedge

3 - Shrubs-small pines

4 - Pine dominance - Little hardwood understory

5 - Pine dominance - Moderate to dense hardwoods

6 - Bottomland hardwoods

7 - Transition "

8 - Upland "

9 - Beaver swamp

These communities key to those of the vegetational map, and plants indicated for a particular habitat type may also occur occasionally in earlier or later seral stages.

Family Genus species	Common Name
Lycopodiaceae	
Lycopodium flabelliforme (Fernald) Blanchard (5)	Running pine
Selaginellaceae	
Selaginella apoda (L.) Spring (6)	Meadow spikemoss
Ophioglossaceae	
Botrychium biternatum (Sav.) Underwood (6)	Southern grapefern
B. virginianum (L.) Swartz (7)	Rattlesnake fern
Osmundaceae	
Osmunda cinnamomea L. (6)	Cinnamon fern
O. regalis L. (6)	Royal fern
Pteridaceae	
Cheilanthes lanosa (Michaux) D.C. Eaton (7)	Hairy lip-fern
Pteridium aquilinum (L.) Kuhn (4,5,8)	Bracken fern
Aspidiaceae	
Athyrium asplenioides (Michaux) A.A. Eaton (6)	Southern lady-fern
Polystichum acrostichoides (Michaux) Schott (6,7)	Christmas fern
Thelypteris noveboracensis (L.) Nieuwland (6)	New York fern
Onoclea sensibilis L. (6)	Sensitive fern

Blechnaceae	
Woodwardia areolata (L.) Moore (6)	Netted chain-fern
Aspleniaceae	
Asplenium platyneuron (L.) Oakes (2,4,7)	Ebony spleenwort
Polypodiaceae	
Polypodium polypodioides (L.) Watt. (6,7)	Resurrection fern
Pinaceae	
Pinus palustris Miller (3-8)	Long-leaf pine
P. taeda L. (3-8)	Loblolly pine
P. echinata Miller (3-8)	Short-leaf pine
Cupressaceae	
Juniperus virginiana L. (2,7)	Eastern redcedar
Typhaceae	
Typha latifolia L. (9)	Common cattail
Sparganiaceae	
Sparganium americanum Nuttall (9)	Bur-reed
Alismataceae	
Sagittaria latifolia Willd. (0)	Duck-potato
Poaceae (Gramineae)	
Arundinaria gigantea (Walter) Muhl. (0,6)	Cane
Tridens flavus (L.) Hitchcock (0,2)	Purple-top
Uniola sessiliflora Poiret (6,7)	
U. latifolia Michaux (6)	
Eragrostis capillaris (L.) Nees (0)	Love grass
Melica mutica Walter (7)	Melic grass
Elymus virginicus L. (0,6)	Wild rye grass
Stipa avenacea L. (8)	Needle grass
Aristida sp. (0,2)	Three-awn grass
Sporobolus poiretii (R.&S.) Hitchcock (0)	Smut grass
Eleusine indica (L.) Gaertner (0)	Goose grass
Cynodon dactylon (L.) Persoon (0,1)	Bermuda grass
Paspalum notatum var. *saurae* Parodi (0,1)	Bahia grass
P. dilatatum Poiret (0,1)	Dallis grass
Digitaria sp. (0,1,2)	Crab grass
Panicum spp. (0,2)	Panic grasses
Erianthus sp. (3)	Plume grass
Andropogon virginicus L. (2)	Broomsedge
Sorghum halepense (L.) Persoon (0,1)	Johnson grass
Cyperaceae	
Cyperus strigosus L. (0)	
C. ovularis (Michaux) Torrey (0)	
Eleocharis obtusa (Willd.) Schultes (9)	
Scirpus purshianus Fernald (9)	
S. cyperinus (L.) Kunth (9)	Woolly bullrush
Carex leptalea Wahlenberg (9)	

Araceae	
Peltandra virginica (L.) Kunth (6,9)	Arrow arum
Arisaema dracontium (L.) Schott (6)	Green dragon
A. triphyllum (L.) Schott (6,7)	Jack-in-the-pulpit
Bromeliaceae	
Tillandsia usneoides L. (7)	Spanish moss
Commelinaceae	
Commelina virginica L. (6)	Dayflower
Tradescantia virginiana L. (8)	Spiderwort
T. ohiensis Raf. (0,7)	
Pontederiaceae	
Pontederia cordata L. (0,9)	Pickerelweed
Juncaceae	
Juncus effusus L. (0,9)	
J. validus Coville (0)	
Luzula multiflora (Retzius) Lej. (7)	Woodrush
Liliaceae	
Smilax bona-nox L. (3,4)	Greenbrier
S. glauca Walter (2-8)	
Smilax sp. (0)	
Trillium underwoodii Small (7)	Underwood's trillium
T. catesbaei Ell. (5, 7)	Catesby's trillium
Medeola virginiana L. (7)	Indian cucumber-root
Smilacina racemosa (L.) Desf. (7)	False Solomon's-seal
Polygonatum biflorum (Walter) Ell. (7)	Solomon's-seal
Yucca filamentosa L. (4,8)	Bear-grass
Amianthemum muscaetoxicum (Walter Gray (7)	Fly-poison
Stenanthium gramineum (Ker) Morong (7,8)	Featherbells
Lilium michauxii Poiret (7)	Carolina lily
Uvularia perfoliata L. (6,7)	Bellwort
U. sessilifolia L. (6,7)	
Allium canadense L. (0)	Wild onion
A. bivalve (L.) Kuntze (0)	False garlic
Dioscoreaceae	
Dioscorea batatas Dcne. (6)	Cinnamon vine
D. villosa L. (5,7,8)	Wild yam
Amaryllidaceae	
Hymenocallis occidentalis (LeConte) Kunth (6)	Spider lily
Hypoxis hirsuta (L.) Coville (5,6,7)	Yellow star-grass
Zephyranthes atamasco (L.) Herbert (9)	Atamasco lily
Agave virginica L. (8)	
Iridaceae	
Sisyrinchium mucronatum Michaux (0)	Blue-eyed grass
Iris cristata Aiton (7)	Dwarf crested iris

Orchidaceae	
Habenaria flava (L.) R. Brown (6)	Southern rein-orchid
H. clavellata (Michaux) Sprengel (6)	Small green wood-orchid
H. cristata (Michaux) R. Brown (5,6)	Crested fringed-orchid
Spiranthes cernua (L.) Richard (0)	Nodding ladies tresses
Goodyera pubescens (Willd.) R. Brown (5.7)	Downy rattlesnake plantain
Malaxis unifolia Michaux (5)	Green adder's mouth
Tipularia discolor (Pursh) Nuttall (6,7,8)	Crane-fly orchid
Saururaceae	
Saururus cernuus L. (6)	Lizard's tail
Salicaceae	
Salix nigra Marshall (6)	Blackwillow
Populus deltoides Marshall (6)	Cottonwood
Juglandaceae	
Juglans nigra L. (6,7)	Black walnut
J. cinerea L. (6)	Butternut, white walnut
Carya cordiformis (Wang.) K. Koch (6)	Bitternut hickory
C. tomentosa (Poiret) Nuttall (7,8)	Mockernut hickory
C. glabra Miller (7,8)	Pignut hickory
C. illinoensis (Wang) K. Koch (6)	Pecan
Betulaceae	
Alnus serrulata (Aiton) Willd. (6)	Tag alder
Betula nigra L. (6)	River birch
Ostrya virginiana (Miller) K. Koch (6,7)	Hop hornbeam
Carpinus caroliniana Walter (6)	Ironwood
Fagaceae	
Fagus grandifolia Ehrhart (6,7)	Beech
Castanea pumila (L.) Miller (7)	Chinquapin
Quercus alba L. (6,7,8)	White oak
Q. stellata Wang (8)	Post oak
Q. michauxii Nuttall (6)	Swamp chestnut oak
Q. prinus L. (8)	Rock chestnut oak
Q. rubra L.	Red oak
Q. velutina Lam. (7,8)	Black oak
Q. falcata Michaux (8)	Southern red oak
Q. marilandica Muenchh. (7,8)	Black jack oak
Q. nigra L. (6,7)	Water oak
Q. phellos L. (6,7)	Willow oak
Ulmaceae	
Ulmus alata Michaux (3)	Winged elm
U. rubra Muhl. (6,7)	Slippery elm
Celtis occidentalis L. (3,8)	Sugarberry
Moraceae	
Morus rubra L. (6)	Red mulberry
Urticaceae	
Laportea canadensis (L.) Weddell (6)	Wood-nettle
Boehmeria cylindrica (L.) Swartz (6)	False nettle

Loranthaceae	
Phoradendron serotinum (Raf.) M.C. Johnston (6-8)	Mistletoe
Aristolochiaceae	
Aristolochia tomentosa Sims (6)	Pipevine
Hexastylis arifolia (Michaux) Small (5,7,8)	Arrowleaf wild ginger
Polygonaceae	
Rumex crispus L. (0)	Curly-dock
Tovara virginiana (L.) Raf. (6)	Jumpseed
Polygonum coccineum Muhl. ex Willd. (0)	Smartweed
P. cespitosum var. *longisetum* (DeBruyn) Stewart (6)	
P. punctatum Ell. (0)	
Amaranthaceae	
Amaranthus sp. (0)	
Phytolaccaceae	
Phytolacca americana L. (0)	Pokeweed
Caryophyllaceae	
Stellaria sp. (0,1)	Chickweed
Cerastium glomeratum Thuillier (1)	Mouse-ear chickweed
Silene stellata (L.) Aiton f. (7)	Starry campion
S. virginica L. (7)	Fire pink
Cabombaceae	
Brasenia schreberi Gmelin (9)	Water shield
Ranunculaceae	
Xanthorhiza simplicissima Marshall (6)	Yellow root
Cimicifuga racemosa Nuttall (7)	Black cohosh
Clematis virginiana L. (6)	Virgin's bower
C. glaucophylla Small (6)	
Thalictrum thalictroides (L.) Boivin (7)	Windflower
T. revolutum DC. (6)	
Ranunculus recurvatus Poiret (6,7)	Buttercup
Hepatica acutiloba DC. (7)	Sharp-lobed liverleaf
H. americana (DC.) Ker. (7)	Liverleaf
Anemone sp. (7)	
Berberidaceae	
Podophyllum peltatum L. (6,7)	May-apple
Menispermaceae	
Cocculus carolinus (L.) DC. (3,4)	Coralbeads
Calycocarpum lyonii (Pursh) Nutt. (6)	Cup-seed
Magnoliaceae	
Liriodendron tulipifera L. (5-7)	Tulip tree
Magnolia virginiana L. (6)	Sweetbay
M. acuminata L. (7)	Cucumber tree

Annonaceae	
Asimina parviflora (Michaux) Dunal (7)	Dwarf pawpaw
Lauraceae	
Sassafras albidum (Nuttall) Nees. (0,3)	Sassafras
Brassicaceae	
Lepidium virginicum L. (0)	Poor-man's pepper
Podostemaceae	
Podostemum ceratophyllum Michaux	Riverweed
Crassulaceae	
Penthorum sedoides L. (0,6,9)	Ditch stonecrop
Saxifragaceae	
Decumaria barbara L. (6,7)	Climbing hydrangea
Philadelphus inodorus L. (6)	Mock-orange
Hydrangea quercifolia Bartr. (7)	Oak-leaf hydrangea
H. arborescens L. (7)	Wild hydrangea
Tiarella cordifolia L. (6,7)	Foamflower
Hamamelidaceae	
Liquidambar styraciflua L. (6,7)	Sweetgum
Hamamelis virginiana L. (6)	Witch-hazel
Platanaceae	
Platanus occidentalis L. (6)	Sycamore
Rosaceae	
Fragaria virginiana Duchesne (0,2)	Strawberry
Duchesnea indica (Andrz.) Focke (0)	Indian strawberry
Rubus sp. (2,3)	Blackberry
Geum canadense Jacquin (0,6)	Avens
Agrimonia pubescens Wallroth (6)	
A. parviflora Aiton. (6,7)	Harvest-lice
Gillenia stipulata (Muhl.) Baillon (7)	Indian-physic
Malus angustifolia (Aiton) Michaux (7)	Crab-apple
Crataegus spathulata Michaux (3,5,8)	Hawthorn
C. uniflora Muenchh. (3,5)	Hawthorn
Prunus angustifolia Marshall (0,3)	Chickasaw plum
P. serotina Ehrhart. (3-5)	Black cherry
P. umbellata Ell. (4,5)	Hog plum
Fabaceae (Leguminosae)	
Albizia julibrissin Durazzini (0)	Mimosa
Schrankia microphylla (Solander ex Smith) Macbride (2,3,4)	Sensitive briar
Cercis canadensis L. (7)	Redbud
Cassia fasciculata Michaux (0,2)	Partridge pea
C. nictitans L. (0)	Wild sensitive plant
Gleditsia triacanthos L. (0,3,7)	Honey locust
Trifolium repens L. (0,1)	White clover
Amorpha fruticosa L. (6)	False indigo
Psoralea psoralioides (Walter) Cory (2,3,4)	Samson snakeroot

Coronilla varia L. (0)	Crown vetch
Stylosanthes biflora (L.) BSP. (0)	Pencil-flower
Desmodium nudiflorum (L.) DC. (7)	Beggar's ticks
Desmodium spp. (4-8)	Beggar's lice
Lespedeza repens (L.) Barton (2-4)	
L. cuneata (Dumont) G.Don (0)	Sericea
Tephrosia virginiana (L.) Persoon (4)	Goat's rue
Vicia sp. (7)	Vetch
Apios americana Medicus (0,6)	Groundnut
Centrosema virginianum (L.) Bentham (0,1)	Butterfly pea
Pueraria lobata (Willd.) Ohwi (0)	Kudzu
Amphicarpa bracteata (L.) Fernald (6)	Hog peanut
Oxalidaceae	
Oxalis dillenii Jacquin (0)	
O. stricta L. (6,7)	Wood sorrel
Geraniaceae	
Geranium maculatum L. (6,7)	Wild geranium
Meliaceae	
Melia azedarach L. (0,3)	China-berry
Polygalaceae	
Polygala grandiflora Walter (0)	
P. curtissii Gray (0)	Curtiss' milkwort
Euphorbiaceae	
Cnidoscolus stimulosus (Michaux) Engelm. & Gray (0,1,4)	Tread-softly
Euphorbia corollata L. (4,8)	Flowering spurge
Anacardiaceae	
Rhus radicans L. (5,7,8)	Poison ivy
R. toxicodendron L.(4)	Poison oak
R. copallina L. (3)	Winged sumac
R. glabra L. (3)	Common sumac
R. typhina L. (3)	Staghorn sumac
Aquifoliaceae	
Ilex opaca Aiton (6)	American holly
I. decidua Walter (6-8)	Possum haw
I. vomitoria Aiton (0)	Yaupon
Celastraceae	
Euonymus americanus L. (6,7)	Strawberry bush
Staphyleaceae	
Staphylea trifolia L. (6)	Bladdernut
Aceraceae	
Acer negundo L. (6,7)	Boxelder
A. rubrum L. (6)	Red maple
A. saccharum Marshall ssp. *floridanum* (Chapman) Desmarais (6,7)	Florida maple

Hippocastanaceae	
Aesculus pavia L. (6,7)	Red buckeye
Balsaminaceae	
Impatiens capensis Meerb. (6)	Spotted jewel-weed
Rhamnaceae	
Ceanothus americana L. (4)	New Jersey tea
Vitaceae	
Parthenocissus quinquefolia (L.) Planchon (4,5,7,8)	Virginia creeper
Vitis rotundifolia Michaux (5,7)	Muscadine
V. baileyana Munson (6)	Possum grape
Tiliaceae	
Tilia heterophylla Vent. (7)	Basswood
Malvaceae	
Hibiscus moscheutos L. (6)	Rose mallow
Hypericaceae	
Hypericum frondosum Michaux (7)	
H. hypericoides (L.) Crantz (0)	St. Andrew's cross
H. punctatum Lam. (0,6)	St. John's wort
H. drummondii (Grev. & Hooker) T.&G. (0)	
H. gentianoides (L.) BSP. (0)	Pineweed
H. mutilum L. (6)	
Cistaceae	
Lechea racemulosa Michaux (0)	Pin-weed
Violaceae	
Viola spp. (5-8)	Violets
Passifloraceae	
Passiflora incarnata L. (0)	Maypops
Cactaceae	
Opuntia compressa (Salisbury) Macbride (2)	Prickly pear
Melastomataceae	
Rhexia mariana L. (0)	Meadow beauty
R. virginica L. (0)	Virginia meadow-beauty
Onagraceae	
Ludwigia palustris (L.) Ell. (6)	
Oenothera biennis L. (0)	Evening primrose
O. speciosa Nuttall (0)	" "
Araliaceae	
Aralia spinosa L. (7,8)	Devil's walking stick

Apiaceae (Umbelliferae)	
Hydrocotyle verticillata Thunberg (6)	Pennywort
Sanicula canadensis L. (7)	Snakeroot
S. smallii Bicknell (7)	
Eryngium prostratum Nuttall (0)	
E. yuccifolium Michaux (4)	Rattlesnake master
Daucus carota L. (0)	Queen Anne's lace
D. pusillus Michaux (0,1)	Dwarf wild carrot
Thaspium sp. (6)	Meadow parsnip
Apium leptophyllum (Persoon) F. Mueller (0)	
Cryptotaenia canadensis (L.) DC. (6)	Marsh parsley
Cicuta maculata L. (6)	Honeywort
	Water hemlock
Nyssaceae	
Nyssa sylvatica Marshall (6-8)	Black gum
Cornaceae	
Cornus florida L. (4-8)	Flowering dogwood
C. amomum Miller (6)	Silky dogwood
C. stricta Lam. (6)	Swamp dogwood
Ericaceae	
Chimaphila maculata (L.) Pursh (5)	Spotted wintergreen
Rhododendron canescens (Michaux) Sweet (5,7)	Wild azalea
Kalmia latifolia L. (7)	Mountain laurel
Oxydendrum arboreum (L.) DC. (7,8)	Sourwood
Gaylussacia dumosa (Andrz.) T. & G. (8)	Dwarf huckleberry
Vaccinium arboreum Marshall (3-5)	Sparkleberry
V. elliottii Chapman (3-5)	Blueberry
Diapensiaceae	
Galax aphylla L. (7)	Galax
Primulaceae	
Lysimachia ciliata L. (6)	Fringed loosestrife
Ebenaceae	
Diospyros virginiana L. (3,7)	Persimmon
Styracaceae	
Halesia carolina L. (6,7)	Silverbell
H. diptera Ellis (6)	Two-wing silverbell
Styrax americana Lam. (6)	Storax
Oleaceae	
Fraxinus pennsylvanica Marshall (6)	Red ash
Chionanthus virginicus L. (8)	Fringe tree
Ligustrum sinense Lour. (6)	Privet
Loganiaceae	
Gelsemium sempervirens (L.) Aiton f. (3-5)	Yellow jessamine
Spigelia marilandica L. (6,7)	Indian pink

Polypremum procumbens L. (0,1,2)	Polypremen
Gentianaceae	
Sabatia angularis (L.) Pursh (0,2)	Rose-pink
Asclepiadaceae	
Asclepias tuberosa L. (0,2)	Butterfly milkweed
A. quadrifolia Jacquin (2,7)	Milkweed
Matelea suberosa (L.) Shinners (6,7)	
Convolvulaceae	
Cuscuta compacta Jussieu (0)	Dodder
Ipomoea pandurata (L.) G.F.W. Meyer (0)	Man-root
I. hederacea (L.) Jacquin (0)	
Polemoniaceae	
Phlox spp. (6,7)	Phlox
Boraginaceae	
Heliotropium indicum L. (0)	Turnsole
Verbenaceae	
Verbena bonariensis L. (0)	Tall vervain
Verbena sp. (0)	Verbena
Callicarpa americana L. (6,7)	American beauty-berry
Lamiaceae (Labiatae)	
Teucrium canadense L. (2)	
Scutellaria lateriflora L. (6)	Skullcap
S. integrifolia L. (0)	
Glecoma hederacea L. (0)	Ground-ivy
Prunella vulgaris L. (0)	Heal-all
Dracocephalum virginianum L. (0)	Obedient plant
Lamium amplexicaule L. (0)	Henbit
Salvia lyrata L. (0,1)	
Monarda fistulosa L. (7)	Wild bergamot
M. punctata L. (0)	
Pycnanthemum incanum (L.) Michaux (2)	Mountain mint
Lycopus virginicus L. (6)	
Collinsonia serotina Walter (7)	Autumn horsebalm
Solanaceae	
Physalis angulata L. (0)	Ground cherry
Solanum carolinense L. (0)	Bullnettle
Scrophulariaceae	
Mimulus ringens L. (0)	
M. alatus Aiton (0)	
Verbascum thapsus L. (0)	Woolly mullein
Penstemon laevigatus Solander ex Aiton (7)	
Scrophularia marilandica L. (7)	Figwort
Linaria canadensis (L.) Dumont (0)	Oldfield toadflax
Veronica sp. (0)	
Aureolaria virginica (L.) Pennell (7)	

A. flava (L.) Farwell (7)	
Pedicularis canadensis L. (7)	Lousewort
Bignoniaceae	
Anisostichus capreolata (L.) Bureau (5,7)	Crossvine
Campsis radicans (L.) Seemann (4,5)	Trumpet creeper
Catalpa speciosa Warder ex Engelm. (3)	Catalpa
Orobanchaceae	
Epifagus virginiana (L.) Barton (6,7)	Beech-drops
Acanthaceae	
Ruellia caroliniensis (Walter) Steudel (5,7)	Ruellia
Justicia americana (L.) Vahl.	Water willow
Plantaginaceae	
Plantago aristata Michaux (0)	Bracted plantain
P. virginica L. (0)	Plantain
P. lanceolata L. (0,1)	English plantain
P. rugelii Dcne.(0,1)	Rugel's plantain
Rubiaceae	
Cephalanthus occidentalis L. (9)	Buttonbush
Diodia teres Walter (0)	Poorjoe
D. virginiana L. (0,1)	Virginia buttonweed
Mitchella repens L. (5,6,7)	Partridge berry
Houstonia tenuifolia Nuttall (7)	
H. purpurea L. (6,7)	
H. caerulea L. (4,5)	Bluets
Galium aparine L. (0)	Bedstraw
Galium spp. (7)	Stickweeds
Caprifoliaceae	
Lonicera japonica Thunberg (5)	Japanese honeysuckle
L. sempervirens L. (7)	Coral honeysuckle
Viburnum sp. (5,7)	Haw
Sambucus canadensis L. (3)	Elderberry
Valerianaceae	
Valerianella radiata (L.) Dufr. (0)	Corn salad
Cucurbitaceae	
Melothria pendula L. (0,1)	Creeping cucumber
Sicyos angulatus L. (0)	Bur cucumber
Campanulaceae	
Specularia perfoliata (L.) A. DC. (0)	Venus' looking-glass
Lobelia cardinalis L. (0,6)	Cardinal flower
L. puberula Michaux (0,6)	
Asteraceae (Compositae)	
Ambrosia artemisiifolia L. (0)	Ragweed
Lactuca sp. (0)	Wild lettuce

Sonchus sp. (0)	Sow-thistle
Hieraceum venosum L. (5,7)	Rattlesnake-weed
H. gronovii L. (5)	
Krigia dandelion (L.) Nuttall (0)	False dandelion
Pyrrhopappus carolinianus (Walter) DC. (0)	
Taraxacum officinale Wiggers (0,1)	Common dandelion
Senecio glabellus Poiret (6)	Butterweed
S. smallii Britton (7)	Small's groundsel
Erechtites hieracifolia (L.) Raf. (4)	Fireweed
Carduus discolor (Muhl. ex Willd.) Nuttall (2)	
Vernonia altissima Nuttall (0,6)	Ironweed
Elephantopus carolinianus Willd. (6)	
E. tomentosus L. (5)	Elephant's-foot
Liatris squarrosa (L.) Michaux (7)	Blazing star
Eupatorium fistulosum Barratt (0,6)	Joe-pye-weed
E. purpureum L. (7)	
E. capillifolium (Lam.) Small (2)	Dog-fennel
E. serotinum Michaux (2)	
E. coelestinum L. (0)	Mistflower
Mikania scandens (L.) Willd. (3,6)	Climbing hempweed
Antennaria plantaginifolia (L.) Richardson (0)	Pussy-toes
Gnaphalium obtusifolium L. (2)	Rabbit-tobacco
G. purpureum L. (0,1)	Cudweed
Erigeron annuus (L.) Persoon (0)	Daisy fleabane
E. strigosus Muhl. ex Willd. (2)	" "
E. canadensis L. (2)	Horseweed
Aster divaricatus L. (7)	Heart-leaved aster
Aster pilosus Willd. (2)	
Solidago nemoralis Aiton (2)	Goldenrod
Solidago spp. (2,3)	
Heterotheca graminifolia (Michaux) Shinners (4)	Grass-leaved camphorweed
Polymnia uvedalia L. (7)	
Silphium compositum Michaux (4)	
S. dentatum Ell. (4,5)	
Rudbeckia fulgida Aiton (0)	Black-eyed susan
R. hirta L. (0)	" "
Helianthus tomentosus Michaux (4,5)	Sunflower
Verbesina alternifolia (L.) Britton ex Kearney (0)	Crownbeard
V. occidentalis (L.) Walter (2)	
V. virginica L. (0)	
Coreopsis major Walter (4,5)	Dye-flower
Bidens sp. (0)	Beggar-ticks
Helenium amarum (Raf. H. Rock (0)	Bitterweed
Achillea millefolium L. (0)	Yarrow

APPENDIX II

Checklist of Vertebrate Species of Horseshoe Bend National Military Park

The following list includes taxa marked by an asterisk (*) which were actually collected or seen during the study period. Those not so marked are animals one might reasonably expect, on the basis of known geographical ranges and habitat preferences, to find in HBNMP. The vertebrates are listed in the systematic order: fishes, amphibians, reptiles, birds, and mammals, and different kinds of information are provided for each of these major groups.

The list of fish species is based upon the study by Williams (1965) on the fishes of the Tallapoosa River and Smith-Vaniz (1968). Several of those collected during the summer of 1974 were not previously known from the HBNMP area. No satisfactory indications of abundance were possible for these species since the motility of both the species and the river itself cause frequent population density changes in the ichthyofauna.

Special information in the list of bird species includes an indication of the winter inhabitants not present in summer with a capital "W" in parentheses after the scientific names. Summer species not actually seen are denoted by a parenthetical capital "S." Double asterisks (**) indicate observed breeding behavior within HBNMP as verified by occupied nests, attended young, young of the species, or identifiable abandoned nests.

Relative abundance within HBNMP for species marked by asterisks is indicated by parenthetical lower case letters as follows:

a = abundant

c = common

u = uncommon

r = rare

The inclusion of these same letters inside quotation marks for species not actually seen indicates abundance within known ranges that include the area of HBNMP. This information and the phylogenetic order followed were gleaned from: Smith-Vaniz (1968) for fishes; Conant (1958) for amphibians and reptiles; Peterson (1947) for birds; Burt and Grossenheider (1964) for mammals.

Class Osteichthys: Bony Fishes.-

Family Genus species	Common Name (s)
Petromyzontidae	Lampreys
*Ichthyomyzon gagei**	Southern brook l.
Lepisosteidae	Gars
Lepisosteus osseus	Longnose g.
Clupeidae	Herrings, shad
Dorosoma cepedianum	Gizzard s.
D. petense	Threadfin s.
Esocidae	Pikes
Esox americanus	Redfin pickerel
E. niger	Chair pickerel
Cyprinidae	Minnows, Chubs, Shiners
*Campostoma anomalum**	Stoneroller
*Cyprinus carpio**	Carp
Erycimba buccata	Silverjaw m.
Hybognathus hayi	Cypress m.
H. nuchalis	Silvery m.
Hybopsis aestivalis	Speckled c.
H. amblops	Bigeye c.
Nocomis leptocephalus	Bluehead c.
*Notemigonus chrysoleucus**	Golden s.
Notropis atherinoides	Emerald s.
*N. baileyi**	Rough s.
*N. bellus**	Pretty s.
*N. callistius**	Alabama s.
*N. chrysocephalus**	Striped s.
N. edwardraneyi	Flavial s.
N. gibbsi	Tallapoosa s.
N. stilbius	Silverstripe s.

N. uranoscopus	Stargazing s.
*N. venustus**	Blacktail s.
N. volucellus	Mimic s.
N. xaenocephalus	Coosa s.
N. zonistius	Bondfin s.
Opsopoedus emiliae	Snubnose m.
Phenacobius catastomus	Riffle m.
Pemephales vigilax	Bullhead m.
*Semotilus atromaculatus**	Creek c.
Catostomidae	Suckers
Carpiodes cyprinus	Quillback
Erimyzon oblongus	Creek chubs
Hypentelium etowanium	Alabama hogs.
Ictobius bubalus	Smallmouth buffalo
Minxtrema melanops	Spotted s.
Moxostoma carinatum	River redhorse
M. duquesni	Blackhorse
*M. erythrurum**	Golden redhorse
*M. poecilurum**	Blacktail redhorse
Ictaluruidae	Freshwater catfish
Ictalurus catus	White c.
I. furcatus	Blue c.
I. melas	Black bullhead
I. natalis	Yellow bullhead
*I. nebulosus**	Brown bullhead
*I. punctatus**	Channel c.
Noturus funebris	Black madtom
*N. leptacanthus**	Speckled madtom
N. nocturnus	Freckled madtom
*Pylodictis olivaris**	Flathead c.
Aphredoderidae	Pirate perches
Aphredoderus sayanus	Pirate p.
Cyprinodontidae	Killifish
*Fundulus olivaceous**	Blackspotted Topminnow
F. stellifer	Southern studfish
Poeciliidae	Livebearers
*Gambusia affinis**	Mosquitofish
Cottidae	Sculpins
*Cottus carolinae**	Banded sculpin
Serranidae	Sea basses
Morone chrysops	White bass
Centrarchidae	Sunfish
Ambloplites ruprestris	Rock bass
*Lepomis gulosus**	Warmouth
L. auritus	Redear S.

*L. cyanellus**	Green s.
*L. macrochirus**	Bluegill
L. megalotis	Longear s.
L. microlophus	Shellcracker
L. punctatus	Spotted s.
*Micropterus coosae**	Redeye bass
*M. punctulatus**	Spotted bass
M. salmoides	Largemouth bass
M. dolomieui	Smallmouth bass
*Pomoxis annularis**	White crappie
P. nigromaculatus	Black crappie
Percidae	Perches, Darters
Etheostoma rupestre	Rock d.
*E. stigmaeum**	Speckled d.
E. whipplei	Redfin d.
E. sp. (cf. *E. coosae*)	Bridled d.
*Percina caprodes**	Log p.
P. lenticula	Freckled d.
P. nigrofasciata	Blackbonded d.
P. palmaris	Bronze d.
P. uranidea	Stargazing d.
P. sp. (cf. *P. maculata*)	Spotted d.
Stizostedion vitreum	Walleye
Sciaenidae	Drums
Aplodinotus grunniens	Freshwater d.

Class Amphibia: Amphibians.-

Family *Genus species*	Common Name (s)
Bufonidae	Toads
Bufo americanus ("a")	American t.
*B. woodhousei** (a)	Fowler's t.
Hylidae	Hylid Frogs
*Acris crepitans** (u)	Northern cricket f.
A. gryllus ("u")	Southern cricket f.
*Hyla cinerea** (c)	Green tree f.
*H. crucifer** (c)	Spring peeper
*H. versicolor** (a)	Gray tree f.
Pseudacris brachyphona ("c")	Mountain chorus f.
P. triseriata ("c")	Upland chorus f.
Microhylidae	Narrow-mouthed toads
*Gastrophryne carolinensis** (a)	Eastern narrow-mouthed t.

Pelobatidae	Spadefoot Toads
*Scaphiopus holbrooki** (c)	Eastern spadefoot
Ranidae	True Frogs
*Rana catesbeiana** (c)	Bull f.
*R. clamitans** (a)	Bronze f.
*R. pipiens** (c)	Southern leopard f.
Ambrystomatidae	Mole Salamanders
Ambystoma maculatum ("u")	Spotted s.
A. opacum ("u")	Marbled s.
A. tigrinum ("u")	Eastern tiger s.
Plethodontidae	Woodland Salamanders
*Desmognathus fuscus** (a)	Dusky s.
D. monticola ("u")	Seal s.
*Eurycea bislineata** (c)	Two-lined s.
*E. longicanda guttolineata** (a)	Three-lined s.
Hemidactylium scutatum ("u")	Four-toed s.
Plethodon dorsalis ("c")	Zigzag s.
*P. glutinosus** (u)	Slimy s.
*Pseudotriton ruber** (c)	Red s.
*P. montanus** (u)	Gulf coast mud s.
Proteidae	Mudpuppies, Waterdogs
Necturus beyeri ("c")	Beyer's w.
Salamandridae	Newts
*Notopthalmus viridescens** (a)	Red-spotted n.

Class Reptilia: Reptiles.-

Family Genus species	Common Name (s)
Anguidae	Lateral-fold Lizards
Ophisaurus attenuatus ("u")	Eastern slender glass l.
Iguanidae	Ignanid Lizards
*Anolis carolinensis** (a)	Green anole
*Sceloporus undulatus** (a)	Fence l.
Scincidae	Skinks
Eumeces anthracinus ("u")	Coal s.
*E. egregius** (r)	Northern mole s.
*E. fasciatus** (c)	Five-lined s.
*E. inexpectatus** (c)	Southeastern five-lined s.
*E. laticeps** (c)	Broad-headed s.
*Scincella laterale** (a)	Ground s.

Teidae	Teid Lizards
*Cnemidophorus sexlineatus** (a)	Eastern six-lined racerunner
Colubridae	Colubrid Snakes
*Carphophis amoenus helenae** (c)	Midwest worm s.
Cemophora coccinea ("u")	Northern scarlet s.
*Coluber constrictor** (c)	Black racer
*Diadophis punctatus** (a)	Ringneck s.
Elaphe guttata ("u")	Corn s.
*E. obsoleta spiloides** (c)	Grey rat s.
Heterodon platyrhinos ("c")	Eastern hognose s.
Lampropeltis calligaster ("u")	Mole s.
L. getulus getulus x *L.g. niger** (c)	Eastern x Black kings.
Masticophis flagellus ("u")	Eastern coachwhip s.
*Natrix erythrogaster** (c)	Yellow-bellied water s.
*N. sipedon** (c)	Midland water s.
Opheodrys aestivus ("c")	Rough green s.
*Regina septemvittata** (c)	Queen s.
*Storeria dekayi** (c)	Midland brown s.
Storeria occipitomaculata ("u")	Northern red-bellied s.
Tantilla coronata ("u")	Southeastern crowned s.
Thamnophis sauritis ("u")	Eastern ribbon s.
*T. sirtalis** (c)	Eastern garter s.
Virginia striatula ("u")	Rough earth s.
V. valeriae ("u")	Smooth earth s.
Viperidae	Pit Vipers
Agkistrodon contortrix contortrix x *A.c. mokeson** (c)	Southern x Northern copperhead
A. piscivorous ("u")	Eastern cottonmouth
*Crotalus horridus** (c)	Timber rattlesnake
Sistrurus miliarius ("u")	Pigmy rattlesnake
Chelydridae	Snapping Turtles
*Chelydra serpentina** (c)	Common s.
Macroclemys temmincki ("u")	Alligator s.
Emydidae	Emydid Turtles
Chrysemys picta picta x *C.p. marginata* ("u")	Painted t.
*Pseudemys concinna** (a)	River cooter
*P. scripta** (c)	Yellow-bellied pond slider
*Terrapene carolina** (a)	Eastern box turtle
Kinosternidae	Mud and Musk Turtles
*Kinosternon subrubrum** (a)	Eastern mud t.
Sternotherus minor peltifer ("u")	Striped-neck musk t.
S. odoratus ("c")	Stinkpot
Trionychidae	Soft-shelled Turtles
*Trionyx spiniferus asper** (c)	Gulf coast spiny softshell

Class Aves: Birds.-

Family Genus species	Common Name (s)
Gaviidae	
Gavia immer (W)	Loons Common l.
Colymbidae	
Colymbus auritus (W)	Grebes Horned g.
Podilymbus podiceps (S?/W)	Pied-billed g.
Ardeidae	
Butorides virescens* (c)	Herons, Egrets Eastern green h.
Casmerodius alba* (r)	Great e.
Anatidae	
Aix sponsa* (u)	Ducks, Geese, Swans Wood d.
Anas platyrhynchos (S?/W)	Mallard
A. rubripes (S?/W)	Black d.
A. discors (W)	Blue-winged teal
A. americana (W)	Baldpate
Aythya collaris (W)	Ring-necked d.
Mergus merganser (W)	Hooded merganser
M. serrator (W)	Red-breasted merganser
Cathartidae	
Cathartes aura* (c)	New World Vultures Turkey v.
Coragyps atratus* (c)	Black v.
Falconidae	
Accipiter cooperi* (c)	Falcons, Hawks Coopers h.
A. striatus (S)	Sharp-shinned h.
Buteo jamaciensis* (c)	Red-tailed h.
B. lineatus** (a)	Red-shouldered h.
Circus cyaneus (W)	Marsh h.
Falco sparverius* (r)	Sparrow h.
Phasianidae	
Colinus virginianus ** (a)	Pheasants, Partridges, Quail Bobwhite
Meleagrididae	
Meleagris gallopavo (S)	Turkeys Wild t.
Rallidae	
Fulica americana (W)	Coots, Rails American c.
Charadriidae	
Charadrius vociferus (S)	Plovers, Turnstones Killdeer

Scolopacidae	Woodcock, Snipe, Sandpipers
Philohela minor (S/W)	American w.
Capella gallinago (W)	Common sn.
Erolia minutilla (S?/W)	Least sa.
Actitis macularia (S?/W)	Spotted sa.
Lauridae	Gulls
Larus delawarensis (W)	Red-billed g.
Columbidae	Pigeons, Doves
*Zenaidura macroura*** (c)	Mourning d.
Cuculidae	Cuckoos
*Coccyzus americanus** (c)	Yellow-billed c.
Strigidae	Owls
*Otus asio** (c)	Screech o.
*Strix varia** (c)	Barred o.
Bubo virginianus (S)	Great horned o.
Caprimulgidae	Goatsuckers
*Caprimulgus carolinensis** (c)	Chuck Will's widow
Chordeilus minor (S)	Nighthawk (S)
Apodidae	Swifts
*Chaetura pelagica** (u)	Chimney s.
Trochilidae	Hummingbirds
*Archilochus colubris*** (c)	Ruby-throated h.
Alcedinidae	Kingfishers
*Megaceryle alcyon** (u)	Belted k.
Picidae	Woodpeckers
*Coluptera auratus** (u)	Yellow-shafted flicker
*Hylatomus pileatus*** (c)	Pileated w.
*Centurus carolinus** (c)	Red-bellied w.
Sphyrapicus varius (W)	Yellow-bellied sapsucker
*Dendrocopus pubescens** (u)	Downy w.
D. villosus (S)	Hairy w.
Tyrannidae	Flycatchers
*Tyrannus tyrannus** (c)	Eastern kingbird
*Sayornus phoebe*** (c)	Eastern phoebe
*Empidonax virescens** (u)	Acadian f.
*Contopus virens** (c)	Eastern wood pewee
Hirundinidae	Swallows
*Hirundo rustica*** (c)	Barn s.
Stelgidopteryx ruficollis (S)	Rough-winged s.
Progne subis (S)	Purple martin
Corvidae	Crows, Jays
*Cyanocitta cristata** (a)	Blue j.
*Corvus brachyrhynchos*** (a)	Common c.

Paridae	Titmice
*Parus carolinensis** (c)	Carolina chicadee
*P. bicolor*** (c)	Tufted t.
Sittidae	Nuthatches
Sitta pusilla (S)	Brown-headed n.
S. canadensis (W)	Red-breasted n.
Troglogytidae	Wrens
*Thryothorus ludovicianus*** (c)	Carolina w.
Mimidae	Mimic thrushes
*Mimus polyglottos*** (c)	Mockingbird
*Toxostroma rufum*** (c)	Brown
Dumatella carolinensis (S)	Catbird
Turdidae	Thrushes
*Turdus migratorius*** (c)	American robin
*Hylocichla mustelina** (c)	Wood t.
Sialia sialis (S)	Eastern bluebird
Sylviidae	Gnatcatchers, Kinglets
*Polioptila caerulea** (u)	Blue-grey g.
Regulus satrapa (W)	Golded-crowned k.
Bombycillidae	Waxwings
Bombycilla cedrorum (W)	Cedar w.
Laniidae	Shrikes
Lanius ludovicianus (S)	Loggerhead s.
Sturnidae	Starlings
*Sturnus vulgaris** (u)	Common s.
Vireonidae	Vireos
*Vireo griseus*** (a)	White-eyed v.
*V. olivaceous** (a)	Red-eyed v.
V. flavifrons (S)	Yellow-throated v.
Parulidae	Wood warblers
*Helmintheros vermivorus** (r)	Worm eating w.
*Dendroica dominica** (u)	Yellow-throated w.
*D. discolor** (c)	Prairie w.
D. coronata (W)	Myrtle w.
D. pinus (S)	Pine w.
D. palmarum (W)	Palm w.
Prothonotaria citrea (S)	Prothonotary w.
*Seiurus motacilla*** (c)	Louisiana waterthrush
*Oporornis formosus** (c)	Kentucky w.
Geothlypis trichas (S)	Yellowthroat
Wilsonia citrina (S)	Hooded w.
Setophaga ruticilla (S)	American redstart

Ploceidae	
Passer domesticus (S)	Weaver finches House sparrow
Icteridae	Meadowlarks, Blackbirds, Orioles
*Sturnella magna** (r)	Eastern m.
*Agelaius phoeniceus*** (u)	Red-winged b.
Euphagus carolinus (W)	Rusty b.
*Icterus spurius** (u)	Orchard o.
*I. virens** (c)	Yellow-breasted chat
*Quiescalus quiescula** (c)	Common grackle
*Molothrus ater** (c)	Brown-headed cowbird
Traupidae	Tanagers
*Piranga rubra** (c)	Summer t.
Fringillidae	Sparrows, Grosbeaks, Finches, Buntings
*Richmondena cardinalis*** (a)	Virginia cardinal
Guiraca caerulea (S)	Blue g.
Hesperiphona vespertina (W)	Evening g.
Carpodacus purpureus (W)	Purple f.
*Passerina cyanea** (c)	Indigo b.
*Spinus tristis** (c)	American goldf.
S. pinus (W)	Pine siskin
*Pipilo erythrophthalmus*** (c)	Rufous-sided towhee
*Spizella passerina*** (c)	Chipping s.
*S. pusilla** (c)	Field s.
Passerculus sandwichensis (W)	Savannah s.
Poaecetes gramineus (W)	Vesper s.
Zonotrichia leucophrys (W)	White-crowned s.
Z. albicollis	White-throated s.
Passerella iliaca (W)	Fox s.
Melospiza melodia (W)	Song s.

Class Mammalia: Mammals.-

Family Genus species	Common Name (s)
Didelphidae	Opossums
*Didelphis marsupialis** (c)	Common o.
Talpidae	Moles
*Scalopus aquaticus** (a)	Eastern m.
Soricidae	Shrews
*Sorex longirostris** (a)	Southeastern s.
*Blarina brevicauda** (a)	Short-tailed s.
Cryptotis parva ("u")	Least s.

Vespertilionidae	Vespertilionid Bats
Myotis lucifugus ("u")	Little brown myotis
Lasionycteris noctivagans ("r")	Silver-haired b.
Pipistrellus subflavus ("c")	Eastern Pipistrelle
Eptesicus fusus ("u")	Big brown b.
Lasiurus borealis* (a)	Red b.
L. cinereus ("r")	Hoary b.
Nycticeius humeralis* (c)	Evening b.
Molossidae	Free-tailed Bats
Tadarida brasiliensis ("r")	Brazilian free-tailed b.
Leporidae	Rabbits, Hares
Sylvilagus aquaticus ("c")	Swamp r.
S. floridanus* (c)	Eastern cottontail
Sciuridae	Squirrels
Tamias striatus* (a)	Eastern chipmunk
Marmota monax* (u)	Woodchuck
Sciurus carolinensis* (a)	Grey s.
S. niger ("r")	Fox s.
Glaucomys volans ("c")	Southern flying s.
Castoridae	Beavers
Castor canadensis* (c)	Common b.
Cricetidae	Cricetids
Reithrodontomys humulis* (c)	Eastern harvest mouse
Peromyscus gossypinus ("c")	Cotton mouse
P. nuttalli* (c)	Golden mouse
Sigmodon hispidus* (a)	Cotton rat
Neotoma floridana* (r)	Eastern wood rat
Microtus pinetorum ("c")	Pine vole
Ondatra zibethicus* (c)	Muskrat
Muridae	Murids
Rattus norvegicus ("u")	Norway rat
Mus musculus ("u")	House mouse
Canidae	Wolves, Coyote, Dogs, & Foxes
Canis familiaris* (a)	Dog
Vulpes fulva* (r)	Red f.
Urocyon cinereoargenteus* (c)	Grey f.
Procyonidae	Raccoon
Procyon lotor* (c)	Common r.
Mustelidae	Mustelids
Mustela frenata ("r")	Long-tailed weasel
M. vison ("u")	Mink
Spilogale putorius ("c")	Eastern spotted skunk
Mephitis mephitis* (c)	Striped skunk
Lutra canadensis ("r")	River otter

Felidae *Lynx rufus** (u)	Cats Bobcat
Cervidae *Dama virginiana** (c)	Cervids White-tailed deer

APPENDIX III

Checklist of Common Insect Families Represented in HBNMP

The following list includes the major insect families reported to occur in the area of HBNMP arranged according to aquatic or terrestrial habitat. The list is based mainly upon a compilation from the literature and collections made during the period 15 Aug. - 15 Sept. 1974. Actual collections document the occurrence of families marked by an asterisk (*). When the identities of these representatives could be determined, this information is provided under the families concerned. Sources consulted include: the Auburn University Entomological Collection; Borror and DeLong (1969); Borror and White (1967); Wray (1967); Dakin and Hays (1970); and Ross (1956).

Aquatic Insects.-

Order Family Genus species	Common Name (s)
Ephemeroptera	Mayflies
Ephemeridae	Borrowing m.
Heptogeniidae	Stream m.
Bactidae*	Small m.
Bactida sp.	
Odonata	Dragonflies
Aeshnidae	Darners
Gomphidae*	Clubtails
Erpetogomphus disigatus	
Libellulidae*	Common skimmers
Erythemis simplicicollis	
Libellula incenta	
Tramea laccrata	
Cordulegastridae	Biddies
Macromiidae*	Belted skimmer
Macromia georgina	
Calopterigidae*	Broad-winged damselflies
Calopteryx maculata	
Hetaerina americana	

Lestidae*	
Lestes sp.	Spread-winged damselflies
Coenagrionidae*	
Argeria sp.	Narrow-winged damselflies
Orthoptera	Grasshoppers, Crickets
Tetrigidae	Pigmy grasshoppers
Tridactylidae	Pigmy mole crickets
Plecoptera	Stoneflies
Hemiptera	True bugs
Corisidae	Water boatmen
Nepidae	Water scorpions
Notonectidae	Back swimmers
Belostomatidae	Giant waterbugs
Naucoridae	Creeping waterbugs
Gelastocoridae	Toad bugs
Gerridae*	Water striders
Veliidae	Ripple bugs
Saldidae*	Shore bugs
Neuroptera	Nerve-winged insects
Corydalidae*	Dobsonflies
Corydalus cornutus	
Coleoptera	Beetles
Haliplidae	Crawling water b.
Dytiscidae*	Predaceous diving b.
Gyrinidae*	Whirligig b.
Dineutus sp.	
Gyrinus sp.	
Hydrophilidae*	Water scavenger b.
Berosus sp.	
Tropisternus sp.	
Dryopidae*	Long-toed water b.
Helichus sp.	
Trichoptera	Caddisflies
Hydropsychidae*	Net-spinning c.
Diptera	Flies
Tipulidae*	Craneflies
Culicidae*	Mosquitoes
Culex spp.	
Anopheles sp.	
Ptychopteridae	Phantom craneflies
Chironomidae	Midges
Simuliidae	Black f.
Tabanidae*	
Chrysops sp.	Deerfly
Tabanus sp.	Horsefly

Mecoptera	Scorpionflies
Panorpidae	Common s.
Bittacidae	Hanging s.

Terrestrial Insects.-

Collembola	Springtails
Poduridae	Elongate-bodied s.
Entomobryidae	" s.
Sminthuridae	Globular s.
Thysanura	Bristletails
Lepismatidae	Common b.
Orthoptera	Straight-winged insects
Blattidae*	Roaches
Cryptocercus punctulatus	
Ischnoptera deropeltiformis	
Parcoblatta bolliana	
P. virginia	
P. uhleriana	
P. fulvescens	
P. divisa	
Acrididae*	Shorthorned grasshoppers
Metaleptea b. brevicornis.	
Syrbula admirabilis	
Orphulella p. pelidna	
Dichromorpha viridis	
Arphia sulphurea	
Chortophaga viridifasciata	
Melanoplus punctulatus arboreus	
M. f. femurrubrum	
M. f. propinquus	
M. sanquinipes vulturnus	
Gryllidae*	Crickets
Nemobius fasciatus	
Gryllus rubens	
Oecanthus exclamationis	
O. quadripunctatus	
Falcicula hebardi	
Phylloscyrtus pulchellus	
Tettigoniidae*	Longhorned grasshoppers
Scudderia curvicauda laticauda	
S. f. furcata	
Neoconocephalus exiliscanorus	
N. triops	
Gryllacrididae*	Cave crickets
Mantidae*	Mantids
Stagmomantis carolina	
Oligonicella scudderi	
Phasmidae*	Walking sticks
Megaphasma denticrus	

Isoptera	Termites, White ants
Rhinotermidae*	Termites
Reticulitermes flavipes	
Dermaptera	Earwigs
Forficulidae	
Labiduridae*	
Psocoptera	Psocids
Unidentified family*	
Phthiraptera	Chewing and sucking lice
Suborder Anoplura	Sucking lice
Suborder Mallophaga	Chewing lice
Thysanoptera	Thrips
Hemiptera	True bugs
Reduviidae*	Assasin bugs
Miridae	Plant bugs
Lygaeidae	Chinch bugs
Coreidae*	Coreid bugs
Nabidae	Damsel bugs
Cydnidae	Negro bugs
Pentatomidae	Stink bugs
Tingidae	Lace bugs
Homoptera	
Cicadidae*	Cicadas
Tibicen sp.	Dog-day c.
Cercopidae*	Spittle bug
Prosapia bicincta	
Fulgoridae	Plant hoppers
Coccidae	Scale insects
Aphidae	Aphids
Membracidae	Treehoppers
Cicadellidae	Leafhoppers
Aleyrodidae	Whiteflies
Neuroptera	Nerve-winged insects
Chrysopidae*	Lacewings
Chrysopa sp.	Green l.
Myrmeleontidae*	Ant lions
Myrmeleon sp.	
Coleoptera	Beetles
Cicindelidae*	Tiger b.
Megacephala carolina	
Cicindela sp.	
Carabidae*	Ground b.
Silphidae*	Carrion b.
Silpha surinamensis	
Cantharidae*	Soldier b.

Lycidae	Net-winged b.
Buprestidae	Metallic wood-boring b.
Tenebrionidae	Darkling b.
Passalidae	Bess b.
Scarabaeidae*	Scarab b.
Chrysomelidae	Leaf b.
Scolytidae	Bark or engraver b.
Staphylinidae	Rove b.
Lampyridae	Lightningbug b.
Elateridae	Click b.
Erotylidae	Pleasing fungus b.
Lucanidae	Stag b.
Cerambycidae*	Long-horned b.
Curculionidae*	Snout b.
Meloidae*	Blister b.
Epicauta sp.	Tumbling flower b.
Mordellidae*	Ladybird b.
Coccinellidae*	
Hippodamia convergens	
Chilocorus stigma	
Strepsiptera	Twisted-wing parasites
Lepidoptera	Butterflies and Moths
Papilionidae*	Swallowtails
Papilio spp.	
Pieridae*	Sulfurs
Pieris sp.	
Eurema sp.	
Lycaenidae	Coppers, blues, hairstreaks
Nymphalidae	Brush-footed butterflies
Satyridae	Wood nymphs
Heliconiidae*	Fritillaries
Agraulis vanillae	Gulf f.
Danaidae	Milkweed butterfly
Hesperiidae	Skippers
Citheroniidae*	Royal moths
Citheronia regalis	Regal moth
Anisota stigma	Maple moth
A. rubicunda	Rosy maple moth
Basilona imperialis	Imperial moth
Saturniidae*	Giant silkworm moths
Actias luna	Luna moth
Callosomia sp.	
Sphingidae*	Sphinx and hawk moths
Pholus pandorus	
Darapsa myron	
Herse cingolata	
Isogramma hageni	
Noctuidae*	Noctuid moths
Euthisnotia sp.	

Notodonidae*	Prominents
Nadata gibbosa	
Cerura sp.	
Arctiidae*	Tiger moths
Halisidota tersellaris	
Hephantria cunea	
Psychidae*	Bagworm moths
Thyridopteryx ephemeraeformis	
Pyromorphidae*	Smoky moths
Pyromorpha sp.	
Lasiocampidae*	Tent caterpillars
Malacosoma americanum	
Tolipe sp.	
Liparidae*	Tussock moths
Yponomeutidae*	Ermine moths
Yponomeuta sp.	
Diptera	Two-wing insects
Tipulidae (adults)*	Craneflies
Ceratopogonidae	Biting midges, no-see-ums
Stratiomyidae	Soldier flies
Simulidae	Black flies
Tabanidae (adults)*	
Chrysops sp.	Deerfly
Tabanus sp.	Horsefly
Asilidae*	Robber flies
Promachus sp.	
Bibionidae*	March flies
Culicidae (adults)*	Mosquitoes
Bombyliidae*	Bee flies
Anthrax sp.	
Syrphidae*	Flower flies
Milenia sp.	
Otitidae*	Otitid flies
Muscidae*	House flies
Musca domestica	
Tachinidae*	Tachinid flies
Calliphoridae	Blow flies
Sarcophagidae	Flesh flies
Siphonaptera	Fleas
Hymenoptera	Wasps, bees, ants, etc.
Tenthredinidae	Common sawflies
Braconidae	Braconids
Ichneumonidae*	Ichneumon wasps
Acrotaphus wilti	
Netelia unguiculanis	
Chrysididae	Cuckoo wasps
Scoliidae*	Scoliid wasps
Scolia dubia	
Mutillidae*	Velvet ant
Chyphotes sp.	

Formicidae*	
Solenopsis saevissima richteri	Fireant
Camponotus sp.	
Vespidae*	Vespid wasps
Polistes canadensis	
P. fuscatus	
Vespula maculata	
*V. maculifrons**	
Pioncnemoide unifascula	
Sphecidae*	Sphecid wasps
Sphecius speciosus	
Halictidae*	Sweat bees
Halictus sp.	
Apidae*	Miscellaneous bees
Apis mellifera	Honey bee
Xylocopa sp.	Carpenter bee
Bombus sp.	Bumble bee
Megabombus sp.	Bumble bee

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The following plants were identified in Horseshoe Bend National Military Park during 1976. They are not included in the list keyed out by Dr. John D. Freeman and his staff from Auburn University in 1974. The plants follow the order of families in MANUAL OF SOUTHEASTERN FLORA by Small, 1933. Further identifying information was obtained from GRAY'S MANUAL OF BOTANY, eighth edition, 1950, and THE NEW BRITTON AND BROWN ILLUSTRATED FLORA OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA, 1963.

Family Genus species	Common Name
Compositae or Asteraceae	
Aster lateriflorus	
Chrysopsis mariana	Golden Aster
Chrysopsis graminifolia	
Aster undulatus	
Sericocarpus asteroides	White-topped Aster
Aster dumosus	
Aster sagittifolius	
Aster patens var. phlogifolius	
Aster pilosus	
Aster divaricatus	
Prenanthes altissima	Rattlesnake Root
Prenanthes autumnalis	
Gnaphalium Helleri	Cudweed
Gnaphalium obtusifolium	
Antennaria fallax	Ladies Tobacco
Crepis nicaeensis	Hawk's Beard
Lactuca canadensis	Wild Lettuce
Vernonia altissima	Ironweed
Helianthus microcephalus	Small Wood-Sunflower
Helianthus angustifolius	
Krigia oppositifolia	Dwarf Dandelion
Krigia virginica	Dwarf Dandelion
Solidago Buckleyi	Goldenrod
Solidago altissima	
Solidago Brotii	
Solidago odora	Sweet Goldenrod
Solidago caesia	
Solidago canadensis var. gilvocanescens	
Solidago nemoralis var. longipetiolata	
Helenium amarum	Sneezeweed
Senecio Smallii	Ragwort
Senecio glabellus	
Rudbeckia serotina	Brown-eyed Susan
Erigeron philadelphicus	"
Silphium asteriscus	Rosin Weed
Silphium brachiatum	
Eupatorium coelestinum	Mistflower
Eupatorium coelestinum var. alba	White Mistflower
Eupatorium compositifolium	Dog Fennel
Cirsium altissimum Nuttallii	Thistle
Cirsium horridulum	Yellow Thistle
Liatris graminifolia var. racemosa	Blazing Star
Coreopsis auriculata	Tickseed
Verbesina occidentalis	Wingstem

Leguminoseae or Fabaceae	
Cassia obtusifolia	
Cassia fasciculata var. robusta	Senna
Rhynchosia tomentosa	Partridge-Pea
Tephrosia hispidula	Hoary Pea
Crotalaria angulata	Rabbit Bells
Vicia angustifolia	Common Vetch
Trifolium incarnatum	Crimson Clover
Trifolium dubium	Yellow Clover
Crotalaria spectabilis	Rattlebox
Umbelliferae or Apiaceae	
Aegopodium podagraria	Goutweed
Sanicula marilandica	Black Snakeroot
Chaerophyllum Tainturieri	Wild Chervil
Convolvulaceae	
Ipomoea lacunosa	Wild Morning Glory
Convolvulus Pharbitis barbigera	Morning Glory
Thyella tamnifolia	Choisy
Caryophyllaceae	
Silene stellata	Starry Campion
Cerastium vulgatum	Mouse-Eared Chickweed
Stellaria media	Chickweed
Solanaceae	
Physalis pubescens	Ground Cherry
Scrophulariaceae	
Penstemon hirsutus	Beard Tongue
Aureolaria flava	False Foxglove
Veronica arvensis	Speedwell
Linaria floridana	Old-Field Toadflax
Agalinis purpurea	Gerardia
Agalinis Harperi	Gerardia
Euphorbiaceae	
Euphorbia apocynifolia	Spurge
Euphorbia mercurialina	Spurge
Gentianaceae	
Gentiana villosa	Sampson's Snakeroot
Gentiana linearis	Bottle Gentian
Onagraceae	
Oenotheria speciosa	Evening Primrose
Oenotheria fruticosa	Evening Primrose
Oenotheria biennis	Evening Primrose
Passifloraceae	
Passiflora incarnata	Passion Flower

Orchidaceae	
Spiranthes gracilis	Slender Ladies Tresses
Tipularia discolor	Crane Fly Orchid
Hexalectris spicata	Cock's Comb Orchid
Goodyera pubescens	Downy Rattlesnake Plantain
Verbenaceae	
Vervain hastata	Verbena
Campanulaceae	
Lobelia puberula var. simulans	Lobelia
Lobelia elongata	Lobelia
Lobelia cardinalis	Cardinal Flower
Saxifragaceae	
Tiarella cordifolia	Foamflower
Commelinaceae	
Commelina erecta	Day Flower
Tradescantia ohiensis	Spiderwart
Asclepiadaceae	
Asclepias variegata	Milkweed
Polygalaceae	
Polygala sanguinea	Milkwart
Polygala polygama	Milkwart
Polygonaceae	
Persicaria opelousana	Smartweed
Rumex acetosella	Sheep Sorrel
Polemoniaceae	
Phlox pilosa	Phlox
Phlox glaberrima	Phlox
Cyperaceae	
Cyperus retrofractus	Sedge
Gramineae or Poaceae	
Andropogon virginicus var. tetrastachyus	Broom Sedge
Gymnopogon brevifolius	Beardgrass
Panicum virgatum	Switchgrass or Panic Grass
Andropogon gracunturus	Wiregrass or Bluestem
Setaria geniculata	Foxtail Grass
Andropogon scoparius	Broom Beardgrass
Sriacthus contortus	Wooly Beardgrass
Erianthus alopecuroides	Wooly Beardgrass
Panicum commutatum	Panic Grass
Erianthus divaricatus	Plume Grass
Uniola latifolia	Spangle Grass or Wild Oats

Violaceae	
Viola cucullata var. Bissellii	Violet
Viola affinis	White Violet
Viola hastata	Halberd Leafed or Yellow Viole
Viola pedata	Bird's Foot Violet
Viola Rafinesquii	Johnny-Jump-Up
Viola Stoneana	Violet
Viola tricolor	Johnny-Jump-Up
Labiatae	
Pycnanthemum montanum	Mountain Mint or Basil
Pycnanthemum incanum var. pubescens	
Scutellaria elliptica var. hirsuta	Skullcap
Collinsonia canadensis	Horse Balm
Monarda punctata	Horse Mint
Hippocastanaceae	
Aesculus discolor	Buckeye
Oxalidaceae	
Oxalis stricta	Wood Sorrel
Oxalis violacea	Wood Sorrel
Rubiaceae	
Houstonia minima	Eluet or Star Violet
Ranculaceae	
Isopyrum biternatum	False Rue Anemone
Ranunculus Harveyi	Crowfoot
Ranuculus abortivus	Small-Flowered Crowfoot
Anemonella thalictroides	Rue Anemone
Papaveraceae	
Sanguinaria canadensis	Blood Root
Cruciferae	
Cardamine parviflora	Bitter Cress
Calycanthaceae	
Calycanthus floridus	Sweet Shrub
Ericaceae	
Rhododendron maximum	Mountain Azalea
Rosaceae	
Crataegus spathulata	Hawthorn, Red Haw
Pyrus angustifolia	Wild Crab Apple
Potentilla anserina	Silver Weed

Iridaceae

Sisyrinchium albidum — Blue-Eyed Grass

Liliaceae

Trillium cuneatum — Wake Robin or Trillium
Chamaelirium luteum — Devils Bit or Fairy Wand
Lilium Michauxii — Carolina Lily