DESIGNATION ORDER

By virtue of the authority vested in me by the Secretary of Agriculture under regulations 7 CFR 2.60(a) and 36 CFR 251.23, I hereby designate as the Panther Hollow Research Natural Area the land described in the following establishment record prepared ~~by Max D.~~ Hutchison, Steven Olson, and Stanley Harris, dated July 31, 1987. These lands shall hereafter be administered as a research natural area subject to the above regulations and instructions issued thereunder.

Chief

4/6/89
Date

RECEIVED IN WO-TMR

APR 7 1989

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

PANTHER HOLLOW

RESEARCH NATURAL AREA

SHAWNEE NATIONAL FOREST

JULY 31, 1987

Panther Hollow

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983 - 425-976 - 415/6115

FS-6200-7 (10/73)

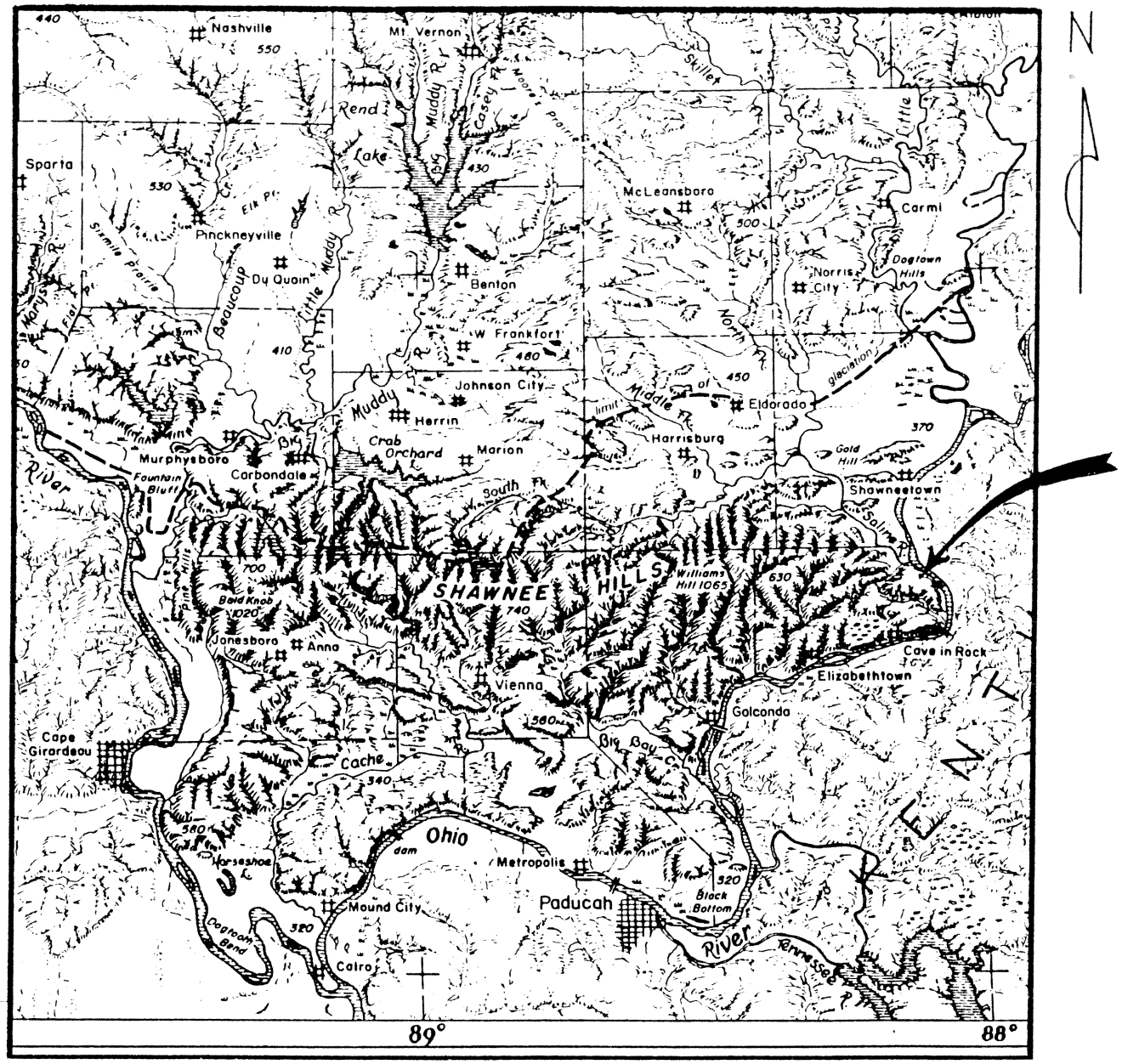

Figure 1. Location of Panther Hollow Research Natural Area shown (with arrow) on copy of J. A. Bier's Landforms of Illinois map, Ill. State Geol. Surv., Urbana, 1980

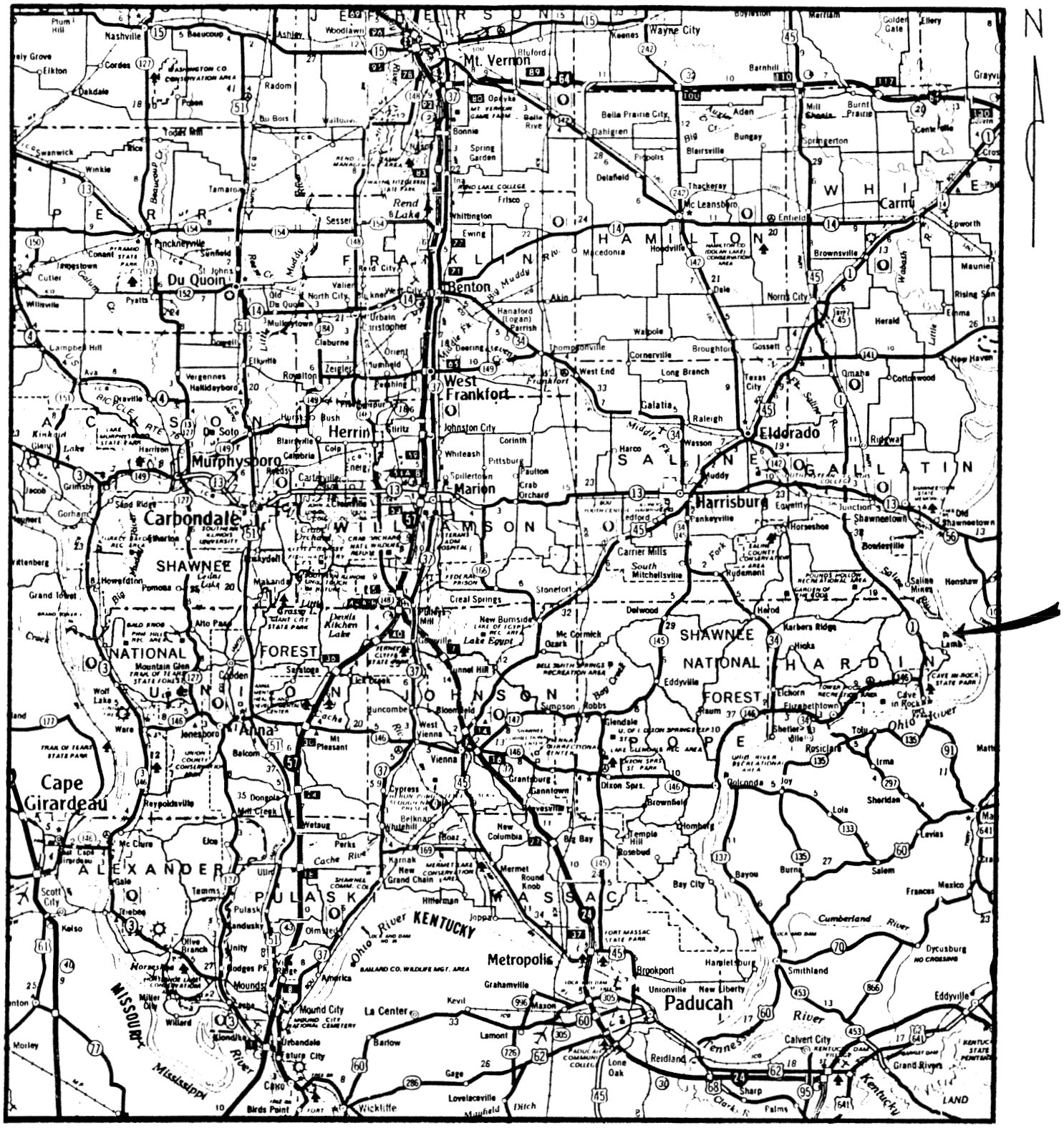

Figure 2. Location of Panther Hollow Research Natural Area shown (with arrow) on copy of Illinois Official Highway Map, 1985-86, Department of Transportation, Springfield

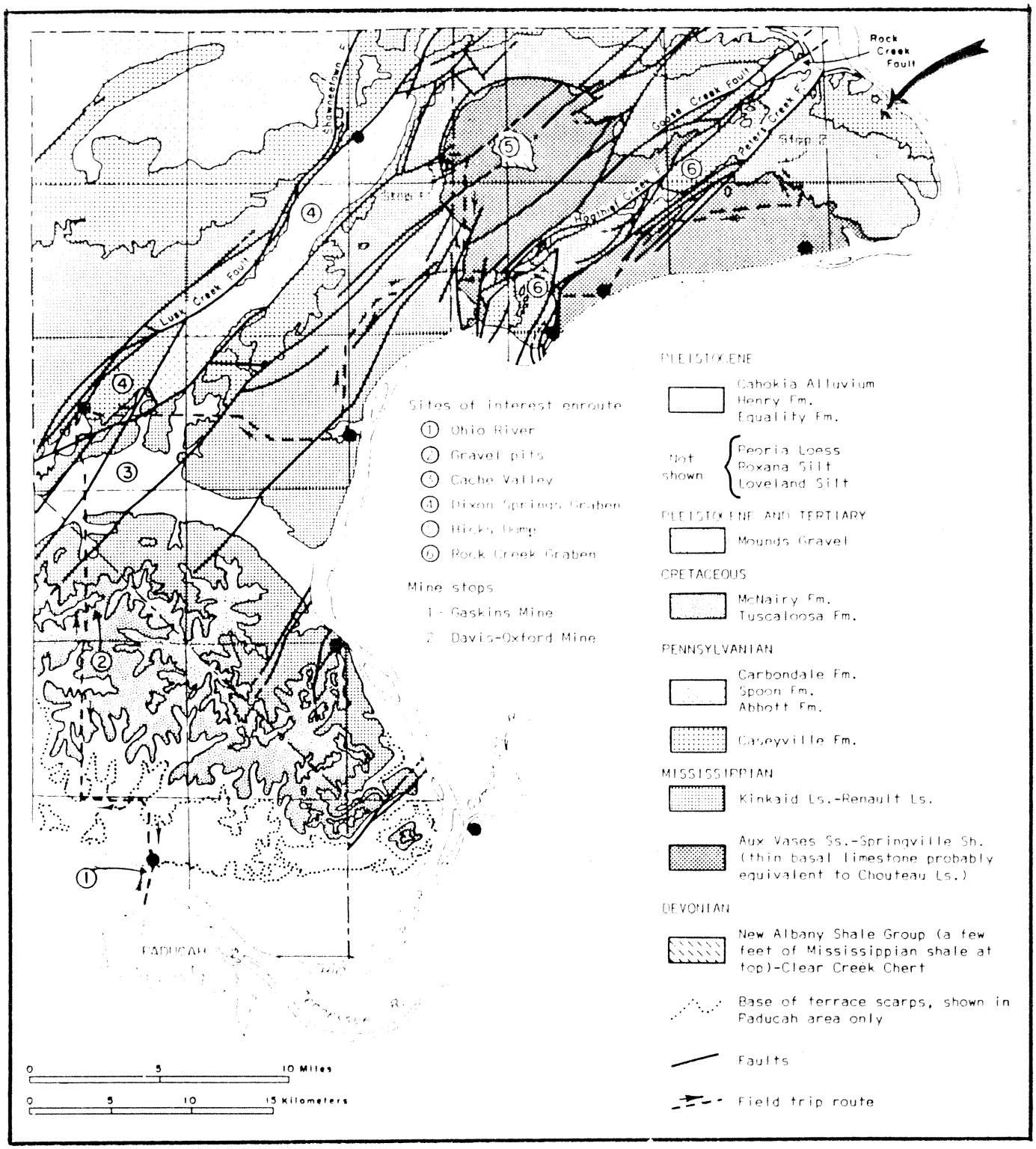

Figure 5. Location of Panther Hollow Research Natural Area shown (with arrow) on copy of map in A geologic excursion to fluorspar mines in Hardin and Pope counties, Illinois by J. W. Baxter, J. C. Bradbury, and N. C. Hester, Ill. State Geol. Surv. Guidebook Series 11, 1973.

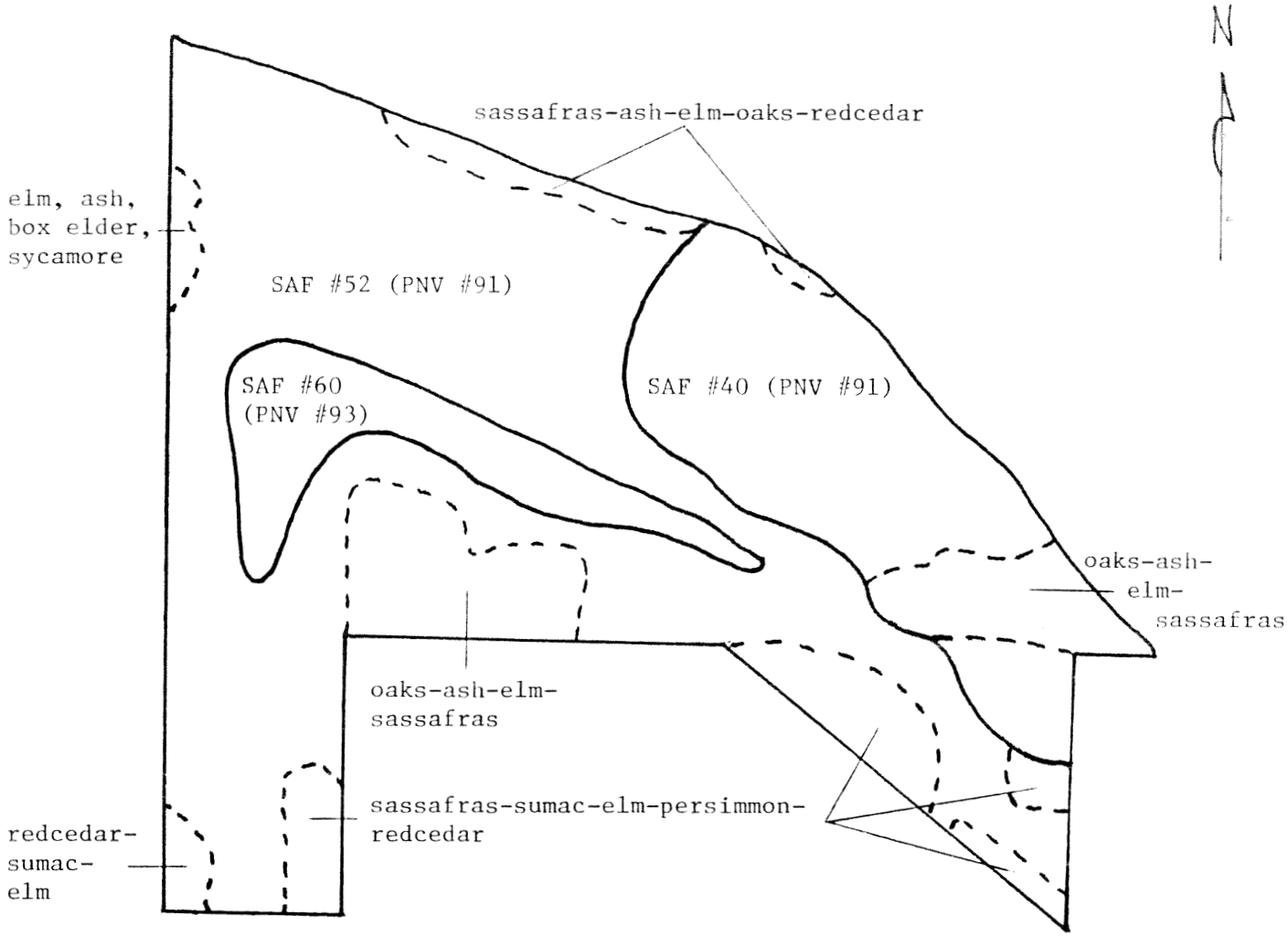

Figure 6. Map of Panther Hollow Research Natural Area showing area cover types *

scale 5.5 cm. = 1/4 mile

SAF Cover Type	Kuchler PNV Type
#40 post oak-blackjack oak	#91 oak-hickory
#52 white oak-black oak-northern red oak	#91 oak-hickory
#60 beech-sugar maple	#93 beech-maple

*Solid lines divide major cover types; dashed lines divide variants and successional types.

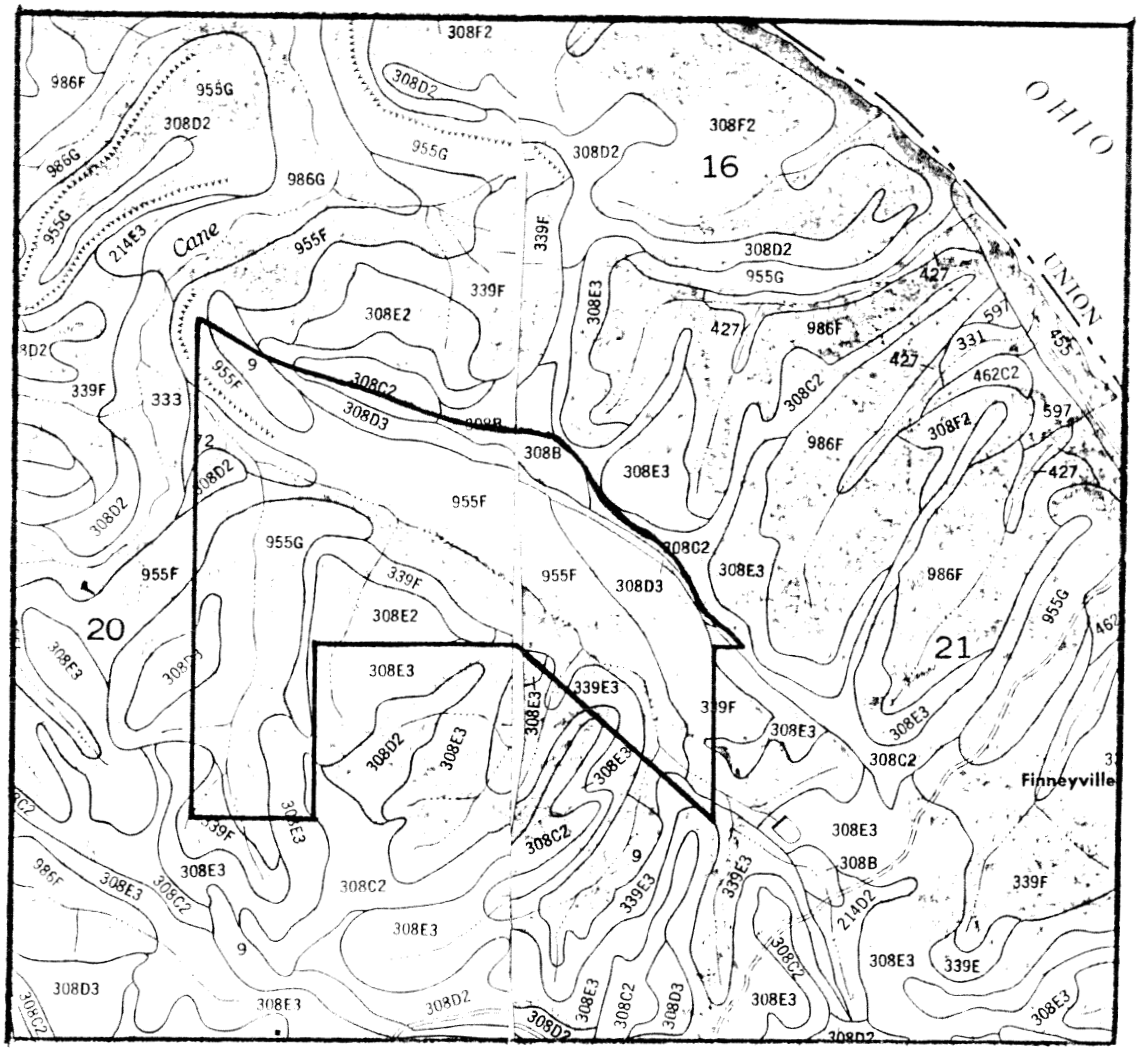

Figure 7. Location of Panther Hollow Research Natural Area shown on map of soils taken from Soil survey of Pope, Hardin, and Massac counties, Illinois by W. D. Parks, et al., SCS and USFS, in coop. with Ill. Agr. Exp. Sta., Urbana, 1975

scale 4" = 1 mile

308 - Alford soils

955 - Muskingum and Berks soils

339 - Wellston silt loam

9 - Sandstone rock land

72 - Sharon silt loam

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PHOTOGRAPHIC RECORD

(See FSM 1643.52)

PHOTOGRAPHER: Copy of ASCS photo (Copy made by M. D. Hutchison)

DATE SUBMITTED: July, 1987

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Fig. 8			Jun. 15, 1938	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	vertical aerial view of Panther Hollow Research Natural Area	35mm. BW

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PHOTOGRAPHIC RECORD

(See FSM 1643.52)

PHOTOGRAPHER Copy of ASCS photo (Copy made by M. D. Hutchison)

DATE SUBMITTED July, 1987

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Fig. 9			Oct. 6, 1980	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	vertical aerial view of Panther Hollow Research Natural Area	35mm. BW

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1600-1 (8/67)

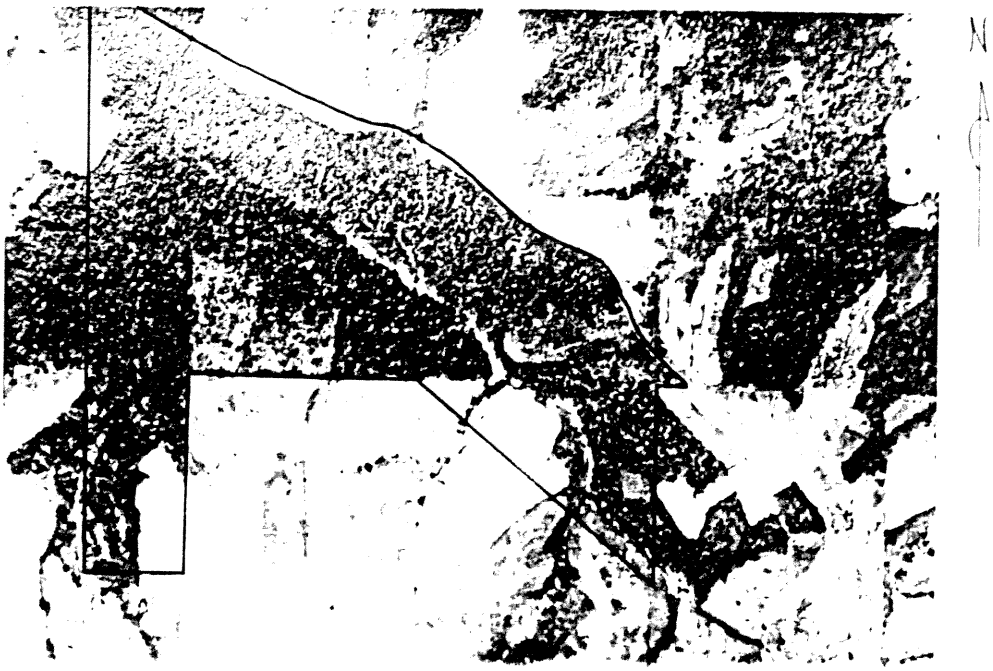

Figure 8. Copy of ASCS aerial photograph taken June 15, 1938 showing location of Panther Hollow Research Natural Area

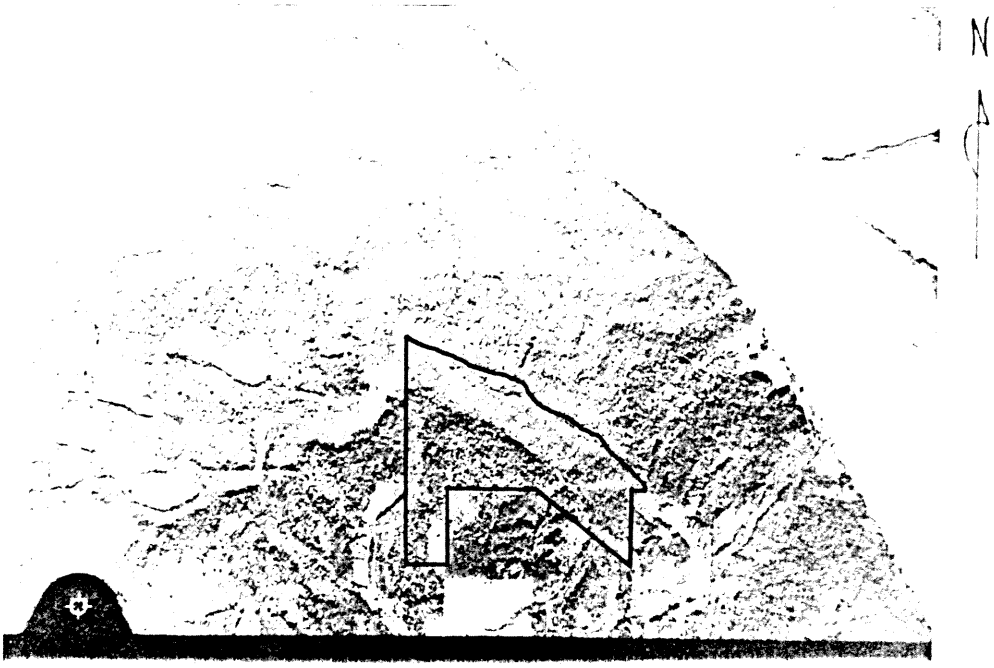

Figure 9. Copy of ASCS aerial photograph taken October 6, 1980 showing location of Panther Hollow Research Natural Area

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(See FSM 1643.52)

PHOTOGRAPHER	DATE SUBMITTED
M. D. Hutchison	July, 1987

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Fig. 10				June 5, 1981	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of sandstone shelter along east side of Panther Hollow	35mm. C

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Fig. 11				Sept.25, 1986	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of sandstone cliffs and narrow valley at Panther Hollow	35mm. C

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Figure 10. View of sandstone shelter along east side of Panther Hollow
- photo taken by M. D. Hutchison, 1981

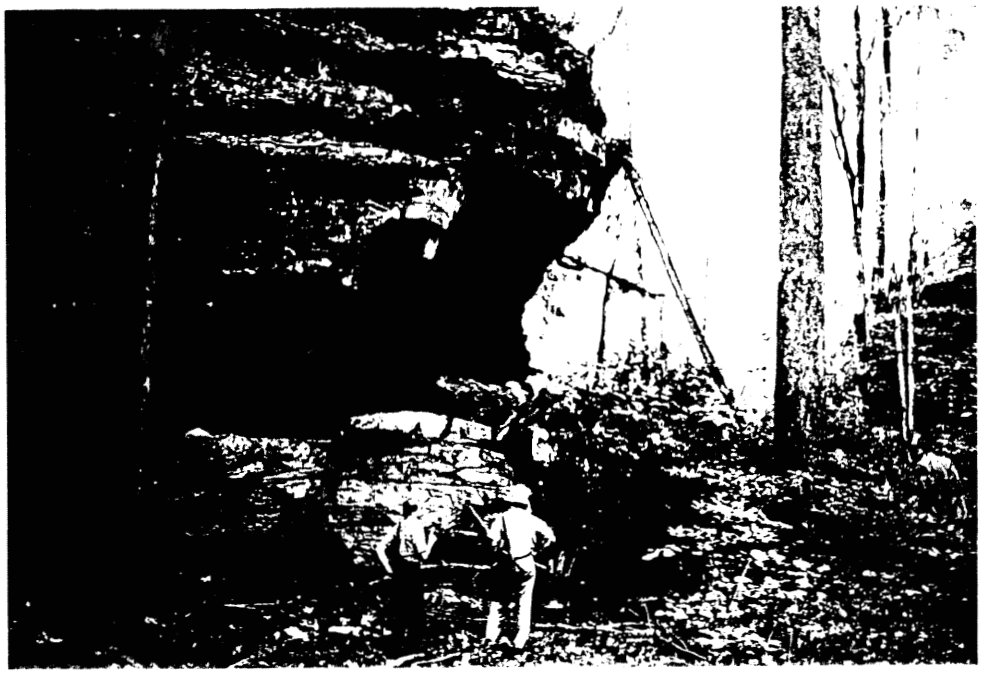

Figure 11. View of sandstone cliffs and narrow valley at Panther Hollow
- photo taken by M. D. Hutchison, fall of 1986

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PHOTOGRAPHER	DATE SUBMITTED
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Fig. 12			Sept.25, 1986	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	a plant fossil in the Pennsylvanian sandstone at Panther Hollow	35 mm. C

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PHOTOGRAPHIC RECORD

(See FSM 1643.52)

PHOTOGRAPHER: M. D. Hutchison

DATE SUBMITTED: July, 1987

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Fig. 13			Sept.25, 1986	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	a large slide block of sandstone in Panther Hollow with mosses, grasses, and shrubs	35 mm. C

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Figure 12. A plant fossil in the Pennsylvanian sandstone at Panther Hollow; these are common along the cliffs and in the rocky stream bed
- photo taken by M. D. Hutchison, fall of 1986

Figure 13. A large slide block of sandstone in Panther Hollow with mosses, grasses, and shrubs; these shaded mesic sites are habitat for the Illinois Endangered and Forest Listed early saxifrage (Saxifraga virginiensis)
-photo taken by M. D. Hutchison, fall of 1986

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Fig. 14			June 5, 1981	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of rocky stream bed in Panther Hollow	35mm. C

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Fig. 15			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of wide shallow stream bed in Buckhart Hollow showing sandstone bedrock and steep slopes	35mm. C

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Figure 14. View of rocky stream bed in Panther Hollow
- photo taken by M. D. Hutchison, 1981

Figure 15. View of wide shallow stream bed in Buckhart Hollow showing sandstone bedrock and steep slopes
- photo taken by M. D. Hutchison in early spring, 1987

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Fig. 16			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view along sandstone shelter on south side of Buckhart Hollow	35mm. C

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Figure 16. View along sandstone shelter on south side of Buckhart Hollow; the north-facing mesic slope provides habitat for southeastern relic plants
- photo taken by M. D. Hutchison in early spring, 1987

Figure 17. A small permanent pool in Buckhart Hollow; this hole has a good assemblage of fishes
- photo taken by M. D. Hutchison in early spring, 1987

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(See FSM 1643.52)

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Fig. 18				Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of rocky drainageway looking upstream (south) in Panther Hollow	35mm. C

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Fig. 19			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view across Panther Hollow from the east side showing beech, sugar maple, and tuliptree stand	35mm. C

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Figure 18. View of rocky drainageway looking upstream (south) in Panther Hollow
- photo taken by M. D. Hutchison in early spring, 1987

Figure 19. View across Panther Hollow from the east side showing beech, sugar maple, and tuliptree stand
- photo taken by M. D. Hutchison in early spring, 1987

USDA-FOREST SERVICE

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(See FSM 1643.52)

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M. D. Hutchison	July, 1987

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Fig. 20			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of sandstone cliffs along west slope of Panther Hollow; trees are beech, sugar maple, tuliptree, and ash	35mm. C

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Fig. 21			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of white oak and post oak stand on south-facing slope of Buckhart Hollow	35mm. C

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1600-1 (8/67)

Figure 20. View of sandstone cliffs along west slope of Panther Hollow; trees are beech, sugar maple, tuliptree, and ash
- photo taken by M. D. Hutchison in early spring, 1987

Figure 21. View of white oak and post oak stand on south-facing slope of Buckhart Hollow; trees are relatively small but old
- photo taken by M. D. Hutchison in early spring, 1987

USDA-FOREST SERVICE

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Fig. 22			Mar. 26, 1987	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	view of post oak-blackjack oak stand on south-facing slope of Buckhart Hollow	35mm. C

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Figure 22. View of post oak-blackjack oak stand on south-facing slope of Buckhart Hollow; here, the trees are short, limby, often leaning or bent, and very old - photo taken by M. D. Hutchison in early spring, 1987

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(See FSM 1643.52)

PHOTOGRAPHER	DATE SUBMITTED
Don Kurz	July, 1987
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Fig. 23			Mar. 23, 1976	Illinois, Shawnee National Forest, Elizabeth-town Dist., Hardin Co.	close view of the early saxifrage (Saxifraga virginiensis), an Illinois Endangered Species at Panther Hollow RNA	35 mm. C

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Figure 23. The early saxifrage (Saxifraga virginiensis); this is an Illinois Endangered Species and also a Forest Listed Species; this plant grows in the shaded mesic canyon at Panther Hollow Research Natural Area
-photo by Don Kurz, Mar. 23, 1976

Fig. 8. Panther Hollow RNA, Hardin Co., Ill.

Fig. 9. Panther Hollow RNA, Hardin Co., Ill.

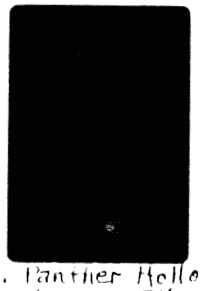


Fig. 10. Panther Hollow RNA, Hardin Co., Ill.

Fig. 11. Panther Hollow RNA, Hardin Co., Ill.

Fig. 12. Panther Hollow RNA Hardin Co., Ill.

Fig. 13. Panther Hollow RNA, Hardin Co., Ill.

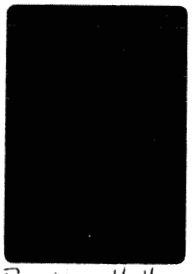


Fig. 14. Panther Hollow RNA Hardin Co., Ill.

Fig. 15. Panther Hollow RNA, Hardin Co., Ill.

Fig. 16. Panther Hollow RNA, Hardin Co., Ill.

Fig. 17. Panther Hollow RNA, Hardin Co., Ill.

Fig. 18. Panther Hollow RNA, Hardin Co., Ill.

Fig. 19. Panther Hollow RNA, Hardin Co., Ill.

Fig. 20. Panther Hollow RNA, Hardin Co., Ill.

Fig. 21. Panther Hollow RNA, Hardin Co., Ill.

Fig. 22. Panther Hollow RNA, Hardin Co., Ill.

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Panther Hollow Research Natural Area

Shawnee National Forest

Hardin County, Illinois

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met in arriving at this recommendation.

Prepared by Max D. Hutchison, Field Representative, Natural Land Institute; Steven Olson, Technical Assistant, Natural Land Institute; and Stanley Harris, Jr., Ph.D., Professor Emeritus, Department of Geology, Southern Illinois University

Recommended by _____ Date 3/21/88
Gary Sieren, District Ranger,
Elizabethtown District

Recommended by _____ Date 4/13/88
Kenneth Henderson, Forest Supervisor,
Shawnee National Forest

Recommended by _____ Date 9/22/88
Floyd Marita, Regional Forester,
Eastern Region

Recommended by _____ Date 10/7/88
Ronald D. Lindmark, Station Director,
North Central Station

TITLE PAGE

Establishment Record for the Panther Hollow Research Natural Area within the Shawnee National Forest, Hardin County, Illinois

ESTABLISHMENT RECORD FOR THE PANTHER HOLLOW RESEARCH NATURAL AREA WITHIN THE SHAWNEE NATIONAL FOREST HARDIN COUNTY, ILLINOIS

INTRODUCTION

The Panther Hollow Research Natural Area (RNA) is a 180-acre (72.9-hectare) tract owned by the federal government and managed by the U. S. Forest Service, Shawnee National Forest (Figure 4). It contains relatively undisturbed natural community types, e.g. sandstone cliff, dry upland forest, dry-mesic upland forest, and mesic upland forest. It is a part of the Panther Hollow Natural Area identified by the Illinois Natural Areas Inventory (1978) as being of significance because of the presence of three uncommon plant species: the early saxifrage (Saxifraga virginiensis), white basswood (Tilia heterophylla), and strawberry bush (Euonymus americanus) (see Appendix I). All three are Shawnee National Forest Listed Species (Shawnee National Forest, Land and Resource Management Plan, 1986). The early saxifrage and white basswood are listed as Endangered Species in Illinois. The strawberry bush is listed as Threatened in the State (Natural Land Institute, 1981).

The Society of American Foresters (SAF) cover types represented include Type 40 (post oak-blackjack oak), Type 52 (white oak-black oak-northern red oak), and Type 60 (beech-sugar maple). Several variants and small stands with other dominants are also present (Figure 6).

The area includes two deeply incised hollows eroded into the massive Pennsylvanian sandstones of the Shawnee Hills. It is within the Interior Low Plateaus Physiographic Province, in the extreme southeastern tip of Illinois (Figures 1, 3, and 4). It is within the Greater Shawnee Hills Section of the Shawnee Hills Natural Division (Schwegman, 1973). Drainage is to the north into the Ohio River by way of a small stream called Cane Creek (Figure 4). The RNA is about one-half mile (0.8 kilometers) from the right bank of the Ohio River, near River Mile #869.

The area was privately owned prior to its acquisition by the federal government to become a part of the Shawnee National Forest (SNF) in 1936-37. There is now no evidence of cultivation or livestock use in the major part of the area. Some relatively small upland sites (included within the boundaries for buffer) were old farm fields, mostly abandoned more than 50 years ago. Because of the rugged terrain and thin rocky soils, the area has never been suitable for agricultural use, and, in many places, the steep slopes have trees of poor form and quality for lumber. Most of the area has been selectively logged, but the cutting was mostly 20 to 40 years ago on the more accessible

upland sites and more than 50 years ago in the deep hollows and on the south-facing slope. Some coves and rocky slopes have very old trees and have probably never been disturbed by logging.

The RNA has received very little public use in the past. Occasionally, hunters and hikers enter the area. The RNA is not within any designated Wilderness, Wild and Scenic River, or National Recreation Area.

The significance of the natural area was first recognized by the Illinois Nature Preserves Commission staff in the 1960's. It was recommended for study as a Forest Service Botanical Area by the Illinois Nature Preserves Commission in 1970 (Forest Service Handbook, Shawnee Supplement No. 13, Dec., 1970). It was first recommended for RNA establishment by the North Central Forest Experiment Station in 1981 (Rink, 1981).

LAND MANAGEMENT PLANNING

The Panther Hollow natural area is recommended for designation as a research natural area in the Land and Resource Management Plan, Shawnee National Forest, approved November 24, 1986 (see SNF, Forest Plan, IV-3, Special Feature Management). The environmental analysis as a part of the planning process supports the recommendation to establish the RNA (SNF, Final EIS, 2-66, Identification and Management of Special Features). It is currently being protected under Management Prescription 8.2.

OBJECTIVES

The objectives of establishing the Panther Hollow Research Natural Area are to:

1) preserve pristine forest and geological natural situations for research, study, observation, monitoring, and educational activities that maintain unmodified conditions,

2) preserve and maintain genetic diversity,

3) protect against serious environmental disruptions,

4) serve as reference area for the study of succession,

5) provide onsite and extension educational activities,

6) serve as baseline area for measuring long-term ecological changes,

7) serve as control area for manipulative research,

8) monitor effects of resource management techniques and practices.

JUSTIFICATION

The most significant feature of the Panther Hollow RNA is the unusual assemblage of southeastern plants near the limit of their natural range. The strawberry bush (Euonymus americanus), early saxifrage (Saxifraga virginiensis), white basswood (Tilia heterophylla), goldenrod (Solidago sphacelata), and crested iris (Iris cristata) are examples of this flora. The early saxifrage and white basswood are Illinois Endangered Species. The strawberry bush is an Illinois Threatened Species. All three are Forest Listed Species.

Society of American Foresters Type 40 (post oak-blackjack oak) is a major cover type in the RNA, and it is listed in Appendix E of the Final Environmental Impact Statement, Land and Resource Management Plan for the SNF (1986) as a type needed in the RNA system.

The area has small stands of high quality forest types, including SAF Type 53 (white oak), SAF Type 54 (northern red oak-basswood-white ash), and SAF Type 55 (northern red oak). These have irregular boundaries, occur in disjunct stands, and intergrade with other types, so that they are not separated on the cover map (Figure 6). The SAF types 53, 54, and 55 are listed as needed in the Shawnee National Forest, Land and Resource Management Plan, 1986.

There are also high quality sandstone cliff communities with species such as Christmas fern (Polystichum acrostichoides), marginal shield fern (Dryopteris marginalis), and alumroot (Heuchera parviflora).

The area is quite scenic with cliffs, steep valley slopes, waterfalls and plunge pools, and flood plains with overbank deposits and flood channels. The deep canyons provide different geologic and microclimatic orientations. These orientations provide contrasts for the observations of the annual cycles of variations in surface runoff, groundwater seepage, freeze-thaw, desiccation, and mass wasting.

The vegetational cover types are related to soil depth, slope, and aspect, and the RNA's geological diversity is responsible for the presence of many of the plant community types found here that are representative of the Greater Shawnee Hills.

This area is suitable for research, demonstration,

and/or learning experience opportunities. Conditions are ideal for studies of rock weathering and pedalogical research dependent upon the presettlement quality of the site, and for studies of vegetational history and geography of plant species migrations.

PRINCIPAL DISTINGUISHING FEATURES

The Panther Hollow Research Natural Area is in a relatively rugged section of the Greater Shawnee Hills. The bedrock is entirely sandstone, shale, and siltstone. The area includes two deeply incised hollows, locally known as Panther Hollow and Buckhart Hollow. The Panther Hollow gradient nearly parallels the direction of dip of the rocks, while Buckhart Hollow is oriented along the strike.

There are narrow canyons with cliffs, overhangs, and waterfalls. The stream in Buckhart Hollow is mostly a series of small permanent pools separated by shallow riffles. The channel bottom consists of alternating solid pavements of sandstone (Figure 15) and gravel and cobble bars. Small boulders present in the channel rest against other rocks or the trunks of trees. Panther Hollow has the steeper gradient with waterfalls and huge boulders that have slipped downslope to nearly block the narrow valley in places (Figure 18).

There is a diversity of plant species with many small stands and habitat types related to aspect and soil depth. The area is nearly all forested, although small sites on the dry, south-facing slopes have an open canopy with scattered shrubby trees. The deep mesic valley of Panther Hollow flows north. It has tall trees with clear trunks growing among the boulders. The upper slopes, where the soil is thin or absent, have narrow bands of redcedars and shrubs.

The uncommon plants found here are mostly of southeastern origin. They occur in the mesic hollow and on the north-facing slopes. The early saxifrage and white basswood are listed as Illinois Endangered Species. The running strawberry bush is an Illinois Threatened plant. These are also Forest Listed Species.

LOCATION

The Panther Hollow Research Natural Area is on the Elizabethtown Ranger District of the Shawnee National Forest. It is in Hardin County, in the extreme southeastern tip of Illinois. Latitude is 37° 33' N, and longitude is 88° 07' W. The area is in sections 20 and 21, T. 11 S., R. 10 E. of the 3rd P. M. (Figures 3 and 4).

The RNA boundaries are described as follows:

Beginning at the quarter corner to sections 20 and 21, thence;

West along the east-west centerline of section 20 to the center-east sixteenth corner section 20, thence;

South along east sixteenth line section 20, 16 chains to a point, thence;

West 10 chains to west-east one sixty-fourth line, thence;

North on west east one sixty-fourth line to a point 7 chains south of west east one sixty fourth corner to sections 17-20, thence;

Southeasterly along ridge crest to intersection with section line to sections 20-21, thence;

Continuing southeasterly along ridge crest about 2 chains to west edge of Forest Road No. 157, thence;

Southeasterly along the west edge of Forest Road No. 157 to the intersection with the east-west centerline of section 21, thence;

West along east-west centerline to the center-west sixteenth corner section 21, thence;

South on west sixteenth line of section 21, 16 chains to a point, thence;

Northwest to point of beginning containing approximately 180 acres (72.9 hectares)

Elevation ranges from 350 feet (106.7 meters) to 600 feet (182.9 meters) above mean sea level.

The area is about 1 mile (1.6 kilometers) northeast of the small village of Lamb. It is about 6 miles (9.7 kilometers) northeast of the village of Cave in Rock. Access is from Ill. Rt. 1, along a county blacktop road that intersects with Rt. 1 at a point 2 1/2 miles (4.0 kilometers) north of Cave in Rock. The county blacktop road (County Route 116) continues to Lamb. In Lamb, there is a single lane gravel road that turns north and continues north and east about a third of a mile (.5 kilometers) to a point where an old lane (FS Road 172A) intersects from the north. One can park at this point and walk north to the south

boundary of the RNA. The old roadway along the northeast boundary (shown on the topo map copy, Figure 4) is abandoned and is mostly impassible to vehicles.

AREA BY COVER TYPES

The Panther Hollow Research Natural Area is mostly forested. The following are SAF and Kuchler cover types represented within the RNA (Figure 6):

SAF Cover Type	Kuchler PNV Type	Acres	Hectares
#40 post oak-blackjack oak	#91 oak-hickory	40	16.2
#52 white oak-black oak-northern red oak	#91 oak-hickory	120	48.6
#60 beech-sugar maple	#93 beech-maple	20	8.1

According to the INAI (1978) data for a larger area, including the RNA, the following types were described:

Natural Community	Plant Community
Dry upland forest	post oak-white oak-sweet pignut hickory
Dry-mesic upland forest	white oak-red oak-sugar maple
Mesic upland forest	sugar maple-white oak-beech
Successional field	sassafras-winged sumac-little bluestem
Tree plantation	loblolly pine
Sandstone cliff	Christmas fern-marginal shield fern-small flowered alumroot

PHYSICAL AND CLIMATIC CONDITIONS

The climatological data are from the collection station at New Burnside which has records dating from 1931. It is 36 miles (58 kilometers) to the west. The following description is copied from the Soil Survey of Pope, Hardin, and Massac counties, Illinois (1975):

The Hardin County area has the continental climate typical of southern Illinois. The annual temperature range is about 100 degrees. Summer maximums reach 100° F. or more about two-thirds of the summers. Winter minimums are zero or below during about half the winters.

Low pressure areas and their associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction much of the year.

Annual precipitation averages about 46 inches and ranges from about 32 to 70 inches. Precipitation is fairly evenly distributed throughout the year. September and October are the driest months. Prolonged dry spells during the growing season are not unusual. Summer precipitation occurs mostly in short showers or thunderstorms which are occasionally accompanied by hail and damaging winds. Only light snows occur during an average winter. The average annual snowfall ranges from 10 to 15 inches, but this total has been exceeded in a single month.

Summers are warm, and continuous warm periods can be prolonged. July is the warmest month; the average daily maximum temperature is near 90° F. for both July and August. January is the coldest month, and both January and February have had temperatures as low as -15° F. The five months from November through March each have 14 to 24 days in which the minimum daily temperature falls below 32° F. December, January, and February average 3 to 5 days each in which the maximum daily temperature does not exceed 32° F.

The number of days between the average date of the last freezing temperature in spring and the average date of the first freezing temperature in fall is between 187 and 200 days. Temperatures vary consistently between ridge and valley locations during radiation freezes, the most common type of freeze in Illinois.

The area is on the north slope of the Shawnee Hills ridge that extends east-west across the southern tip of Illinois. The drainageways have a steep gradient from the vertical cliffs downward to the floodplain. The valley slopes are rocky, and Panther Hollow is a canyon with huge sandstone boulders, cliffs, and waterfalls. The intermittent streams flow over bedrock with many riffles and a few permanent pools.

The area is nearly all forested. A few relatively small sites within the boundaries were once parts of agricultural fields, but they are now in various stages of succession, reverting to forest (Figures 8 and 9).

Much of the area is drouthy with thin soils, and the steep rocky slopes have a thin cover of trees with individuals that are often stunted and partly dead. The groundcover is generally sparse, although shrubs and vines form thickets in places. In the mesic valley bottoms and along lower north-facing slopes, large tall trees grow among the boulders.

DESCRIPTION OF VALUES

Flora

The area is nearly all forested, but there are sites that were used as agricultural fields prior to 1938 that are still in various stages of succession. These are not all separated on the cover type map (Figure 6), as they are considered to be temporary variants of the climax types. Their location is shown with dashed lines on the map, Figure 6. Their species composition includes a variety of shrubs and pole-size trees. Most upland disturbed sites have redcedar (*Juniperus virginiana*), sassafras (*Sassafras albidum*), ash (*Fraxinus americana*), persimmon (*Diospyros virginiana*), elm (*Ulmus* spp.), and several species of oaks. Vines, especially greenbrier (*Smilax bona-nox*), are common. The small site in the floodplain near the northwest corner has elm, ash, box elder (*Acer negundo*), and sycamore (*Platynus occidentalis*).

The northeast part of the RNA is mostly dry and is typed as SAF #40 (post oak-blackjack oak) (Figure 22). It is on a south- and southwest-facing slope, and is considerably dissected by small channelways that extend down to the stream in the valley bottom. The soils are thin, rocks and gravels are exposed, and the site is generally drouthy. The stand is dominated by post oaks (*Quercus stellata*). Drier sites, especially higher on the slope, have blackjack oaks (*Quercus marilandica*). White oak (*Quercus alba*) is locally common, as is black oak (*Quercus velutina*). Hickories (*Carya ovata* and *C. glabra*) are occasional but not abundant. The trees are relatively small but old. Many are overmature and have dead limbs. In most places, the understory is open with scattered clumps of farkleberry (*Vaccinium arboreum*). There is little groundcover.

The major part of the RNA area is typed as SAF #52 (white oak-black oak-northern red oak). Although this is the SAF cover type that seems to fit best as a general description, there are small stands with other dominants. These are discontinuous and are seldom compact in shape with clear boundaries. None is probably large enough to map as a significant individual type, although they are important as local variants that increase the diversity of habitats. Along the southwest-facing slope in the northern part of the

RNA, there is a relatively thin band of redcedar-hardwoods. Farkleberry is common here on the rocky outcrops. Higher on the slope, white oak is dominant; lower on the slope, there are more red oaks (Quercus rubra), black oaks, and hickories.

On the rugged, rocky, north-facing slopes, white oaks and red oaks are generally dominant, although sugar maples (Acer saccharum) are locally common. Hickories are scattered but fairly abundant. The stand structure varies considerably. Some sites with deeper soils have large, tall trees. Other rocky sites have stunted trees that grow slowly and often are limby and short of stature.

The deeper valleys and lower slopes are more mesic, and here, the forest is dominated by sugar maple and beech (Fagus grandifolia). There is a diversity of other tree species, including hickories, tuliptree (Liriodendron tulipifera), ashes, and various oaks, but the larger, older trees are representative of the SAF #60 (beech-sugar maple) cover type (Figure 19). The trees are relatively large and tall. They grow more rapidly here than on other sites within the RNA. The canopy is dense except where sandstone boulders cause the stands to be scattered. The groundcover is rich in spring ephemerals with species such as spring beauty (Claytonia virginica), Dutchman's breeches (Dicentra cucullaria), bloodroot (Sanguinaria canadensis), and trilliums (Trillium spp.).

Three Forest Listed plant species are known from the RNA: early saxifrage (Saxifraga virginiensis), white basswood (Tilia heterophylla), and strawberry bush (Euonymus americanus). The saxifrage and white basswood are listed as Endangered in Illinois. The strawberry bush is listed as Threatened in the State. There are no Federally Endangered or Threatened Species known from the area.

Fauna

There are no rare or Endangered animals known from the RNA, but little inventory work has been done in the vicinity.

The following insects were noted during one short visit, September 25, 1986:

bristletail (Thysanura)
short-horned grasshopper (Acrididae)
water strider (Gerris remigis)
noctuid moth (Catocala sp.)

Several land snails were collected in 1986, including:

Polygyra inflecta
Polygyra tridentata

Haplotrema concavum
Ventridens ligerus
Mesomphix perlaevis

Amphibians reported from the RNA include the two-lined salamander (Eurycea bislineata), spring peeper (Hyla crucifer), and American toad (Bufo americanus).

The eastern box turtle (Terrapene carolina) is common in the area.

Several species of minnows and chubs (Cyprinidae), killifishes (Cyprinodontidae), sunfishes (Centrarchidae), and darters (Percidae) occur in the small pools in Buckhart Hollow.

Birds observed in the RNA during brief visits in 1986 include:

cardinal (Richmondena cardinalis)
yellow-billed cuckoo (Coccyzus americanus)
mourning dove (Zenaidura macroura)
blue-gray gnatcatcher (Polioptila cerulea)
red-tailed hawk (Buteo jamaicensis)
blue jay (Cyanocitta cristata)
wood thrush (Hylocichla mustelina)
turkey vulture (Cathartes aura)

Very little survey work for either resident or migratory birds has been conducted in the vicinity.

Most of the animals common to the region probably occur in, or occasionally use, the RNA, especially the larger mammals such as the white-tailed deer (Odocoileus virginianus), coyote (Canis latrans), gray fox (Urocyon cinereoargenteus), raccoon (Procyon lotor), opossum (Didelphis marsupialis), and gray squirrel (Sciurus carolinensis).

Geology (Figure 5)

The bedrock is sandstone, shale, and siltstone, entirely within the Caseyville Formation, the basal formation of the Pennsylvanian System (Figure 5). Many units are massive cliff formers. The uplands have a deep veneer of silty loess. The silts are easily eroded, and steep slopes have little loess left.

The Caseyville is divided into four members, which contain similar lithologies and are not distinguishable at isolated exposures. The geologic map by Baxter et al. (1963) indicates that the lower slopes and valley bottom of Panther Hollow lie entirely within the Lusk "shale"; the higher cliff and upper slope is Battery Rock Sandstone. The latter unit dips down to Buckhart Hollow while the overlying

unnamed shaly unit (Drury in southwestern Illinois) encloses the upper part of Buckhart Hollow and the northeastern slopes. Lastly, the Pounds Sandstone forms the crest of the ridge and the northeast side.

The sediments are all of non-marine origin, generally considered to be deltaic. Some units contain abundant plant remains, as in Panther Hollow in a shelter bluff a short distance downstream from the 20-foot (6.1-meter) high waterfall (Figure 12). The sandstones are commonly crossbedded; in some places, scour and fill channels can be recognized. Both sandstones and the silty-shale layers are ripple marked. The sandstone bodies, especially in the Lusk, may wedge out. Some bodies are continuous for considerable distances, and it is often difficult to find a weaker zone to traverse their cliffs.

The shale zones are very irregular and are generally not exposed because of weathering and a cover of mass-wasted materials. Commonly, the rock is dominantly silty with thin clay layers. The clay layers were apparently subject to being ripped up by flood waters, because clay pebbles are found enclosed in many units.

The sand grains are of quartz, while white granules and small rounded pebbles of quartz are common in the coarser sandstone deposits.

The structural uplift at the end of the Paleozoic Era produced faulting and warping in the region. Extreme eastern Hardin County is a part of a large block tilted 3° to 6° toward the north but apparently devoid of faults. Subsequent differential erosion produced a series of cuestas, each ridge and back slope capped by a resistant sandstone. Panther and Buckhart hollows are eroded into the back slope of the Pennsylvanian sandstone cuesta, whereas Barker Bluff is on the scarp face of the Bethel Sandstone cuesta, some 4 miles (6.4 kilometers) to the south.

The entire drainage area of the combined hollows is little more than half a square mile (129.6 hectares).

Erosion by running water is the dominant geomorphic process. Unconcentrated surface runoff transports considerable material across the bluff tops and down the valley slopes. The wash, especially of loess from the ridges, is clearly visible down the cliff faces and in the deposits at the reentrants and shelters at the base of cliffs. Concentrated flow on the slopes produces some gullies which are boulder filled and rarely very deep.

Panther Hollow has a classic V-shape, with deepening in process (Figure 18). In the upper course, bedrock forms much of the channel floor with repetitive accumulations of boulder and cobble bars. Here and there, the valley floor

widens enough to have small deposits on which finer material has accumulated and herbaceous and woody plants are growing. Numerous cataracts interrupt the gradient. A waterfall marks the midcourse. A massive cliff-forming sandstone forms a 10-foot (3.0-meter) ledge, below which is exposed weak shaly material. A plunge pool is maintained with great boulders below it. Many have been shifted by the force of the plunging water. Others are collapse blocks resulting from undercutting of the weak shales. Large overhanging shelters line the base of the cliffs at stream level. One very large, rather recent, collapse area consists of large and small blocks, including a plant-covered segment which formed the slope above the overhang (Figure 13).

After heavy rains, there is abundant seepage of groundwater from the coarse unconsolidated debris which mantles the slopes. This debris is subject to mass wasting (downslope movement by gravity), mainly as creep. The slopes beneath the cliffs are the steepest and covered with fresh blocks, mostly without growths of moss. On the other hand, tilted trees from sliding masses are not in evidence in Panther Hollow.

Freezing and thawing, as well as wedging by plant roots, are important in loosening rock. Joints and bedding planes provide ready access to wedging media.

References: J. W. Baxter, P. W. Potter, and F. L. Doyle. 1963. Areal geology of the Illinois Fluorspar District Part 1--Saline Mines, Cave in Rock, Dekoven, and Repton quadrangles. Illinois State Geological Survey, Circular 342. 44 pages plus map.

S. E. Harris, Jr., C. W. Horrell, and D. Irwin. 1977. Exploring the land and rocks of southern Illinois, a geological guide. Southern Illinois University Press, Carbondale. 240 pages.

Soils (Figure 7)

Most of the soils in the RNA are stony and shallow. They are well drained, and runoff is rapid. They mostly formed in loess and underlying material weathered from shale or sandstone. Organic content is low, and the hazard of erosion is very severe (Figure 7).

Alford silt loam (308) occurs on narrow ridge crests and upper slopes in the RNA. This soil formed in moderately deep loess and is acid in reaction.

Sandstone rock land (9) is mapped along the southwest-facing slope in the northwestern part of the RNA. It is very stony with rock outcrops dominant. Silt and loam are mixed with the stones, and the soils are acid.

Muskingum and Berks soils (955) are mapped on the middle and lower slopes including major parts of Panther and Buckhart hollows. These soils formed in silty and loamy materials mixed with sandstone and flagstones. They are moderately deep in places and are acid.

Wellston soils (339) are somewhat deeper than Muskingum and Berks soils and have more clay in the B horizon. They occur on slopes in the eastern part of the RNA.

A small area of Sharon silt loam (72) is mapped in the northwestern part of the RNA along the narrow stream bottom. It is nearly level and formed in silty sediment. There are small areas of sandy soil. All are acid.

Reference: W. D. Parks et al. 1975. Soil survey of Pope, Hardin, and Massac counties, Illinois. Soil Conservation Service and Forest Service, in cooperation with the Illinois Agricultural Experiment Station, Urbana, Illinois. 126 pages plus maps.

Lands

All of the RNA is federal land acquired by the U. S. Forest Service as a part of the Shawnee National Forest. There are no outstanding mineral rights at Panther Hollow.

Cultural

There are no known historical sites, cemeteries, or Indian features within the RNA.

IMPACTS AND POSSIBLE CONFLICTS

The Shawnee National Forest's Land and Resource Management Plan contains standards and guidelines for the management and protection of special areas, including the proposed research natural areas. These standards and guidelines provide the basis for conflict resolution.

Mineral resources

There are no outstanding mineral rights at Panther Hollow. According to Appendix E of the Shawnee National Forest, Land and Resource Management Plan (1986), the potential for the presence of fluorite, lead, and zinc is high. The potential for the presence of oil and gas is low, and the potential for the presence of coal is medium.

Fluorspar is currently being mined in Hardin County, and there might be interest in future exploration in this area.

Grazing

This area is not under any range allotment and is unsuitable for livestock grazing. It is nearly all forested. There is no known interest in developing this area for livestock. The soils on the steep rocky slopes are subject to extreme erosion, and livestock use would have undesirable effects on the soils, natural plant communities, and rare species in the area.

Timber

All of the potential research natural areas identified in the Shawnee National Forest Land and Resource Management Plan (1986) were considered inappropriate for timber production. These lands were not included in the Shawnee National Forest timber base. Consequently, no additional withdrawals will be required.

Watershed values

Drainage from the relatively small watershed encompassing the Panther Hollow Research Natural Area is to the north by means of a small stream called Cane Creek. It empties into the Ohio River about a half mile (0.8 kilometers) north of the RNA (Figure 4).

Cane Creek is normally clear and unpolluted. The protection of the RNA will help maintain the natural quality of the stream and its watershed.

Recreational values

There has been little recreational use of the RNA in the past. Occasionally, hunters and hikers enter the area, and campfires have been built in a few places under rock shelters.

The rugged cliffs, waterfalls, and scenic beauty of the area are attractions that could cause protection problems in the future if the area is advertised and public use increases significantly. Adequate supervision and management should prevent recreational use conflicts from developing.

Wildlife and plant values

No special maintenance of wildlife or plants is needed other than the removal and control of exotics. Such are not threatening any significant feature at the present time. Their removal should not cause any significant impact or result in any conflict with other uses in the vicinity.

Wilderness, Wild and Scenic River, or National Recreation area values

No designated or proposed Wilderness, Wild and Scenic River, or National Recreation Area would be impacted.

Transportation plans

There are no known transportation plans that are likely to adversely affect the RNA.

The RNA contains no existing roads, and none should be needed for Forest Service management of properties in the RNA and vicinity.

MANAGEMENT PRESCRIPTION

The primary objective of the Panther Hollow Research Natural Area management is to protect and maintain its natural character, i.e., to preserve the area from unnatural disturbance.

The purpose of management is to provide an area to illustrate and typify for research and educational purposes, some of the important forest types characteristic of the Midwest, as well as other plant communities that have special and unique characteristics of scientific interest and importance.

Vegetative management

Exotics are not a problem in the less disturbed parts of the RNA, and none of the significant cover types or rare plant species is threatened at the present time, but removal and control of certain aggressive species, such as Japanese honeysuckle (*Lonicera japonica*), would be desirable. Most exotic populations are in the old clearings that are undergoing succession, and the development of a more complete forest canopy should naturally reduce most exotics. The rare plant sites will be monitored closely, and invading exotics will be removed from those sites by hand or with hand tools.

ADMINISTRATIVE RECORDS AND PROTECTION

The administrator and protector of the Panther Hollow Research Natural Area is:

District Ranger
Elizabethtown District
USDA - Forest Service
Elizabethtown, Illinois 62931

The research coordinator is:

Director
North Central Forest Experiment Station
1992 Folwell Ave.
St. Paul, MN 55108

The research data file is maintained by the North Central Forest Experiment Station and the Shawnee National Forest Headquarters, Harrisburg, Illinois 62946. The Natural Heritage Division of the Illinois Department of Conservation, 524 S. 2nd Street, Springfield, Illinois 62706 also maintains a file of the natural area. Plant species collected in the area have been deposited in the herbarium at Southern Illinois University at Carbondale, Illinois 62901.

REFERENCES

Baxter, J. W., J. C. Bradbury, and N. C. Hester. 1973. A geological excursion to fluorspar mines in Hardin and Pope counties, Illinois. Illinois State Geological Survey, Guidebook Series 11, Urbana. 30 pages.

Baxter, J. W., P. W. Potter, and F. L. Doyle. 1963. Areal geology of the Illinois Fluorspar District Part I--Saline Mines, Cave in Rock, Dekoven, and Repton quadrangles. Illinois State Geological Survey, Circular 342. 44 pages plus map.

Bier, J. A. 1980. Landforms of Illinois. Illinois State Geological Survey, Urbana. Map.

Eyre, F. H. 1980. Forest cover types of the United States and Canada. Society of American Foresters, Washington, D. C. 148 pages.

Forest Service Handbook, Shawnee Supplement No. 13. 1970. Management plan for Panther Hollow Botanical Area, Shawnee National Forest, Illinois. Shawnee National Forest, Harrisburg, Illinois. 13 pages.

Harris, S. E., Jr., C. W. Horrell, and D. Irwin. 1977. Exploring the land and rocks of southern Illinois, a geological guide. Southern Illinois University Press, Carbondale. 240 pages.

Illinois Natural Areas Inventory. 1976-78. Project conducted by University of Illinois and Natural Land Institute under contract to Department of Conservation. Area data on file and available from the Illinois Department of Conservation, Springfield.

Illinois Official Highway Map. 1985-86. Department of Transportation, Springfield.

Kuchler, A. W. 1964. Potential natural vegetation. Special Publication No. 36, American Geographic Society, New York. Map and "Manual to Accompany the Map." (Number revisions by U. S. Geol. Survey in 1969).

Little, E. L. 1953. Check list of native and naturalized trees of the United States (including Alaska). Agriculture Handbook No. 41, Forest Service, Washington, D. C. 472 pages.

Natural Land Institute. 1981. Endangered and threatened vertebrate animals and vascular plants of Illinois. Rockford, Illinois. 189 pages plus appendices.

APPENDIX ITEM I.

Computer printout of data collected for Panther Hollow by the Illinois Natural Areas Inventory, 1976-78

(Note that the natural area identified by the INAI is larger than the Research Natural Area described in the establishment record. All of the RNA is within the INAI area, but a pine plantation included in the INAI natural area for buffer is left out of the RNA.)

Illinois Natural Areas Inventory
Natural Land Institute

AREA # 949

COUNTIES: 35 Hardin

REFERENCE NUMBER: 23

AREA NAME: Panther Hollow

NATURAL AREA CATAGORIES & SIGNIFICANT FEATURES:

CAT.	CODE / DESCRIPTION	
V	Shawnee National Forest special use area	
II	228	Saxifraga virginiensis (Rocky forests near streams)
II	89	Tilia heterophylla (Mesic ravine)

EXCEPTIONAL FEATURES:

CAT.	CODE / DESCRIPTION	
II	139	Euonymus americanus (Mesic upland forest)
I	A5.9	Sandstone cliff community
IV	Sandstone cliff	
VII	Intermittent stream	

PRESERVATION VALUE SCORE: 4

EVALUATOR: 4 Kurz

LEGAL LOCATION:

TWP	RNG	PM	SEC	QUARTER	QUARTER-QUARTERS
11S	10E	3	20		A&8+&9&10&11
11S	10E	3	21		5&6&12

TOPOGRAPHIC QUADRANGLES: 275d Dekoven 7.5

SPECIFIC STREAM : Cane Creek

STREAM SYSTEM (Water Shed) :27 Massac--Bay--Lusk--Big Grand Pierre--Big Creek system

LEGISLATIVE DISTRICT: 59

MUNICIPALITY:- none

MINIMUM ALTITUDE: 340

MAXIMUM ALTITUDE: 620

TOPOGRAPHY:

PHYSIOGRAPHIC UNIT: 50 Shawnee Hills Section
MAJOR FEATURE: 47 Erosional hills in bedrock (thick loess)

INDIVIDUAL TOPOGRAPHIC FEATURES:
114 Ravine

GEOLOGIC FORMATIONS:

160 Caseyville Formation
216 Peoria Loess

SOIL ASSOCIATION (STATE) :
15 O Stookey-Alford-Muren

SOIL ASSOCIATION (COUNTY) :
Alford-Wellston

NATURAL COMMUNITY
1.1
Dry upland forest

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 1 Forest
RARITY INDEX: 2 Common
NATURAL QUALITY:
70.0 acres of grade C ;
Mature second growth

SAF COVER TYPE: 40 Post oak--black oak

PLANT COMMUNITY:
208 Quercus stellata,post oak-
195 Quercus alba,white oak-
320 Carya ovalis,sweet pignut

NATURAL COMMUNITY
1.2
Dry-mesic upland forest

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 1 Forest
RARITY INDEX: 3 Occasional
NATURAL QUALITY:
59.0 acres of grade C ;
Mature second growth

SAF COVER TYPE: 53 White oak

PLANT COMMUNITY:
195 Quercus alba,white oak-
206 Quercus rubra,red oak-
6 Acer saccharum,sugar maple

NATURAL COMMUNITY
1.5
Mesic upland forest

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 1 Forest
RARITY INDEX: 3 Occasional
NATURAL QUALITY:
36.0 acres of grade C ;
Mature second growth

SAF COVER TYPE: 54 Northern red oak--basswood--white ash

PLANT COMMUNITY:
6 Acer saccharum,sugar maple-
195 Quercus alba,white oak-
98 Fagus grandifolia,beech

NATURAL COMMUNITY
6.6
Successional field

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 6 Cultural
RARITY INDEX: 0 Not collected or not applicable
NATURAL QUALITY:
68.0 acres of grade D ;
Regrowth

SAF COVER TYPE: * Not collected

PLANT COMMUNITY:
230 Sassafras albidum,sassafras
/
211 Rhus copallina,winged sumac
/
14 Andropogon scoparius,little bluestem

NATURAL COMMUNITY
6.7
Tree plantation

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 6 Cultural
RARITY INDEX: 0 Not collected or not applicable
NATURAL QUALITY:
37.0 acres of grade D ;
Pine plantation

SAF COVER TYPE: * Not collected

PLANT COMMUNITY:
171 Pinus taeda,loblolly pine

NATURAL COMMUNITY
5.9
Sandstone cliff community

NATURAL DIVISION AND SECTION: 13a
Greater Shawnee Hills Section, Shawnee Hills Divis
COMMUNITY CLASS : 5 Primary
RARITY INDEX: 2 Common
NATURAL QUALITY:
Unknown acres of grade A ;
Essentially undisturbed

SAF COVER TYPE: * Not collected

PLANT COMMUNITY:
181 Polystichum acrostichoides,Christmas fern-
325 Dryopteris marginalis,marginal shield fern-
324 Heuchera parviflora,small-flowered alumroot

DIVERSITY INDEX: 4

TOTAL ACREAGE: 270

OWNERSHIP TYPE: 2 Public

NUMBER OF OWNERSHIPS: 1

USE OF NATURAL AREA:
10 No apparent use

USE OF SURROUNDING LAND (% wildland): 80

USE OF SURROUNDING LAND (% farmland): 20

USE OF SURROUNDING LAND (% developed land): 0

NEAREST SMSA: 9 St. Louis (Madison and St. Clair counties)

DISTANCE TO SMSA: 99

NUMBER OF NEARBY SCHOOLS: 1

NEAREST SCHOOL: 87 Southeastern Illinois College, Harrisburg

NUMBER OF NEARBY D.O.C. FACILITIES: 2

MANAGEABILITY: 1

PRESERVATION STATUS:
2 Public land, formally designated as a natural area

THREATS:
4 No known threat

SPECIES LISTS:

1 Woody plants
2 Ferns and fern allies
3 Summer birds
4 Amphibians, reptiles, and mammals

SAMPLING FORMS:

- none

DISCUSSION OF PRESERVATION VALUES:

Panther Hollow is a Shawnee National Forest special use area which contains the following endangered, threatened and rare plants: Virginia saxifrage, white basswood, running strawberry (Euonymous americanus), dwarf crested iris, and the goldenrod Solidago sphacelata.

PUBLICATIONS:

CITATION # 486
Illinois Nature Preserves Commission. 1971. Illinois Nature Preserves two-yea report, 1969-1970. Ill. Nature Preserves Comm., Rockford. 50 p.

CITATION # 491
Illinois Nature Preserves Commission. 1973. Illinois Nature Preserves two-year report, 1971-72. Ill. Nature Preserves Comm., Rockford. 65 p.

CITATION # 1301
Quarterman, E., and R. L. Powell. 1978. Potential ecological/geological Natural Landmarks on the Interior Low Plateaus. (Report to the National Park Service.) 738 p.

APPENDIX II.

Copy of Page 21, Shawnee National Forest, Land and Resource Management Plan, Final Environmental Impact Statement, Appendix E, illustrating the role of the Panther Hollow Research Natural Area in natural diversity

SAF Cover Type

SAF cover types in relation to RNA's

SAF Type	ATWOOD RIDGE	BARKER BLUFF	BURKE BRANCH	KASKASKIA	LARUE/OTTER	MTN TOWNSHIP	OZARK HILL	PANTHER HOLLOW	WHOOPIE CAT	Needed	Comments
40	X	X	X	X	X	X	X			Yes	In RNA in Kentucky, 1968 RNA Directory
44	X									Yes	Midwest example
46		X								Yes	Not in any RNA
52	X	X	X	X	X		X		X	Yes	Midwest example
53			X	X		X				Yes	Midwest example
55								X		Yes	Central Midwest example
59				X	X					No	In RNA in Indiana
60	X				X		X			No	In RNA in Indiana
63			X							Yes	Not in any RNA, Northern Example
64				X			X			Yes	Not in any RNA
65					X					Yes	Not in any RNA
75			X							Yes	Northern example
87					X					Yes	Not in any RNA

This table is from a Regional Office 4060 memo dated October 27, 1983. The memo recommends that we provide minimum coverage of all SAF cover types indicated as needed in the above table.

A 4060/1920 memo from the Regional Office dated December 22, 1983, updates the above table. This memo places SAF cover types into three categories. One, in which there is no representative nationally; two, a category in which there is only one RNA representative; and three, a category in which there are two RNA's representing the cover type. These categories are as follows:

Not Represented	In one RNA	In two RNA's
SAF 46	SAF 40	SAF 55
SAF 65	SAF 53	
SAF 87		

Based on the above information, establishment of the following RNA proposals were recommended to provide minimum coverage of the needed SAF cover types.

	SAF Cover Types
Atwood Ridge	40, 44, 52, 60
Barker Bluff	40, 46, 52
Burke Branch	40, 52, 53
LaRue Pine Hills/Otter Pond	40, 52, 59, 60, 65, 75, 76, 87
Panther Hollow	40, 54, 55

APPENDIX III.

Copies of pages selected from the Shawnee National Forest, Land and Resource Management Plan documents describing the Panther Hollow Research Natural Area and documenting the recommendations of the Forest for its designation and management

Murphysboro Ranger District

13. Oakwood Kite Site	53
14. Toothless Cave	8
15. Cave Spring Cave	120
16. Big Bayou Kite Site	80

Jonesboro Ranger District

1. Atwood Ridge	955
2. Clear Creek Swamp	4
3. LaRue Pine Hills/Otter Pond	3547
4. Opossum Trot Trail	3
5. Ozark Hill Prairies	535
6. Wolf Creek Area	495
7. Bald Knob Geological	7

Detailed descriptions of each of these sites is in the planning record. Analysis details are in Appendix F of this FEIS.

Research Natural Areas

Research Natural Areas are protected areas reserved for nonmanipulative research observation and study. Each area is part of a national network representing a full array of North American ecosystems, biological communities, habitats, and phenomena, and geological and hydrological formations and conditions. Research Natural Areas (RNA's) are established by the Chief of the Forest Service.

There are currently no RNA's established on the Shawnee National Forest; however, four separate proposals have been submitted to the Forest Supervisor for consideration.

As a result of the four proposals submitted to the Forest Supervisor, the following twelve areas were considered for Research Natural Area designation in the planning process:

Table 3-15
Recommended Research Natural Areas

AREA	ACRES 1/
Atwood Ridge	955
Barker Bluff	60
Burke Branch	300
Dennison Hollow	205
Kaskaskia	1,050
Panther Hollow	180
Whoopie Cat Mountain	17
Ozark Hill Prairies	535
LaRue Pine Hills	1,905
Otter Pond	680
Cave Hill	465
Stoneface	176

1/ The acreage shown is as originally proposed. Some modifications have been made in individual alternatives (see Appendix E).

Detailed descriptions of each area and the analysis of RNA proposals is in Appendix E of this FEIS.

Roadless Areas

The Shawnee National Forest does not currently have any areas designated as units of the National Wilderness Preservation System. It does, however, have nine roadless areas which are being considered for their potential as wilderness or for nonwilderness uses. These areas and their acreage are:

Table 3-16
Roadless Areas

Roadless Area	Size (Ac. NFS Land)
Bald Knob	5,888
Burden Falls	2,999
Burke Branch	6,230
Clear Springs	4,777
Garden of the Gods	3,844
Lusk Creek	6,055
Murray Bluff	4,172
Panther Den	722
Ripple Hollow	3,530

These nine areas were originally inventoried in 1977 during the second Roadless Area Review and Evaluation. This study came to be known as RARE II and was completed in 1979 with the issuance of a Final Environmental Statement. Four areas totaling 15,093 acres were recommended for wilderness study: Garden of the Gods, Bald Knob, Clear Springs, and Panther Den. Three areas totaling 13,143 acres were recommended for non-wilderness management: Murray Bluff, Burke Branch, and Ripple Hollow. Two areas totaling 8,883 acres were recommended for further evaluation: Lusk Creek and Burden Falls.

APPENDIX E
RNA Assignment by Alternative

Alternative I

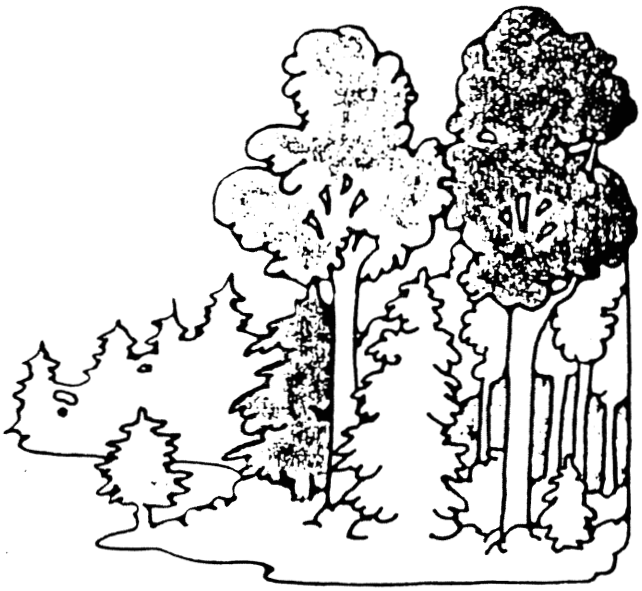
Alternative I emphasizes the maintenance and enhancement of wildlife habitat and preservation of unique natural features. A variety of motorized and nonmotorized recreation features are provided. All proposed Research Natural Areas are recommended for further evaluation.

Management Prescription 8.1

Kaskaskia Experimental Forest

Management Prescription 8.2

Barker Bluff
Atwood Ridge
Burke Branch
LaRue Pine Hills
Otter Pond
Dennison Hollow
Cave Hill
Stoneface
Ozark Hill Prairie
Whoopie Cat Mountain
Panther Hollow



INTRODUCTION

This appendix lists areas of significant physical, biological and cultural features. Where necessary, additional information is provided to assist in implementing management on an area by area basis.

INTENSIVE RESEARCH AREAS

The following areas are assigned to Management Prescription 8.1 to provide for on-going natural resource research and management.

Name	Size (Acres)
Palzo Reclamation Project	325
Dixon Springs Agricultural Research Station	4259
Kaskaskia Experimental Forest	2169
Sugar Creek Seed Orchard	105

NATURAL AREAS

The following areas are assigned to Management Prescription 8.2 (except as noted) to provide for the preservation and protection of their unique scientific or educational values. One or more natural area categories (National Natural Landmark, Research Natural Area Candidate, Botanical Area, etc.) may be assigned to an individual site as warranted.

National Natural Landmarks (existing)

These areas are managed for their landmark features in accordance with the Forest-wide Standards and Guidelines and those in the Management Prescription shown.

Name	Mgmt. Prescription	Size (Acres)
Bell Smith Springs	8.2	1,260
LaRue Pine Hills	8.2	1,905
Little Grand Canyon	8.2	1,023
Lusk Creek	9.3	720
Total Acres		4,908

Candidate Research Natural Areas (RNA)

The following areas will be managed for the site specific features listed. Direction is found in the Forest-wide Standards and Guidelines and those in Management Prescription 8.2. If through evaluation at higher organizational levels and area(s) is not accepted into the National System, it will continue to be managed under Management Prescription 8.2 (or in case of Kaskaskia, 8.1) for the life of the plan.

APPENDIX E
Special Features

Name	Management Prescription	Size(acres)
Atwood Ridge	8.2	955
Barker Bluff	8.2	60
Burke Branch	8.2	300
Cave Hill	8.2	465
Stoneface	8.2	175
Dennison Hollow	8.2	205
Ozark Hill Prairie	8.2	535
Panther Hollow	8.2	180
Whoopie Cat Mountain	8.2	17
Kaskaskia Exp. Forest	8.1	1,050
LaRue Pine Hills/Otter Pond	8.2	2,811
Total		6,753

Atwood Ridge

Location:

The Atwood Ridge RNA proposal is located in portions of Sections 4, 5, 8, 9, 16, and 17, T13S, R2W, Jonesboro Ranger District, Union County.

Area:

955 acres

SAF Cover Types Identified in Area:

SAF 40, SAF 44, SAF 52, SAF 60.

General Information:

The area includes a relic stand of chestnut oak as well as Magnolia acuminata and azalea near the western edge of their respective ranges. In addition, the area includes a number of Indian burial sites. The area is an example of dry, upland Illinois forest. Portions of the northern part of Atwood Ridge have been clearcut. Aside from the clearcuts, the area could provide baseline information on succession in upland hardwood forests.

Selective logging has occurred on some portions of the area. There remains representative mature dry upland forest stands with chestnut oaks that are essentially undisturbed. In many places, the steep slope timber was left (including many chestnut oaks).

A hiking trail exists within the area.

Purpose and Special Features:

To maintain the natural character of a large upland area with a diversity of habitats and to protect the following special features:

-Dry upland forest dominated by the rock chestnut oak (Quercus prinus).

Federal Threatened and Endangered Species:

No records documenting any Federal T & E Species in this area.

Sensitive Species (proposed):

No records documenting any Sensitive Species in this area.

Forested Listed Species:

No records documenting any Forest Listed Species in this area.

Panther Hollow

Location:

The area is located in portions of Sections 20 and 21, T11S, R10E, Elizabethtown Ranger District, Hardin County.

Area:

180 acres.

SAF Cover Types:

SAF 40, SAF 53, SAF 54.

General Information:

The area is in two hollows. Panther Hollow is narrow with adjacent sandstone cliffs and outcroppings. Buckhart Hollow is broader and the upper reaches contain exposed sandstone bedrock which forms an intermittent stream. The southwestern bluff tops of both hollows contain dry and xeric upland forest and sandstone glade communities.

Purpose and Special Features:

To maintain the natural character of an upland forested area with a diversity of habitats and to protect the following special features:

-Early Saxifrage (Saxifraga virginiensis).
-White Basswood (Tilia heterophylla).
-Strawberry bush (Enonymus americanus).
-A sandstone cliff community.

This area has forest stands that represent a diversity of habitats ranging from mesic ravines to dry ridgetops.

Federal Threatened and Endangered Species:

No records documenting any Federal T & E Species in this area.

Sensitive Species (proposed):

No records documenting any sensitive species in this area.

Forest Listed Species:

-Early Saxifrage (Saxifraga virginiensis).
-Strawberry Bush (Euonymus americanus).
-White Basswood (Tilia heterophylla).
-Loggerhead Shrike (Lanius ludovicianus).

Whoopie Cat Mountain

Location:

The area is located in portions of Sections 9 and 16, T12S, R8E, Elizabethtown Ranger District, Hardin County.

Area:

17 acres.

SAF Cover Types:

SAF 52.

General Information:

The tract contains essentially undisturbed limestone glades and important habitat for an orchid (Hexalectris spicata).

There is some evidence of past selective logging. Whoopie Cat Lake is adjacent to the area.

Purpose and Special Features:

To maintain the natural character of an upland, mostly forested area with a diversity of habitats and to protect the following special features:

-Limestone glade.
-Crested coralroot orchid (Hexalectris spicata).

Federal Threatened and Endangered Species:

No documented records for Federal T & E in this area.

Sensitive Species (proposed):

No records documenting any sensitive species in this area.

Forested Listed Species:

-Crested coralroot orchid (Hexalectris spicata).
-Loggerhead Shrike (Lanius ludovicianus).