

# **Shawnee National Forest**

## 1992 Amended Land and Resource Management Plan

### Monitoring and Evaluation Report

Fiscal Year 2003

Responsible Official:  
Hurston A. Nicholas, Forest Supervisor

Copies of this report are available from:

Shawnee National Forest  
50 Highway 145 South  
Harrisburg, IL 62946  
(618)253-7114 or (800) MY WOODS

The monitoring report is posted on our web site:  
<http://www.fs.fed.us/r9/forests/shawnee>

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means of communication of program information (Braille, large print, audio tape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice or TDD).

To file a complaint of discrimination, write  
USDA, Director, Office of Civil Rights  
Room 326-W, Whitten Building,  
14th and Independence Ave., SW  
Washington, DC 20250-9410

or call 202-720-5964 (voice or TDD).

USDA is an equal opportunity provider and employer.

**INDEX**

	<b><u>Page</u></b>
I. Certification .....	4
II. Executive Summary.....	5
III. Introduction .....	8
IV. Results of Monitoring and Evaluations .....	9
Recreation .....	9
Wilderness .....	12
Wild and Scenic Rivers .....	15
Heritage Resources .....	15
Visual Resources .....	18
Ecological Restoration .....	21
Timber Management .....	21
Range .....	21
Insects and Pathogens.....	22
Wildlife and Fish .....	22
Threatened, Endangered, and Sensitive Species .....	32
Special Areas Management .....	38
Soil, Water and Air .....	39
Land Ownership .....	51
Geology and Minerals .....	53
Transportation System .....	54
Fire Management .....	55
Law Enforcement .....	56
Rural and Community Development .....	58
V. References.....	59

## I. CERTIFICATION

I have reviewed the FY 2003 Monitoring and Evaluation Report prepared by an interdisciplinary team for the Shawnee National Forest. The report meets the intent of both the 1993 *Shawnee National Forest Amended Land and Resource Management Plan* and regulations contained in 36 CFR 219. Amendments recommended in this report will be evaluated for potential action by the Forest Leadership Team.

This report is approved.

HURSTON A. NICHOLAS  
Forest Supervisor

Date:

## II. EXECUTIVE SUMMARY

The purpose of the 2003 Monitoring Report is to evaluate progress the Shawnee National Forest (SNF or Forest) has made toward achieving goals described in the 1992 *Shawnee National Forest Amended Land and Resource Plan* (Plan). The report provides a general assessment of key resource areas. Information in the monitoring report will be useful in Forest Plan Revision. The monitoring report will provide information, data, and evaluation to better understand the need for change.

### **Purpose of Monitoring**

Monitoring determines how well the Forest Plan is being implemented. If monitoring results indicate there is a significant difference between actual conditions and those estimated in the Plan, this report may recommend changes in performance, changes in funding, or changes in the Plan. Monitoring and evaluation are performed in order to determine:

- If conditions or demands in the areas covered by the Forest Plan have changed significantly enough to require a revision of the Plan.
- If budgets have altered sufficiently the long-term relationships between levels of multiple-use goods and services to create the need for a significant amendment of the Plan.
- How well the objectives stated in the Forest Plan have been met.
- How closely management standards and guidelines have been followed.

### **Issues Addressed by Monitoring**

These seven management issues consolidate related concerns raised both by the public and by Forest Service staff during the 1986-1992 planning period. Each is an important consideration in the management of the Forest for current and future generations, and each is addressed in various parts of Section III of this report.

1. Water Quality and Riparian Ecosystems
2. Biological Diversity and Wildlife Habitat
3. Desirable Forest Settings and Facilities For Recreation
4. Timber Supply
5. Mineral Production
6. Additional Wilderness
7. Contribution to the Growth of the Local Economy

### **Conclusions and Recommendations**

Some conclusions and recommendations made in the resource-area reports follow.

#### **Recreation**

- Continue monitoring unauthorized equestrian use, vehicles, all-terrain vehicle (ATV) use, camping, campfires and climbing in natural areas.
- Propose additional system trails for equestrian use and to reduce resource impacts.
- Increase the effort for trail maintenance with volunteers and partners, increase budget or close system trails seasonally in order to reduce resource damage during the freeze-thaw periods. Monitor for effectiveness.

- Inventory actual recreation use on trails and in recreation areas. Monitor satisfaction.
- Provide better-marked trails and maps for public use at offices, at major trailheads, and on the worldwide web.
- Adequately mark and maintain trails.

#### Wilderness

- Inventory non-system trails and evaluate for possible new equestrian trails. Propose new equestrian trails and trail facilities.
- Gather baseline user data, including the type and amount of use in each wilderness and satisfaction with the resource condition and with opportunity for solitude.
- Seasonally close wilderness to equestrian use (Dec-Feb), except on trails that have been improved for year-round use, i.e. River-to-River. This may reduce the effects of horse use on bare-soil trails (and cross-country) during freeze-thaw periods.
- Replace signs made of non-natural materials with ones made from natural materials, or natural-appearing materials. Place signs infrequently to provide for visitor safety or resource protection, and to blend in with the environment.
- Remove buildings or other structures found to be ineligible for national historic register.

#### Wild and Scenic Rivers

- Conduct a suitability study for each stream with cooperators and land-owners within the corridors. Determine appropriate classification for each stream on national forest lands.

#### Heritage Resources:

- Continue monitoring sites for vandalism.
- Continue to involve the public in archaeological and historical resource protection programs, such as "Passport In Time" and "Camp I, Too, Am America," and in Southern Illinois University (SIU) field school.

#### Visual Resources

- Continue current open-land management techniques with the newly-acquired farmland in the northwestern part of the Forest.

#### Ecological Restoration

- Implement the ecological management program to restore stands of non-native pine to hardwoods.

#### Timber Management

- Restore an active timber sale program in hardwoods and pines, and at Oakwood Bottoms in order to meet Forest plan objectives for age-class distribution and species composition.

#### Range

- Implement a program to maintain existing openland habitats that includes mowing and/or hay permits. Mowing maintains openlands for many species of wildlife that would be otherwise lost due to woody encroachment and conversion to forested lands.

### Insects and Pathogens

- Continue to monitor for insect and disease problems in FY04. Utilize prescribed fire and timber harvesting to help establish a young and vigorous red and black oak component of the oak-hickory forest.

### Wildlife and Fish

- Continue to monitor northern bobwhite and eastern wild turkey populations utilizing Illinois Department of Natural Resources (IDNR) bird point-count data. Implement management recommendations.
- Continue to monitor gray squirrel, whitetail deer and wood duck populations utilizing harvest data from IDNR to maintain current healthy populations.
- Continue to utilize point-census counts to monitor the declining populations of Henslow's sparrow, blue grosbeak, dickcissel, Bell's vireo, field sparrow, northern bobwhite and loggerhead shrike.
- Continue to monitor conditions of stream habitat and fish populations.
- Identify management strategies for ponds from rehabilitation for fish management to amphibian refuges. Improve visitor access, signage and maps for fishing ponds.
- Continue participation in conservation education events. Events or programs held in FY03 included "Fish Tales" and "Kids' Fishing Day".
- Stabilize the equestrian trail crossing Lusk Creek to reduce sedimentation.

### Threatened, Endangered, and Sensitive (TES) Species

- Implement management of large openland areas in order to improve habitat for threatened and endangered species, as well as many grassland species that are declining in numbers. Continue to monitor bald eagle nesting pairs.
- Continue to monitor and implement recovery efforts for the Eastern woodrat through cooperative efforts with IDNR and SIU. A recovery plan was implemented in 2003 to re-establish populations, translocating 82 individuals from Arkansas, Missouri and LaRue Pine Hills to several sites on the Forest. Populations were stable in 2003, but are continually vulnerable to extirpation due to their small size and relative isolation.
- Expand monitoring of Indiana bat populations and foraging habitat use. Expand the use of data loggers to monitor temperature and human-disturbance factors in habitat caves. Expand the use of ultrasound bat-detectors.
- Continue the road-closure policy during the spring and fall for snake migrations. Continue to monitor den populations.
- Monitor Mead's milkweed populations for health and vigor. Update the prescription for improving habitat, including the use of prescribed fire and tree and shrub removal. Utilize updated management techniques.
- Continue to evaluate all TES plant species (165) for adverse project impacts.

### Special Areas

- Continue to mark the boundaries of natural areas. Restore markings that have been vandalized. The boundary markings completed in 2003 are effectively protecting the natural areas from resource damage and the sites are re-vegetating.
- Continue to monitor natural areas for unauthorized uses.

- Educate the public about the scientific, educational and intrinsic values of natural areas. Develop a brochure on natural areas. Install at key entry points interpretive signs that describe the natural area's values.

#### Soil, Water, Air

- Continue monitoring system and non-system trails for widening and deepening. Implement trail maintenance or improvements to reduce widening and deepening of system trails.
- Designate a number of non-system trails in order to improve and maintain them, or close and rehabilitate them to eliminate soil erosion.
- Continue to review the monitoring results of the Illinois Environmental Protection Agency (IEPA) Water Quality Report (2002) and the three river sites monitored by the Department of Natural Resources River Watch Program for potential changes. The three river sites indicated a good water quality.
- Continue to review the results of local and regional air-quality monitoring by the U.S. Environmental Protection Agency. No sites on the Forest were monitored In 2003.

#### Land Ownership

- Verify and resolve the potential 300 encroachments involving unauthorized use and occupancy of Forest land.
- Increase emphasis on land and rights-of-way acquisition to consolidate land ownership in wilderness, natural areas and other areas.

#### Minerals and Geology

- Revise the cumulative effects analysis of the Forest Plan in relation to the oil and gas leasing.

#### Rural and Community Development

- Continue existing rural development programs in neighboring communities. Programs in 2003 included: "Fish Tales" with several local, state and federal partners; the development of economic recovery plans in Alexander, Gallatin, Hardin, Pope, Pulaski and Saline counties; three economic recovery grants from three counties; participation in Johnson County Chamber of Commerce events; an agreement with Elizabethtown Smiley Christmas Community Cookout; and a grant with Vienna School to construct a Smokey fire sign.

### **III. INTRODUCTION**

#### **Purpose of the Monitoring and Evaluation Report**

The purpose of the 2003 Monitoring and Evaluation Report is to evaluate progress the Forest has made toward implementation of the Forest Plan. Our intent is to provide a general assessment of key resource areas that bolsters information available to revise the Forest Plan and support a better understanding of the need for change. This report is intended to provide information for the public and the employees of the Forest.

If monitoring results indicate there is a significant difference between actual conditions and those estimated in the Forest Plan, this report may recommend changes in performance, changes in funding, or changes in the Plan. Not every one of the resource areas or every facet of a resource

area is "monitored," as that word has meaning in this report; but we have focused on what we believe are the major areas of concern and interest.

The National Environmental Policy Act (NEPA) requires monitoring of Plan implementation to ensure that conditions established in the final environmental impact statement on the Plan are met (40 CFR 1505.2 and 1505.3). Direction to monitor and evaluate Forest Plan implementation is also found in 36 CFR 219. Monitoring and evaluation are performed in order to determine:

- If conditions or demands in the areas covered by the Forest Plan have changed significantly enough to require a revision of the Plan.
- If budgets have altered sufficiently the long-term relationships between levels of multiple-use goods and services to create the need for a significant amendment of the Plan.
- How well the objectives stated in the Forest Plan have been met.
- How closely management standards and guidelines have been followed.

All major actions that implement the Forest Plan require site-specific environmental analysis. The decision that results from environmental analysis and approves a project may include mitigation measures beyond those required by the Forest Plan (40 CFR 1501.3). The environmental analysis can support monitoring efforts by documenting the anticipated and potential effects of management activities proposed. The results of environmental analyses also document the necessary compliance with standards and guidelines set forth in the Forest Plan.

Not all questions and issues concerning management of the Forest have been fully answered or resolved. All we can say about some things is that we are still investigating and considering them, but do not know yet whether they will require a change in the Plan. Future monitoring will support resolution of some of these issues.

## **IV. RESULTS OF MONITORING AND EVALUATION**

### **RECREATION**

Plan Forest-wide standards and guidelines direct the Forest to, "Provide a mix of recreation opportunities, a variety of natural settings and different experience levels." The following is a description of the mix of recreational opportunities offered on the Forest and the amount and type of recreational uses and satisfaction rates.

The Forest is the largest area of public land in Illinois. Many attractions, including scenic vistas, historic sites, wilderness areas and trails are marketed by federal, state, and private tourism organizations and individual businesses, increasing non-local use. Some of the businesses in rural southern Illinois depend on tourism revenue created by recreational opportunities offered on the Forest. The Forest is less than a one-hour drive from Indiana, Kentucky and Missouri and is enjoyed by tourists from these states. Local Illinois residents enjoy the many outdoor opportunities on the Forest as well.

The total number of visitors to the SNF in 2003 was reported to be 585,000 (Don English, USDA Forest Service, May 2004). Many visitors visited more than one developed recreational site during the same visit, amounting to 837,000 site visits.

Ninety-eight percent of Forest visitors in 2000 were white, male (78 percent) and evenly distributed between ages 21 and 60. Sixty-two percent resided within a 30-mile radius of the outer boundary. Visitors probably engaged in the same recreational activities this year as in 2000. The four primary activities—relaxing, viewing scenery, viewing wildlife and walking—had participation rates greater than 40 percent (USDA Forest Service, 2002, p 13). The next seven most popular activities—each with a greater-than-15-percent participation rate—included picnicking and family gatherings in developed sites; driving on roads for pleasure; swimming, games and sports; fishing; visiting historic/prehistoric sites; visiting a nature center or trail; and camping in developed sites. Nature study, hunting, and horseback riding had participation rates greater than five percent. Primitive camping, backpacking, motorized water travel, bicycling, canoeing and gathering mushrooms or berries had participation rates of less than five percent (USDA Forest Service, 2002, p. 13).

The Forest is primarily a day-use provider, with almost half of the visitors (48 percent) using non-motorized trails (USDA Forest Service, 2002, p. 14). More than a quarter of the visitors used picnic areas and swimming areas. Ten percent or more used scenic byways, forest roads, interpretive sites and developed campgrounds.

Visitors on the Forest are satisfied with their visit, with scenery scoring 4.8 out of 5. Condition of Forest roads and trails scored around 3.5 (USDA Forest Service, 2002, pp. 17-18). Visitors had a very low perception of crowding in developed or day-use sites and in the general forest area (USDA Forest Service, 2002, p. 19).

The majority of campgrounds on the Forest were constructed in the 1960's and 1970's. Most of the campgrounds on the Forest were designed for tents and single-vehicle families. Trends in camping changed from tent camping in the 60's to more recreational-vehicle (RV) camping. This created a different set of amenities, campground design and different expectations than in the past. Electric hookups, hot showers, flush toilets and water, larger campsites and play areas are fairly commonplace in today's campground. Overall, campground occupancy is low, with the exception of the Lake Glendale electrified loop and Pharoh Campground at Garden of the Gods. The electrified loop at Lake Glendale is frequently fully occupied with RVs. Lake Glendale is the only Forest campground that offers electric hookups and hot showers. Pharoh Campground is frequently full with tent campers due to its close proximity to the most highly visited attraction on the Forest. In contrast, day-use areas receive increased use on the Forest, with families enjoying picnicking, swimming, boating, interpretive sites and scenic areas.

In addition to trends preferring a greater level of comfort and better access in developed recreation sites, there has been a shift in equestrian use of the Forest. The Forest has become a regional destination for many horse owners. Many travel from other states to stay at one of the numerous adjacent, privately owned equestrian camps. As equestrian use has increased, pressure on trails has mounted and cross-country riding inadvertently began to develop new trails, particularly in the eastern part of the Forest.

**Developed Recreation:**

There are 44 developed recreational sites on the Forest. The capacity of a recreation site is measured by identifying the total number of people at one time (PAOT) that the recreation area can hold comfortably. The recreation maintenance report for fiscal year 2000 shows the total capacity for the developed recreation sites as 9,668 PAOT's: 6,793 on the Vienna-Elizabethtown Ranger District and 2,875 on the Jonesboro-Murphysboro Ranger District.

**Table 1. Disability access ATV permits issued by year at the SNF Headquarters/Supervisor's Office (SO) and the Vienna-Elizabethtown (V-E) and Jonesboro-Murphysboro (J-M) offices.**

YEAR	PERMITS	SO	V-E	J-M	TOTAL	CHANGE
1999	New	57	74	35	166	(11% increase)
	Renewal	68	65	51	184	(31% increase)
	<b>Total</b>	<b>125</b>	<b>139</b>	<b>86</b>	<b>350</b>	(21% increase)
2000	New	71	81	33	185	(11% increase)
	Renewal	95	73	69	237	(29% increase)
	<b>Total</b>	<b>166</b>	<b>154</b>	<b>102</b>	<b>422</b>	(21% increase)
2001	New	44	109	21	174	(6% increase)
	Renewal	166	87	81	334	(41% increase)
	<b>Total</b>	<b>210</b>	<b>196</b>	<b>102</b>	<b>508</b>	(20% increase)
2002	New	63	36	43	142	(18% increase)
	Renewal	239	146	65	450	(35% increase)
	<b>Total</b>	<b>302</b>	<b>182</b>	<b>108</b>	<b>592</b>	(17% increase)
2003	New	54	42	30	126	(11% increase)
	Renewal	177	194	101	472	(5% increase)
	<b>Total</b>	<b>231</b>	<b>236</b>	<b>131</b>	<b>598</b>	(1% increase)

**Trails (excluding wilderness):**

Trail infrastructure is lacking in adequacy to accommodate horse use year round. Maintenance frequencies are also inadequate due to lack of funding and staffing.

**Disability Access Permit:**

Disability access all-terrain vehicle (ATV) permits are issued to people with disabilities. A description of the program (revised 10/1/01) may be found at any of our five offices. The permitted ATV rider is allowed to have a companion on another ATV. The rider is allowed to ride cross country in some areas of the Forest during most of the year. The program first issued a total of 33 disability ATV permits the first year it was tracked in 1993. Now, about 600/year are issued, indicating a potential of 1,200 ATV riders traveling on roads or cross-country during most of the year. Table 1 shows the number of permits issued for the past five years.

**Conclusions**

- Equestrian use has increased since 1992, especially in the eastern part of the Forest.
- There is low campground use throughout most of the Forest.
- There is an increase in the importance of tourism and regional reliance on the Forest as a primary attraction and provider of quality outdoor recreation for local and regional communities.
- There are increased opportunities with other organizations and individuals for partnerships and volunteer assistance.

- Recreational trail goals in the Forest Plan have been partially met. A range of high quality recreational trail experiences are offered and most recreation trail users are fairly satisfied. Public health and safety is generally provided.
- Forest Plan standards and guidelines are generally met with the following exceptions:

-System trails will be maintained to experience levels 1, 2 or 3.

*System trails are not generally maintained to Plan standards due to lack of budget and personnel.*

-Trails will be closed or restricted to prevent resource damage.

*The majority of system and non-system trails are not closed when resource damage occurs.*

### **Recommendations**

- Continue monitoring unauthorized horse use, vehicle use, ATV use, camping, campfires and climbing in natural areas.
- Propose additional system trails to respond to increased demand for equestrian trails, and to reduce resource impacts.
- Continue to track meaningful measures standards in developed recreation areas, trails and general forest areas and document when facilities and trails do not meet standards.
- Increase the effort for trail maintenance with volunteers and partners, increase budget or close system trails seasonally in order to reduce resource damage during the freeze-thaw periods. Monitor for effectiveness.
- Revise the Plan to restrict horses to system trails. Close bare soil trails that do not meet meaningful measures standards for safety or resource protection.
- Inventory actual recreation use on trails and in recreation areas. Monitor satisfaction.
- Provide better marked trails and maps for public use at offices, at major trailheads and on the worldwide web.
- Continue to upgrade high-use recreational and trail facilities to reduce backlog and deferred maintenance.
- Look for opportunities for private-sector partnerships and management of developed recreation areas.
- Conduct an inventory of Recreation Opportunity Spectrum and evaluate potential for non-motorized recreation experiences.

### **WILDERNESS**

The primary purpose of management is to preserve natural ecosystems, protect the wilderness character for future generations and to provide a wilderness experience in a natural-appearing, unmodified environment within a semi-primitive, non-motorized recreation setting.

Monitoring for compliance with the Forest Plan, Illinois Wilderness Act and regulation was conducted to measure the effects of recreational use and management activities. Monitoring was conducted through field inspections, personal contacts, letters, phone calls, cooperative research, and reviewing violations for unauthorized motorized use.

Natural areas within wilderness remain closed to camping, campfires, rock climbing and equestrian use under Forest Supervisors' orders of January 31, 1997 and September 14, 1999. Highlines were placed in popular equestrian staging areas to confine resource impacts to smaller areas, reducing tree mortality, vegetation trampling and soil compaction.

There were approximately 38,000 visitors to wilderness areas on the Forest in 2003 (English, 2004). Most of the visitors were male (80 percent), white (94 percent) and between the ages of 21-50 (USDA Forest Service, 2002). The majority of visitors rated their satisfaction with scenery and the condition of the environment very high (4.4 out of 5.0). Satisfaction with the condition of trails was rated lower, at 3.7. About 90 percent felt there was little to no crowding in wilderness, giving an impression of satisfaction with the opportunity for solitude.

**Table 2. Wilderness acreage, trail miles and trail density.**

Wilderness	Acres	Square Miles	System Trail Miles	Trail Density of System Trails	Non-system Trails	Total Trails	Trail Density of ALL routes (sys + non-sys)
Garden of the Gods	3,996	6.24	13.17	2.11	4.6	17.77	2.85
Lusk Creek	6,298	9.84	10.16	1.03	44.3	54.46	5.53
Bay Creek	2,769	4.33	0	0	11.1	11.1	2.56
Burden Falls	3,687	5.76	1.08	0.19	16.92	18	3.13
Panther Den	839	1.31	4.2	3.21	0.54	4.74	3.62
Clear Springs	4,769	7.45	9.6	1.29	9.23	20.84	2.8
Bald Knob	5,786	9.04	11.61	1.28	4.79	14.39	1.59
<b>TOTAL</b>	<b>28,144</b>	<b>44</b>	<b>49.82</b>	<b>1.13</b>	<b>91.48</b>	<b>141.3</b>	<b>3.21</b>
Panther Den (FS) + Crab Orchard (FWS)*	4,889	7.64	9.2	1.2	7	16.74	2.19

\*Combined acreages and trail miles for two adjacent wildernesses. Trail mileages for Crab Orchard are estimates.

### **Dispersed Recreation and non-system trails**

Table 2 presents the number of miles of trail for each wilderness, and the number of miles of non-system trail. Since the last planning period, the numbers of miles of non-system trails have increased.

### **Conclusions**

- Equestrian use in wilderness has increased, rendering many dual-use trails uncomfortable for hikers because of pock-marking and muddiness—effects of hooves on bare soil trails—and horse urine and manure.
- Forest Plan standards and guidelines are being met, with the following exceptions:
  - The Forest Service will detect, monitor, and evaluate the presence of non-native species within wilderness. Minimum-tool control measures will be taken.

*Many non-native invasive species (NNIS) are not currently inventoried or controlled. Wilderness Implementation Schedule (WIS) guidelines stressed the need for a Wilderness Fire Plan and for prescribed fires to control some invasive species.*

-A range of options, including signage and brochures, trail closures, restoration, tent pads, regulatory approaches, or a permit system will be considered when unacceptable environmental damage or significant user dissatisfaction occurs.

*Neither system trails nor non-system routes are generally closed when resource damage occurs. Equestrian use in natural area inclusions has been controlled.*

-Axe blazing will generally be used where reassurance markers are needed. There should be no painted or plastic blazes.

*Axe blazes are not used as reassurance markers. Wooden and/or plastic and/or carsonite or wood signs or reassurance markers exist on some wilderness trails. WIS guidelines allowed for wooden diamond reassurance markers and stressed need for a trail plan.*

-All signs will conform to wilderness standards.

*Carsonite or plastic signs and markers used to mark natural area boundaries and some trails do not conform to wilderness standards.*

-Existing buildings and other structures will be obliterated and the site restored to natural conditions.

*Some structures remain in some wilderness areas and may be removed at a future date in compliance with State Historic Preservation Office guidelines.*

-The use of fires as a management tool is limited to controlling insects and pathogens and/or perpetuating unique plant communities and threatened, endangered or sensitive species.

*Prescribed fire is not being used in wilderness, to the detriment of several fire-maintained natural and unique communities. This aspect of the wilderness resource is being lost due to lack of fire.*

### **Recommendations**

- Inventory non-system trails and evaluate for possible new equestrian trails. Propose new trails and include equestrian trail facilities.
- Gather baseline user data, including the type and amount of use in each wilderness, satisfaction with the resource condition and with opportunity for solitude.
- Write fire suppression and prescribed fire management plans for each wilderness. Submit request to Chief for approval to use prescribed fire in fire-dependent natural plant communities. Revise the Forest Plan to include handling of natural ignitions.
- Continue to improve existing system trails, including hardening the trail tread with gravel where horse use is high.
- Consider hiker-only trails to respond to dissatisfaction of hikers on equestrian trails.
- Distribute the Forest "Horse Stewardship" brochure and other behavior modification suggestions to trailheads and horse campgrounds. Develop articles for popular equestrian

magazines encouraging the adoption of behaviors that reduce adverse resource impacts when riding.

- Seasonally close wildernesses to equestrian use (Dec-Feb), except on trails that have been improved for year-round use.
- Monitor the effectiveness of the seasonal equestrian closure and modify if needed to include other periods of rain and moisture.
- Draft and implement a plan to detect and eliminate NNIS.
- Evaluate the need for commercial outfitting and guiding. Evaluate purpose and demand. Inventory level of current outfitter or guide services.
- Revise the Plan to allow rustic trail structures that protect resources. The absence of trail infrastructure for horses continues to cause resource damage. Revise the plan to allow painted blazes as trail markers and natural area boundary markers. Axe blazing can damage trees.
- Replace signs made of non-natural materials with ones made from natural materials, or natural-appearing materials. Place signs infrequently to provide the visitor safety or resource protection objective and to blend in with the wilderness environment.
- Remove buildings or other structures that have been evaluated and determined to be ineligible for national historic register.

### **WILD AND SCENIC RIVERS**

The Forest Plan identified six streams for study and possible inclusion in the National Wild and Scenic River System. These streams are Bay Creek, Big Creek, Big Grand Pierre Creek, Big Muddy River, Hutchins Creek, and Lusk Creek. A corridor extending one-quarter mile on each side of these streams was assigned to the “Candidate Wild and Scenic River” management prescription, limiting management activities to those necessary for public health and safety and the prevention of significant loss of the existing resources or productivity of the area. Until classification of these streams is determined through the river study, corridors will continue to be managed to retain their potential eligibility as “Scenic” Rivers.

### **Conclusion**

- All management proposals within the Candidate Wild and Scenic River management area were evaluated based on compliance with the management prescription standards and guidelines. Maintenance activities in recreational areas and on system roads and trails, as well as ecosystem management, continued within these areas. No incompatible uses were observed to occur within the stream corridors.

### **Recommendation**

- Since management prescription 9.2 is an interim prescription pending congressional action based on a suitability study, conduct a suitability study for each stream with cooperators and land-owners within the corridors. Determine the appropriate classification for each stream and revise the Forest Plan to include the results of classification and suitability. Make recommendations to congress.

### **HERITAGE RESOURCES**

There are two independent origins of potential impacts to heritage resources located on the Forest: 1) management-related and 2) those caused by public use. Heritage resources are protected from management-related impacts by implementation of the Forest Plan standards and

guidelines and compliance with 36 CFR 219.24 and Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended. The NHPA mandates Federal land-managing agencies to take into account the effect of earth-disturbing activities on historic properties that are eligible or determined to be eligible for inclusion on the National Register of Historic Places (NRHP). The primary purpose of the NHPA and the NRHP is the recording and preservation of archaeological sites that have the potential to contribute meaningful information about historic and prehistoric lifeways that cannot be gathered from any other source.

In order to determine the effects of these management activities on historic properties, the location of these properties in relation to the project area must be identified. This is accomplished through an inventory conducted prior to implementation of the management activity. At the time of inventory, a determination is made regarding the eligibility or potential eligibility of the sites recorded. Many sites are determined not to be eligible because previous research has found that certain types or classes of sites are not able to contribute meaningful information about the history or prehistory of southern Illinois. These include prehistoric isolated finds, historic-era isolated wells and cisterns, rock walls and piles, and isolated ponds. Recording their location exhausts their research potential.

Other sites which are not considered to be eligible for inclusion on the NRHP consist of those that are severely damaged due to past management activities (prior to federal preservation legislation-1966), or were damaged or destroyed prior to federal acquisition. Although excluded from eligibility considerations, these sites are, however, recorded, assigned site numbers and incorporated into the inventory files. The remainder of the sites, both prehistoric and historic, are considered to be potentially eligible for inclusion on the NRHP. These sites, because of their below-ground physical integrity, are likely to contain information which will contribute to our knowledge of historic or prehistoric lifeways that can not be collected from any other source.

The second aspect of the monitoring program is to determine whether public use, either intentional impacts as in the case with vandalism, or unintentional affects, including over-use, is adversely affecting the heritage resources. It is believed that the best way to prevent negative impacts on heritage resources related to public use is to provide information, education, and opportunities to participate in preservation projects. Several heritage resource projects have been initiated, with this umbrella-like theme in mind. In 2003, two "Passport in Time" public volunteer excavations were hosted by the Forest. Another heritage resource project, called "Camp I, Too, Am America," was also held. This conservation education day camp program is aimed at educating children, parents and teachers about protecting heritage resources in general, and about the Miller Grove community in particular. Also, the Forest, in cooperation with SIU, hosted SIU's Archaeological Methods Field School.

### **Current Management**

During the summer and fall of 2003, archaeological inventory was conducted on 139.4 miles of equestrian and hiking trails (comprising 2,283.2 total acres). As a result of these investigations, a total of 221 cultural resources were recorded and/or monitored in the survey area. Of these, 149 were previously recorded sites: 95 historic and 54 prehistoric. Seventy-two new cultural resources were discovered, comprising 55 historic and 17 prehistoric sites. Of the 221 cultural resources inventoried in this survey, 97 are ineligible for inclusion on the NRHP. The remaining

124 sites have not been fully evaluated, but initial inspection indicates that they could potentially qualify for inclusion on the register.

Routine monitoring projects completed during the year included inspection of the four national register sites on the Forest: Millstone Bluff, the Great Salt Springs, Iron Furnace and Battery Rock. Several sites in the Miller Grove community (including a cemetery, school/church, and four farmsteads), Sand Cave, Crow Knob, Indian Kitchen, Hogg Bluff (including eleven adjacent rock shelters), the Stonefort stone fort, Pounds, Ox-Lot shelter, War Bluff, and Fitzgibbons were also subject to monitoring in the 2003 field season.

Miller Grove is a community of free African Americans founded prior to the civil war. It was abandoned during the Great Depression. Several sites within this community are thought to have been stops on the Underground Railroad. On Tuesdays and Thursdays throughout the summer, supervised children's groups are invited to an archaeological excavation at one farmstead in this community, the home of Bedford and Abigail Miller. The children learn about the Underground Railroad, basic archaeological field methods, and the importance of preserving heritage resources. This program is called *Camp I, Too, Am America*. Additionally, Miller Grove was the site of the first of two week-long "Passport In Time" public volunteer excavations hosted by the Forest in 2003. Volunteers excavated at the home of Bedford and Abigail Miller, and at the Miller Grove school/church.

Indian Kitchen, War Bluff, Hogg Bluff, Pounds and Stonefort are prehistoric bluff-top stone forts, each with a low-standing rock wall across the only easily accessible part of the bluff (or in a semi-circle as is the case with the Stonefort stone fort). These sites date to the Late Woodland period (AD 400 to 900), and are routinely monitored. In cooperation with the Forest, the stone fort at Stonefort, Illinois, was the site of SIU's field school in archaeological methods. Additionally this was the site of the Forest's week-long PIT excavations. Local residents were also invited to observe.

The Great Salt Springs, Fitzgibbons and War Bluff sites contain prehistoric burials, and have been repeatedly vandalized. These sites are routinely monitored.

In summary, 72 new sites were recorded and 179 previously recorded sites were monitored. Site forms and site sketch maps and recommendations were produced or updated for each of the 251 sites encountered. Additional heritage resource projects included SIU's field school in archaeological methods, two "Passport in Time" excavation weeks and "Camp I, Too, Am America."

### **Recommendations.**

- The great majority of the sites that were inventoried and monitored in 2003 were in an excellent state of preservation with little to no threat of future impact from forest use. However, a small number of sites are currently being impacted vandals. These sites should continue to be monitored by archaeologists and law enforcement.
- Some part of 25 of the heritage resources discovered and monitored during the 2003 trails designation project are being affected by equestrian use. Redesigning the travel corridors to avoid these sites and obliteration of user-developed trails will mitigate the ongoing impact.

- A continued effort to involve the public in archaeological and historical resource protection programs is another important approach to reducing future impacts on sites in the Forest. Educating the public about the fragility of heritage resources and about the wide variety of prehistoric and historic heritage resources the Forest contains is the best way to protect them.

### **VISUAL RESOURCES**

The monitoring of visual resources during FY03 reviews the management activities of the Middle Mississippi Early Successional Bottomland Forest. The existing visual condition is discussed and how the current management of this area is contributing to the establishment of the desired future condition, which is a more visually diverse landscape in the short term and in the long term.

Since there has not been much timber activity within the past decade on the Forest, this report will focus on the positive aspects of the birth of a new forest that is taking place within the Mississippi River floodplain (photos C thru J) and the Oakwood Bottom Moist Soil Unit (photos A&B). The photos included in this year's report will serve as a photo reference, in time, of the early-successional phase of a bottomland forest (photos C thru J) and wetland management (photos A and B). The rapid rate of vegetative regeneration within a ten-year period shows the high visual absorption capability of southern Illinois.

The existing visual condition is characterized as an openland setting cleared and used for agricultural row crops in the past 80–100 years. Prior to this time-frame, this land was a bottomland forest. This area is within the Mississippi River floodplain and is subject to annual flooding, ideal for reversion to a bottomland forest.

Ditches and levees once used on these lands to eliminate flooding for crop production have been modified to promote periodic flooding and wetland conditions (photos F thru J). Subsequently, these areas are experiencing a dramatic re-vegetative growth rate and are providing much visual variety with many plant and animal species typical of an early successional bottomland forest inter-mixed with some openland wetlands.

Water features include ditches, ponds, sloughs, and swamps (photos F, G & J). A rapidly expanding vegetative cover provides the habitat for many species of birds, waterfowl, game fish and game animals (photo J). Wildlife viewing opportunities are limited only by the visitor's willingness to attempt entry into this somewhat remote setting of the Forest.

Although human land use practices are evident, the visual quality objective of Modification is being met. Virtually nothing is required, other than controlled flooding, to meet this objective because of the rapid vegetative succession that is taking place. Some hand planting of cypress and oaks has been done within the past ten years to promote more variety of plant species.



**Photo A**↑ Oakwood Bottom Moist Soil Unit is a part-time, openland wetland maintained with a visual quality objective of partial retention where management activities remain visually subordinate to the characteristic landscape. Since agricultural openland management is prevalent adjacent to Forest Service lands, the openland management of this moist soil unit is compatible with the VQO.



**Photo B**↑ Disking is required every three to four years plus annual mowing to maintain an openland character. Water is pumped into this area annually, promoting habitat for moist soil plants and animals. Viewing blinds placed at the edge (in the immediate foreground) become a positive asset.



**Photo C**↑ This picture shows agricultural land use in juxtaposition with the genesis of a new forest (private farm land on left, Forest Service land on right).



**Photo D**↑ Primarily, natural regeneration will continue to occur with some hand-planted species (oak, cypress, etc.) to assist in a more rapid establishment of desired species.



**Photo E** ↑ Prairie Cord Grass (*Spartina* Genus). This grass occurs naturally in river floodplains in Illinois and was hand planted to armor the slopes around drainage structures on levees.



**Photo F** ↑ Water levels will be maintained by man-made drainage structures.



**Photo G** ↑ Water levels will also be maintained by natural means (beaver dams).



**Photo H** ↑ Some wetland areas will maintain water levels throughout the year, while others will provide only seasonal moisture.



**Photo I** ↑ Cornfields were converted to wetlands with cattails and lily pads by allowing natural succession from the action of beaver dams.



**Photo J** ↑ Mile Hole slough – willow stands offer immediate, prime habitat for wildlife (egrets, ducks, beavers, turtles, frogs, etc.) Prior to formation of these stands ten years ago, farmers had planted these fields in corn and soybeans. Levees and ditches are maintained to assist in water retention.

**Conclusion**

- This year's visual resource segment focuses on recently acquired private farmland and the high visual absorption capability of southern Illinois on what was formerly agricultural openland management. Although the climatic conditions are similar to the rest of the Forest, the soil conditions and the control of available groundwater in this area will provide prime growing conditions for a landscape with a dramatic display of visual variety and interest to the visiting public.

**ECOLOGICAL RESTORATION**

Ecological restoration refers to the application of different treatments to restore a particular area to a more diverse, natural state. The restoration of stands occupied by non-native pine is referred to on the Forest as ecological restoration. No ecological restoration in pine stands was completed during FY03.

**Conclusion**

- The proposed acreages to be managed under ecological restoration management practices are not being achieved.

**Recommendation**

- The Forest ecological restoration management program should be implemented.

**TIMBER MANAGEMENT**

The Forest offered no timber sales in FY 2003. There was no timber harvest activity during FY03. No harvested areas were monitored for regeneration survival.

**Conclusions**

- Without a recent timber harvest, no conclusion can be drawn regarding regeneration success.
- Objectives for forest age-class distribution and species composition are not being met due to lack of timber harvest.
- Other than through natural mortality, there is no movement toward age-class distribution objectives in the Oakwood Bottoms management area due to the lack of timber harvesting and other practices resulting in a modification of age-class distribution.
- Uneven-aged objectives in hardwood stands across the Forest are not being met due to the lack of timber harvesting.

**Recommendation**

- Recommend that the Forest restore an active timber sale program in hardwoods and pines, and at Oakwood Bottoms as a tool to move toward Plan objectives.

**RANGE**

Grazing is permitted in openland components when compatible with the management prescription. No grazing allotments were issued on the Forest during FY03. Over the last five to ten years, the Forest has acquired several new tracts, much being openlands. Much of the open pastureland on these new tracts is being vegetated by brush, redcedar and NNIS such as autumn olive. No hay permits were issued during FY03 due to the amount of environmental analysis needed to authorize the permits.

**Conclusion**

- Mowing for hay can be an effective tool to reduce woody encroachment and keep openlands in high quality, early successional habitat for wildlife.

**Recommendations**

- Recommend that the Forest utilize mowing and hay permits on lands that the Plan and annual monitoring have identified as important openland habitats. This management tool is a viable alternative to more costly maintenance treatments.
- Recommend re-analysis of the need for and suitability of grazing allotments during the Forest Plan revision.

**INSECTS AND PATHOGENS**

The Forest was surveyed aerially for insect and pathogenic problems in FY03 by the Forest Service, state and private forestry. Some scattered oak mortality was observed, but no major problems were identified. Dr. John Reeve from SIU has also surveyed sections of the Forest and found nothing different from previous years. Southern pine beetle was not found and the closest infestations are believed to be in Tennessee.

The gypsy moth trapping program was once again implemented during the summer of 2003. Approximately 100 traps were set out across the Forest in June and collected in September. Most were located in recreational areas where most out-of-state traffic was expected. Traps containing moths were inspected by a trained professional. No gypsy moths were found. A similar program will take place in the summer of 2004.

**Conclusion**

- There were no major insect or pathogenic problems on the Forest in FY03. Scattered oak mortality is likely due to the senescence of red and black oaks.

**Recommendation**

- Continue to monitor for insect and pathogenic problems. Regeneration of aging oak-hickory stands through prescribed burning and timber harvesting would help in establishing a younger, more vigorous red and black oak component of the oak-hickory forest.

**WILDLIFE AND FISH**

Federal regulation, 36 CFR 219.19(6), requires that population trends of management indicator species (MIS) be monitored to determine the effects of management on wildlife habitat and populations. MIS represent groups of fauna that depend upon the same habitat, and are used to determine the effects of forest management practices on wildlife.

The Forest Plan identifies seventeen MIS on pages IV-66-67. They are indicated in the following discussion by an asterisk (\*). Habitat changes are monitored through the use of the Habitat Evaluation Procedure (HEP) and direct observations; populations are monitored by Forest Service personnel, through cooperative research studies with university researchers, and with assistance of the IDNR staff.

**HEP models**

HEP models are used to evaluate the environmental effects of management on five major habitat components (bottomland hardwoods, upland hardwoods, croplands, oldfields and grasslands) for thirteen of the seventeen MIS. The number of species evaluated depends upon the habitat utilized by the species. The current model does not address the environmental effects of management activities on the American redstart (*Setophaga ruticilla*), the great-crested flycatcher (*Myiarchus crinitus*), or the rainbow darter (*Etheostoma caeruleum*). Environmental effects on these species are generally based on professional observations and collaborative data and are generally addressed in a narrative manner. The bluebird (*Sialia sialis*), a modeled species, is used to address the effects on the great-crested flycatcher (*Myiarchus crinitus*).

In analyzing direct and indirect effects of management in the short and long terms, only lands proposed for timber harvest are evaluated in the HEP analysis. Other Forest management activities are either too infrequent or the duration of change takes so long to occur that they do not result in measurable output in the current HEP model. From a sample of stands in the area to be harvested, field personnel measure 50 habitat characteristics that define the structural components most strongly correlated with wildlife distribution and abundance.

Approximately 260 HEP samples were taken from habitats across the Forest for use in the Forest Plan revision. These data were collected in early fall of 2003. These also provide habitat monitoring for comparison with the present conditions for seven MIS in the 1992 Plan. According to preliminary comparisons of HEP modeling results for wood thrush, scarlet tanager, worm-eating warbler, yellow-breasted chat, eastern wild turkey and white-tailed deer, there appear to be declines in habitat quantity and quality for all seven species. This appears to be due primarily to declines in habitat quality for all species since 1992. Further comparison and analyses of these data will be done in 2004, including looking at northern bobwhite habitat quality and quantity comparisons between 1992 data and 2003 data.

**Terrestrial and avian census**

Population trends of MIS are also monitored by both direct and indirect population counts. Direct population censuses involve the use of established field-monitoring protocols such as call counts, covey counts and point-census counts. Indirect population counts involve the use of harvest data for such species as white-tailed deer (*Odocoileus virginianus*)\* and eastern wild turkey (*Meleagris gallopavo*)\*.

Call counts and covey counts are used to monitor northern bobwhite (*Colinus virginianus*)\* populations and point-census counts are used to monitor other avian MIS. The point-census monitoring protocol developed by C. John Ralph is used to monitor MIS such as the Kentucky warbler (*Oporornis formosus*)\* and the wood thrush (*Hylocichla mustelina*)\*.

Call counts, covey counts and point-census counts are done when possible in cooperation with the IDNR and/or university research staff. These counts are conducted along established survey routes to determine population trends.

**Northern bobwhite call and covey counts:**

Forest Service personnel did not conduct call or covey counts in 2003.

**Conclusion**

- The continuing long-term downward trend in northern bobwhite populations as documented in the 1999 Monitoring Report is undoubtedly due to declining amounts and quality of habitat related mainly to intensified agricultural practices. The continuing decline in bobwhite quail populations at the Pennant Bar Ranch is due to a lack of management (i.e., prescribed fire) and conversion of former grassy areas to shrubland.

**Recommendation**

- Continue to rely on census data from the IDNR and site-specific bird point-count data to determine the effects of management on northernbobwhite populations.

**Eastern wild turkey populations:**

Forest Service personnel did not conduct any direct population monitoring of the eastern wild turkey in 2003.

**Conclusion**

- Harvest data available from the IDNR indicate that wild turkey reproduction was generally poor for several years prior to 1998 but has since rebounded.

**Recommendation**

- Continue to rely on census data from the IDNR and its management recommendations to determine management effects on eastern wild turkey populations.

**Gray squirrel ,whitetail deer and wood duck populations:**

Forest Service personnel did not conduct any direct population monitoring of gray squirrel (*Sciurus carolinensis*)\*, whitetail deer (*Odocoileus virginianus*)\*, or wood duck (*Aix sponsa*)\* populations in 2003.

**Conclusion**

- Harvest data available from the IDNR indicates that populations of these three MIS remain stable throughout the Forest.

**Recommendation**

- Continue to rely on census data from the IDNR and its management recommendations to determine the effects of management on populations of these three species.

**Point-census counts**

Point census counts are done during the last week in May and the entire month of June. In 1992, Forest personnel identified on USGS quadrangle maps sixteen permanent census routes. Five and one-half routes were located and permanently marked on the ground. Point-census data has been collected from several of these census routes by agency biologists or university research staff since 1993.

A 1998 study by a student from Princeton University was completed to determine the factors important to cowbird reproduction: host-density, host-quality, nest-predation, and female brown-headed cowbird (*Molothrus ater*) density. This research project compared cowbird

reproduction in a forest and oldfield habitat. Preliminary results of the first field season suggest that, per unit area, forest produces about 150 percent as many brown-headed cowbirds as oldfields. The number of brown-headed cowbirds fledged in the forest appears to be about 1.57 times the number of brown-headed cowbirds produced in old fields. A paper summarizing this study, presented at the Society for Conservation Biology in Washington, D.C., concluded: "On balance, this study suggests that forests produce more cowbirds. By increasing cowbird abundance, forest fragmentation may be reducing the reproductive success of all cowbird host species; not only that of forest-breeding species." A final report has not been submitted.

Dr. Robinson, his colleagues, and several other researchers have published research documents dating back to 1989 that address the effects of cowbirds and forest fragmentation on many of our MIS. Dr. Robinson continues to compile and analyze the data he has collected to determine long-term population trends.

A cooperative project with Dr. Scott Robinson of the University of Illinois resulted in re-surveying the routes conducted in 1999. Dr. Robinson provided the Forest with copies of the field-data for all the routes conducted between 1989 and 2002. The Forest has the census points in a geographic information system (GIS) program and has entered census data for 1999, 2000, and 2001 into the database. The Forest is in the process of entering census point data into the GIS program for all routes conducted by Dr. Robinson from 1989 thru 1998 and 2002. Trend analysis of this data will be conducted in 2004.

Dr. Robinson expanded his bird point census routes to include the following openland sites in 2002: Pennant Bar Ranch, Turpen Tract, Ashby Tract, and McConnel Tract. The data from point census routes surveyed in 2003 were not available to be included in this monitoring report.

### **Conclusion**

- Dr. Robinson's preliminary conclusions indicate that Henslow's sparrow populations are declining significantly at the Pennant Bar Ranch. Only eight pairs were counted in 2002, compared to 25-50 pairs in 1998. Other grassland species that he noted are continuing to decline are the blue grosbeak, dickcissel, Bell's vireo, field sparrow and northern bobwhite. A single pair of loggerhead shrikes is all that remains at the ranch. The site is one of only a few on the Forest that has Bell's vireos. Dr. Robinson attributes this decline to a lack of management (i.e., prescribed fire) and shrubland succession that has replaced many of the formerly open grassy sections.

### **Recommendation**

- Continue to utilize point-census counts as a valuable tool to monitor avian MIS populations. University research personnel, cooperators and volunteers will continue to play a vital role in the overall monitoring of MIS.

### **Other ongoing research:**

In 1999, Dr. Robinson began a National Science Foundation research project that included portions of the Forest to determine the effects of forest fragmentation on avian nesting success as mediated by landscape composition. This study will assess directly how landscape composition affects the outcome of forest fragmentation on birds nesting in southern Illinois and conclude in

2004. He is also looking at the songbird populations in non-native pine plantations versus hardwood forest habitats on the Forest to aid in forest planning. The results of Dr. Robinson's research has not been provided to the Forest for use in the 2003 monitoring report.

### **Fisheries Program Summary for 2003—Fish Surveys and Habitat Management**

Primary activities within the Fisheries Program in 2003 included monitoring the fish population status of large lakes; inventorying stream habitat and fish populations; monitoring and maintenance of ponds; conducting conservation education events, and coordination with federal and state agencies.

#### **Large lakes monitoring:**

IDNR Fisheries Biologists, in cooperation with the Forest Service Fisheries Biologist, sampled Cedar, Dutchman, Kinkaid, Little Cache, Pounds Hollow and Tecumseh lakes, via boat-electrofishing. The purpose of the sampling was to monitor the health of the fisheries. All fish collected were measured and weighed to determine Proportional Stock Density (PSD) and Catch per Unit Effort (CPUE; number per hour). PSD is an index of population balance calculated as:  $PSD (\text{percent}) = \frac{\text{number} > \text{quality size}}{\text{number} > \text{stock size}} \times 100$ . Quality size for bass is 300 mm (12 inches), while stock size is 200 mm (8 inches). For sunfish, quality size is 150 mm (6 inches) and stock size is 80 mm (3 inches). In general, a PSD of 40-70 indicates a balanced bass population, while a PSD of 20-40 indicates a balanced bluegill population. CPUE is used as a measure of relative abundance or simply an estimate of the population density. Table 3 summarizes pertinent information from sampling conducted in lakes.

**Table 3. Summary of boat electrofishing sampling, including population indices, for Cedar, Dutchman, Kinkaid, Little Cache, Pounds Hollow and Tecumseh lakes, 2003.**

Name	Bass PSD	Bass CPUE	Bluegill PSD	Bluegill CPUE	Redear PSD	Redear CPUE
Cedar Lake	46	160	28	90	63	40
Dutchman Lake	82	136	7	128	0	48
Kinkaid Lake	64	63	26	167	0	13
Little Cache	33	40	24	380	57	20
Pounds Hollow	37	162	31	328	43	28
Tecumseh Lake	39	288	25	67	17	14

The largemouth bass population in Cedar Lake looks excellent and continues to show a wide-ranging size distribution. Relative abundance of largemouth bass was good as reflected by the high CPUE, which was the highest ever recorded. The number of largemouth bass greater than 18-inches was the highest since 1999. IDNR passed a new regulation to reduce the number of largemouth bass smaller than 14 inches. Bluegill CPUE was also high and the redear sunfish population has rebounded from 2002. IDNR will continue to sample Cedar Lake to monitor improvements in the fish populations.

The Dutchman Lake electrofishing survey resulted in record abundance of largemouth bass; all bass were in good condition based on relative weight. Quality sized bluegills were rare in 2003 as were adult redear sunfish. Bluegill and redear that were sampled showed high relative weights. Non-vulnerable channel catfish were stocked in Dutchman lake in 2003. Submersed vegetation in Dutchman Lake has been a problem for the past couple of years and a management plan needs to be implemented.

In Kinkaid Lake, largemouth bass CPUE decreased. Redear sunfish CPUE more than doubled, but the sample data remain low, which indicates that Kinkaid Lake lacks quality habitat for redear sunfish. Redear sunfish prefer weed beds, which are absent from the sample area. White crappie, muskie, and walleye are well represented in Kinkaid Lake. IDNR has completed two rearing ponds and used one of the ponds to raise largemouth bass and the other pond was used to raise largemouth bass and walleye. There is a possibility of stocking smallmouth bass in Kinkaid Lake. IDNR added 50 pine trees for fish habitat in the water plant area.

The sport fish population in Little Cache is in good condition. CPUE values for largemouth bass and redear were similar to last year, but still below the desired numbers. Bluegills were more abundant in 2003 than the previous nine years. PSD for largemouth bass was high, but was still below the goals of IDNR.

Largemouth bass in Pounds Hollow exhibited low mean relative weights and few fish greater than 15 inches. An abundance of submerged aquatic vegetation is present in the littoral zone, allowing juvenile sunfish to escape predation by larger bass. One proposed solution is to decrease the amount of submerged aquatic vegetation in the littoral zone. Bluegill and smallmouth bass populations in Pounds Hollow are thriving. Mean relative weights of channel catfish are within the target range and the continued stocking of non-vulnerable channel catfish should continue to provide good fishing opportunities.

The Tecumseh Lake electrofishing survey collected a total of 245 fish representing seven different species. PSD (39) for largemouth bass was close to the range of 40-60. Mean relative weight (79) was low compared to the preferred range of 90-110. Bluegill and redear sunfish had a PSD of 25, well within the range of 20-40. Mean relative weight of bluegill and redear was 90. Channel catfish PSD and mean relative weights have improved in 2003.

### **Conclusions and Recommendations**

- In 2003, IDNR surveyed five lakes on the Forest: Cedar, Kinkaid, Little Cache, Pounds Hollow and Tecumseh. All have balanced fish populations except for the sunfish in Dutchman and Kinkaid lakes.
- Due to an abundance of aquatic vegetation, Dutchman Lake lacks quality-sized bluegill and adult redear sunfish. The aquatic vegetation needs to be treated or removed to allow for predation on smaller-sized sunfish.
- Kinkaid Lake lacks quality habitat for redear sunfish. IDNR and the Forest need to devise a plan to implement quality habitat for redear sunfish.
- Pounds Hollow also has an abundance of aquatic vegetation that needs to be treated or removed.

### **Stream habitat and fish populations**

The Forest conducted habitat and fish population surveys throughout the Lusk Creek drainage in 2003. Habitat data included categorization of habitat type (i.e., pool, riffle or run), wetted width, depth, substrate composition, water velocity and discharge. Water-quality data included temperature, pH, dissolved oxygen, conductivity and turbidity. At each site, the fish population was sampled using a backpack shocker. All habitat data was entered in the Water module of the Forest GIS database. Summaries of the habitat data are on file at the Forest Supervisor's Office.

Table 4. Results of the Forest 2003 stream survey in Lusk Creek and tributaries. All sites were on the Forest and are arranged from the upper to lower portions of the drainage.

	Mean Width (m)	Mean Depth (m)	Mean Velocity (m/s)	% Silt	% Sand	% Gravel	% Pebble	% Cobble	% Boulder	% Bedrock
Lusk Creek	8.7	0.33	0.01	10.0	22.0	16.0	22.0	18.0	12.0	0.0
Lusk Creek	5.9	0.21	0.12	0	0.0	16.3	16.3	26.6	14.3	26.5
Lusk Creek	5.1	0.09	0	0.0	6.8	3.3	13.3	23.3	50.0	3.3
Bear Branch	2.7	0.1	0.03	0	0.0	2.2	11.4	15.9	2.3	68.2
Ramsey Branch	3.2	0.3	0	4.6	36.9	23.0	12.3	15.4	6.3	1.5
Ramsey Branch	2.5	0.1	0	0	8.6	22.9	11.4	45.7	5.7	5.7
Little Lusk Creek	3.0	0.1	0.09	0	2.2	28.9	33.3	28.9	4.5	2.2
Little Lusk Creek	4.3	0.29	0	0	3.7	14.8	48.2	29.6	3.7	0.0
Little Lusk Creek	7.1	0.46	0.01	0.0	0.0	3.4	8.6	36.2	39.7	12.1
Lusk Creek	3.4	0.43	0	46.3	9.3	14.8	7.4	18.5	3.7	0.0
Lusk Creek	9.7	0.49	0	3.4	35.6	8.5	16.9	35.6	0.0	0.0
Lusk Creek	10.4	0.4	0.14	3.1	21.9	14.1	20.3		34.3	6.3
Copperous Branch	0.2	3.49	0	0.0	8.6	8.6	34.3	11.4	17.1	20.0
Copperous Branch	3.2	0.09	0	0	0.0	15.0	10.0	12.5	0.0	62.5
Lusk Creek	13.6	0.39	0.18	0	12.3	23.1	29.2	27.7	7.7	0.0
Quarrel Creek	2.9	0.01	0	0	0.0	16.9	12.3	13.8	17.0	40.0
Flick Branch	2.6	0.14	0	0.0	9.5	16.2	14.9	29.7	29.7	0.0
Flick Branch	2.9	0.16	0	5.0	0.0	15.0	25.0	30.0	20.0	5.0
Tributary of Lusk Cr.	4.4	0.26	0.03	18.2	0.0	6.1	21.2	33.3	21.2	0.0

Stream habitat within the Lusk Creek drainage is characterized by coarse substrates (i.e., gravel, pebble and cobble) with very little silt, relatively high instream cover, moderate sinuosity, good bank stability and heavy coverage by the riparian canopy. Instream habitat types include long sections of runs, deep pools and high quality riffle habitat (Table 4).

Twenty stream sites were sampled in Lusk Creek during 2003. Twenty-four species of fish were collected and are listed in Table 5. Listed species collected include the spring cavefish (*Forbesichthys agassizi*), northern hogsucker (*Hypentelium nigricans*) and the least brook lamprey (*Lampetra aepyptra*). NNIS collected include Asian clams and zebra mussels. Another NNIS, Asian carp, have been reported in the Ohio River drainage, but were not collected in 2003. The Forest Codes indicate the status of a species: A=abundant, C=common, M=management indicator species, R=rare, and VR=very rare. An X indicates a state threatened or endangered species.

**Table 5. List of species collected in the Lusk Creek watershed, 2003.**

Species Collected	Forest Code
<i>Ameiurus natalis</i>	C
<i>Aphrododerus sayanus</i>	C
<i>Campostoma pullum</i>	A
<i>Cyprinella spiloptera</i>	C
<i>Erimyzon oblongus</i>	C
<i>Etheostoma caeruleum</i>	C, M
<i>Etheostoma kennicotti</i>	A
<i>Etheostoma nigrum</i>	C
<i>Etheostoma squamiceps</i>	C
<i>Forbesichthys agassizi</i>	R
<i>Fundulus olivaceus</i>	A
<i>Hypentelium nigricans</i>	R
<i>Labidesthes sicculus</i>	C
<i>Lampetra aepyptra</i>	R, X
<i>Lepomis cyanellus</i>	A
<i>Lepomis macrochirus</i>	A
<i>Lepomis megalotis</i>	C
<i>Luxilus chrysocephalus</i>	C
<i>Lythrurus umbratilis</i>	A
<i>Micropterus punctulatus</i>	C
<i>Micropterus salmoides</i>	A
<i>Moxostoma erythrurum</i>	C
<i>Pimpephales notatus</i>	A
<i>Percina caprodes</i>	C
<i>Semotilus atromaculatus</i>	A

The IDNR also conducted monitoring within the Forest. Table 6 shows survey sites over the past five years.

**Table 6. Stream sites surveyed by the IDNR, 1998-2002.**

Stream	1999	2000	2001	2002	2003
Bay Creek		x			
Big Creek - (AO-02)			x		
Big Grand Pierre - (AL-01)		x		x	
Bay Creek Ditch - (AJK-01)			x		
Cache River - Post Ck Cutoff - (AD-04)				x	
Cache River - Miss. River - (IX-05)				x	
Clear Creek - (IC-01)	x				
Clear Creek - (IC-02)	x				
Clear Creek - (IC-03)	x				
Clear Creek - (IC-05)	x				
Dutch Creek - (ICD-02)	x				
Hutchins Creek - (ICE-01)					
Lusk Creek - (AK-02)		x			
Miller Creek - (IBA-08)				x	
Big Muddy River - (N99)					x
Cedar Creek - (NA-02)					x
Cedar Creek - (NA-03)					x

### **Conclusions and Recommendations**

- In 2003, the Forest surveyed various sites within the Lusk Creek watershed. Stream habitat is characterized by gravel, pebble, cobble and very little silt, good bank stability and heavy coverage by the riparian canopy. Twenty-four different species were collected. An unidentified ammocoete (i.e., larval lamprey) was collected at another site during the Forest 2003 survey.
- Lusk Creek seems to be in good to excellent condition and the Forest needs to maintain the near pristine conditions of Lusk Creek by continued monitoring of stream-habitat conditions and the fish population.

### **Pond monitoring and maintenance:**

In June of 2003, a pond survey was initiated by the Forest to obtain a current inventory of habitat conditions and fish populations. Forty-three ponds were sampled at sites located on the Pennant Bar Ranch, West Property and Dixon Springs Agricultural Center. Data collected included water quality, habitat condition, fish populations and trophic status.

Water quality measurements included water temperature, dissolved oxygen, conductivity, pH, TDS and water transparency. Water quality measurements differed substantially between sites. For example, dissolved oxygen values varied from extremely low (< 1 mg/L) to very high levels (> 14 mg/L); pH varied from 5.3 to 8.6; TDS ranged from 0 to 0.7 g/L; secchi transparency ranged from 15 cm to 150 cm. The differences in water quality could be due to the amount of vegetation, primary production, respiration, photosynthesis and water clarity. The range for dissolved oxygen in a pond should be between 5-8 mg/L for maximum fish growth (IDNR 2001). pH values in most surface waters range between 7 and 8, although in humid regions the pH of surface waters is commonly slightly less than 7. In general, a pH range of 6.0-9.0 appears to provide suitable habitat for most freshwater fish species and bottom-dwelling invertebrate fish food organisms (Thurston et al. 1979). Low secchi disk depths indicate eutrophic conditions (Murphy 1996). Turbidity varied between each of the ponds. If turbidity is higher in a pond, less sunlight is able to penetrate the depths of the pond and therefore less photosynthesis will occur in the pond. If turbidity is lower in a pond, more sunlight is able to penetrate the depths of the pond resulting in more photosynthesis. Sedimentation may also be a problem for ponds.

Habitat measurements included surface area (hectares), maximum depth (m), average depth (m), and percent coverage by emergent aquatic vegetation, shoreline development index (SDI), and morphoedaphic index (MEI). Surface area of the ponds ranged from 0.03 to 4.4 ha. The minimum size of a pond suitable for fish management is approximately 0.4 ha. Shoreline Development Index (SDI) ranged from 2.88-7.63, maximum depth was between 1.1 m to 4.1 m, mean depth ranged from 0.70 m to 2.51 m, MEI ranged from 0 to 0.26, and percent average vegetation cover was from 0 to 100 percent.

To sample the fishery, multiple seine hauls (6 m bag seine) along the shoreline were used to collect fish. We recorded fish species, size class and a count of the fish sampled by seining. Five fish per cm group were measured and the remaining individuals were counted to determine total number of fish collected in each size class. After measurement the fish were returned to the pond. The majority of the fish sampled by seine were *Lepomis macrochirus* (bluegill) and *Micropterus salmoides* (largemouth bass). Other fish sampled by seine were *Lepomis*

*microlophus* (redeer sunfish), *Lepomis cyanellus* (green sunfish), and *Fundulus olivaceus* (blackspotted topminnow). Fish populations varied in each pond: 1) desirable fish population but bass crowded; 2) undesirable fish population with bluegill overcrowded; 3) desirable fish population; 4) undesirable fish population with bluegill absent; and 5) undesirable fish population.

To correct for the unbalanced fish population, where bass are crowded, harvest bass in those ponds; where bluegill are crowded, reduce the amount of bluegills in the pond; where bluegill are absent, add bluegill; and ponds considered undesirable, remove all fish and restock. Relative abundance is used to make temporal or spatial comparisons, determine if stock size is changing, give an overview of density patterns, provide insight into influencing factors, develop management strategies and adjust angler expectation. Relative abundance of juvenile fish is sometimes used to assess reproductive success and to project future abundance of the adult stock (Kohler 1993). Relative abundance was calculated by the number of fish (by species) captured per area seined (Welker, personal communication). This data will help us determine the status of the fish population and of fisheries, as well as whether or not the pond needs to be stocked to establish a more desirable fish population.

For a pond to become productive and stable, it should at least be 0.4 ha (IDNR 2001). Smaller ponds are more difficult to manage, making their fish and aquatic vegetation populations hard to control (IDNR 2001). Shoreline Development Index indicates the size of the littoral area of the pond (Murphy 1996). Littoral areas are important aspects of a pond because they provide areas for fish to spawn. Depth is also important to ponds. Water along the shoreline of a pond should be at least three feet deep to reduce shallow plant growth (IDNR 2001). Shallower ponds are more difficult to maintain. MEI is based upon lakes and ponds with higher total concentrations of dissolved solids and shallower mean depths will tend to have higher fish productions (Murphy 1996). Vegetation coverage was a major problem for the ponds surveyed. Too much vegetation coverage decreases the amount of sunlight penetrating the pond and suffocates the fish and their offspring. It also provides protection for juvenile fish resulting in overcrowding.

### **Conclusions and Recommendations**

- The results of our sampling indicate pond management is the solution. With proper management, the ponds will eventually be utilized as a source of recreation and will also give us important data to monitor the status of pond habitat and fisheries.
- To gain a better understanding of all ponds located in the forest, surveys need to be completed on the remaining ponds. Once surveys are complete, ponds deemed suitable for fish management should be rehabilitated and ponds not suitable for fisheries should be managed as amphibian refuge. Access to the ponds should be improved and signs posted to make access easier for the public. Also, creating a current fisheries map would benefit the public.

### **Conservation education**

The Fisheries Biologist, technicians and volunteers assisted in the preparation of and participated in the following fishing and conservation education events: Fish Tales, Kid's Fishing Day at Lake Glendale, Kid's Fishing Day at Glen O. Jones Lake and Pounds Hollow Homecoming.

### **Conclusions and Recommendations**

- Continue to participate in conservation education events. Organize a fishing derby on the west side of the Forest. Currently, there are two fishing derbies on the east side, but none on the west side.

### **Direct Habitat Improvements**

- Drawdown of Lake Glendale to control aquatic vegetation.
- Cleanup of dump site on Lusk Creek.
- Lusk Creek trail crossing stabilization to reduce sedimentation.

### **Conclusions and Recommendations**

- Continue annual drawdown of Lake Glendale. Work with IDNR to determine the timing and duration of these drawdowns. Alternate the focus of the drawdown each year. One year should focus on vegetation management and the following year would focus on fish management.
- Continue to clean up stream sites as needed.
- Work with Recreation to determine additional trail crossings that may need to be stabilized.

### **THREATENED, ENDANGERED AND SENSITIVE SPECIES**

There are seven species listed by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered known to inhabit the Forest: bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), least tern (*Sterna albifrons*), gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), Price's groundnut (*Apios priceana*) and Mead's milkweed (*Asclepias meadii*). Sixteen Regional Forester sensitive wildlife species and sixty-three sensitive plant species are listed on the Forest as of February 2001.

A number of wildlife species were identified as Regional Forester sensitive species (RFSS) or Forest-listed species in the Forest Plan (see pp. IV-50 to IV-57). Since these lists were compiled, there have been updates and revisions. The latest RFSS list is dated February 29, 2000 (list maintenance August 30, 2002), and may be found in the FY2000 Monitoring and Evaluation Report. The 165 plant species that are surveyed during environmental analysis of projects on Forest and are listed in the FY2001 Monitoring Report.

Areas proposed for any management activity are inventoried to determine whether and how habitat for these species could be potentially affected by the proposed activity. In addition, species listed by the USFWS are monitored for occurrences at or near known locations.

### **FAUNA**

#### **Henslow's sparrow (*Ammodramus henslowii*)**

Dr. Scott Robinson and J.H. Herkert conducted breeding-bird surveys at the Pennant Bar Ranch on June 6 and June 13, 1998. They conducted 41 fixed-radius (100m) point-census counts during their survey. Henslow's sparrow was the second most-commonly encountered species, 9.5 percent of all birds observed; only the common grackle, at 10.35 percent of observations, was seen in greater numbers. Their observation of this population of Henslow's sparrow is

significant because the birds were discovered in the far southern part of the state. Populations of more than fifteen pairs of Henslow's sparrows are very rare in Illinois.

Dr. Robinson's 2002 bird point-census at the Pennant Bar Ranch revealed that the Henslow's sparrow, along with other grassland birds, decreased significantly. Once numbering between 25 and 50 pairs, the 2002 population of Henslow's sparrow was down to 8 pairs. Dickcissels, blue grosbeaks, Bell's vireos and field sparrows were also among the species recorded with declining populations. Dr. Robinson attributed this decline to the conversion of once former open grassy sites to shrubland. This conversion from grassland to shrubland was also noted on other openland sites, including the Ashby, Turpen, White, Wilson, Bebout, Walter's and West tracts.

To improve habitat for the Henslow's sparrow and other grassland animals, 85 acres of prescribed burning was done on the Pennant Bar Ranch site during 2003. Our effort to remove invasive shrub growth continued. Several hundred autumn olives were removed on the Pennant Bar Ranch and the West properties in 2003.

### **Conclusion**

- Preliminary observations indicate that substantial shrub growth, including the invasion of autumn olives and Eastern redcedar (West tract), could potentially have an adverse effect on populations of the Henslow's sparrow, a RFSS and Forest-listed (state endangered) species.

### **Recommendation**

- Manage large openland areas to benefit threatened and endangered species, as well as many grassland species that are declining in numbers.

### ***Bald eagle (Haliaeetus leucocephalus)***

The bald eagle nest at the mouth of Big Grand Pierre Creek remains inactive and has deteriorated to the point that the eagles no longer use the site. Eagles have not returned to the site since 1994. Four other bald eagle (*Haliaeetus leucocephalus*) nests have been identified on the Forest during the past two years. Bald eagles continued to maintain active nests on both the national forest and private land in Alexander, Jackson, Hardin, Pope and Johnson Counties.

Nesting success has been monitored over the past several years by the IDNR Division of Natural Heritage. According to a report from the IDNR an aerial survey of known and potential bald eagle nesting sites was conducted on April 1, 2003. During the 5.6-hour survey a total of 24 nests was observed, two of which were found on the Forest. During the annual winter bald eagle survey twenty-three eagles were observed by boat along a 133-mile stretch of the Ohio River from the mouth of the Wabash River in Gallatin County to the Mississippi River in Alexander County.

No monitoring was done at the winter roost-site at Atwood Ridge research natural area during the winter of 2003. The number of eagles using the area has historically peaked in December and slowly declined through mid-winter. All the birds leave the area by March.

### **Conclusions**

- Nesting bald eagles appear to be increasing on the Forest and throughout their range. With increasing nesting apparent in southern Illinois and adjacent states, we anticipate that the major rivers and reservoirs on or adjacent to the Forest will provide additional nesting habitat in the near future.
- The Forest Plan's stated goal of having two nesting pairs of bald eagles on the Forest by 2020 continues to be met.

### **Recommendations**

- The Forest and IDNR should continue to monitor bald eagle populations and nesting sites throughout the Forest.
- The identified goal of two nesting pairs of bald eagles by 2020 should be re-evaluated during Plan revision and adjusted in view of the number of recently-documented active nests on or near the Forest.

### ***Osprey (Pandion haliaetus)***

During the past decade, none of the five osprey nesting-platforms erected on the Vienna-Elizabethtown Ranger District have been used. Additional nesting platforms were erected in 1994 near Fountain Bluff and at Dutchman, Sugar Creek and Kincaid lakes. Sites located near Fountain Bluff, Dutchman Lake, Sugar Creek and Kincaid lakes were not monitored during 2003.

### **Conclusion**

- Human disturbance may be adversely affecting nesting and hindering recovery of this species.

### **Recommendation**

- Continue monitoring the nesting use at established platforms.

### ***Eastern woodrat (Neotoma floridana)***

Populations of the Eastern woodrat are declining in many parts of its geographic range. In Illinois, the Eastern woodrat is listed as endangered. The only known populations in the state are found on the Forest. Extensive research and annual monitoring of this population has continued since the early 1970's. Surveys conducted since then indicate two small, but slightly expanding populations, in upland and bottomland forest occur at LaRue Pine Hills Ecological Area and at Fountain Bluff near the Mississippi River. IDNR personnel surveyed the LaRue Pine Hills/Otter Pond and Horseshoe populations during 2002. The results of this survey are being analyzed.

A recovery plan for the Eastern woodrat was implemented in 2003. In an effort to re-establish populations, 82 woodrats were translocated from Arkansas and Missouri, as well as LaRue Pine Hills, to several sites within the Forest.

### **Conclusion**

- Both populations of the Eastern woodrat have moderately fluctuated during the past two decades. Populations currently appear to be stable. Their small size and relative isolation continue to make them very vulnerable to extirpation in the event of a catastrophic event.

### **Recommendation**

- Continue cooperative efforts with both IDNR and SIU to monitor current populations and implement the objectives of the Eastern woodrat recovery plan.

### **Indiana bat (*Myotis sodalis*)**

The results of monitoring activities conducted by graduate students at SIU are not available for inclusion in this monitoring report. Forest Service biologists conducted bat-monitoring activities (mist-netting) at several openland sites proposed for management in 2003. No Indiana bats were found during these surveys.

### **Conclusions**

- After several years of intensive bat-netting, the Forest is developing a better understanding of the distribution of many forest bats. Monitoring efforts were increased significantly between 1998 and 2002 with the signing of a challenge cost-share agreement between SIU and the Forest Service. This five-year effort will continue to expand our knowledge of habitat-use and distribution of bats on the Forest, all of which are either endangered or threatened.
- The use of the ultrasound bat detector continues to be an effective tool for monitoring existing habitat by determining the presence of bats in trees with exfoliating bark. Observations made during 2003 indicate that Indiana bats are continuing to use live or dead trees as roost sites in many areas of Oakwood Bottoms Greentree Reservoir. Additional mist netting will help us validate this assumption. The enigmatic behavior of the bats makes it difficult to draw definitive conclusions about habitat needs and preferences. It is also too early to determine whether the number of bats using caves and abandoned mines on the Forest is increasing, decreasing or remaining stable.
- Mist-netting, although very labor intensive, has also added valuable information to our knowledge of the habitats and distribution of Forest bats. The use of mist-netting has proven valuable in determining the general presence of foraging and roosting bats in a given area.
- The continued use of data-logs in a few caves and mines that serve as hibernacula for Indiana bats to record temperature and monitor human disturbance will provide an effective tool to monitor changes in environmental conditions that may help determine causes for population fluctuations and changes in habitat use.
- Volunteers from the Little Egypt Grotto (LEG) have made a significant contribution to bat conservation through their willingness to help maintain a clean and healthy cave environment at several sites that historically have been used by hibernating bat colonies. In 2002, L. Geoff Schropp of the LEG conducted an extensive study to determine visitor use at several cave locations. Mr. Schropp's report dated July 30, 2002 concluded that Ava, Equality, Guthrie and Riche's Caves have extensive amounts of visitation. Mr. Schropp's report also identified several management recommendations he felt were need to ensure the long-term protections of the cave resources on the Forest.

### **Recommendations**

- Continue, and expand if possible, intensive efforts to monitor bat populations and habitat use—especially foraging habitat. The use of data loggers to monitor cave temperature and human disturbance factors should be expanded. The ultrasound bat detector has proven to be an effective monitoring tool and its use should be expanded.

- Continue to evaluate cave-gating at several sites as a means of protecting fragile wintering habitat.
- During Plan revision, evaluate and include as appropriate USFWS-recommended changes to the current Forest-wide standards and guidelines for the management of Indiana bats.
- Encourage volunteers from the LEG to continue their efforts to help maintain a clean and healthy cave environment at several cave sites on the Forest.
- Review Mr. Schropp's report and determine what actions are needed to implement his management recommendations.

### **Copperbelly water snake (*Nerodia erythrogaster neglecta*)**

In 1996, in consultation with the USFWS, guidelines for the management and protection of habitat for the copperbelly water snake were reevaluated. The Forest developed project and site-specific guidelines to protect the species and its habitat during management activities.

#### **Conclusion**

- The site-specific guidelines are expected to adequately protect the copperbelly water snake.

#### **Recommendation**

- Recommend Plan revision evaluate and include as appropriate the site-specific standards and guidelines developed to protect the copperbelly water snake and its habitat.

### **LaRue Pine Hills road closure during snake migrations:**

No den surveys were conducted in 2003.

#### **Recommendation**

- Continue the present road-closure policy during the spring and fall snake migrations and the monitoring of both public and snake use within the closure area and at an associated den site.

### **Conclusions and Recommendations**

- Monitoring of possible species population changes as affected by project implementation did not reveal any significant adverse effects on any federally-listed endangered or threatened species, or any RFSS. Direct habitat improvements were made in partnership with the National Wild Turkey Federation, Quail Unlimited and private citizens. Forest Service personnel monitored the effects of these practices.
- Direct population monitoring was done in cooperation with the IDNR, research staff and students of SIU and other cooperators. We expect these cooperators to continue working with us to monitor populations of management indicator species, as well as those listed as endangered, threatened or sensitive.

### **FLORA**

Two plant species listed by the USFWS as threatened are known to occur, or are recorded to have once occurred, on the Forest: Price's groundnut (*Apios priceana*) and Mead's milkweed (*Asclepias meadii*). A third species, the small whorled pogonia (*Isotria medeoloides*) (endangered), historically occurred just outside the Forest boundary, and potential habitat for it existed on the Forest.

A number of plants were identified as RFSS or Forest-listed species in the Forest Plan (see pp. IV-50 to IV-57). Since these lists were compiled, there have been updates and revisions that also apply to Forest-wide projects. The latest RFSS list is dated February 29, 2000 (list maintenance October 20, 2003). This list may be found in the FY2000 Monitoring and Evaluation Report or may also be accessed on the Region 9 website at [www.fs.fed.us/r9/wildlife/tes](http://www.fs.fed.us/r9/wildlife/tes).

#### ***Asclepias meadii* (Mead's Milkweed)**

A challenge cost-share agreement was continued between the Forest and The Morton Arboretum. Also contributing to the national recovery efforts of Mead's milkweed are the USFWS, IDNR, Illinois Nature Preserves Commission, Indiana Division of Nature Preserves and the Illinois Endangered Species Protection Board.

The habitat for the milkweed is markedly overgrown by encroaching trees and shrubs due to the lack of periodic fire. No active management occurred at the sites this year. Loss of habitat continues to be the greatest threat to this species in Illinois. Lack of active management at these sites could lead to the demise of this species on the Forest. Sites 1-5 were reviewed early in the spring, but formal monitoring efforts were not conducted during the growing season. One of the priority projects identified for FY04 will include the planning of prescribed burns and tree and shrub removal within selected natural areas.

#### ***Apios priceana* (Price's Groundnut) Federal Threatened**

Price's groundnut has not been seen on the Forest since 1941. This species has been de-listed by the state because it has been presumed extirpated from the Wolf Lake site at LaRue-Pine Hills/Otter Pond Research Natural Area. It is only known from four other states and believed extant at 25 populations with never more than 50 individuals. It will no longer be addressed in annual monitoring reports unless future searches demonstrate that it still exists on the Forest.

#### ***Isotria medeoloides* (Small Whorled Pogonia)**

The small whorled pogonia is known from just outside the Forest's boundaries in Randolph County, and potential habitat exists on the Forest. It has not been seen for several years and the population is presumed by IDNR heritage division to be extirpated. There are 104 occurrences documented from 21 states, but this species is listed as possibly extirpated in six states and the District of Columbia, critically imperiled in eleven states and Ontario, Canada and imperiled in four states. It will no longer be addressed in the annual monitoring report unless future searches demonstrate that it exists on the Forest.

#### **Conclusion**

- The only federally listed species on the Forest is Mead's milkweed (*Asclepias meadii*). Observations and research of the nation's Mead's milkweed populations by the leading expert on the species has led to the finding that populations exposed to repeated prescribed fires are more vigorous in morphological growth and are better candidates for sexual reproduction. The five sites on the Forest have lacked prescribed fire over the last several years. Although tree and shrub removal enhances the habitat, this fire-dependent species will continue to decline in health and vigor until fire is again a part of its ecosystem. The only remaining populations are found within a small distance of each other at the Eagle Mountain Complex.

Fire scars on tree rings from this area indicate that periodic fires were possibly man-made and/or natural events that perpetuated these populations.

### **Recommendations**

- Although Price's groundnut (*Apios priceana*) and the small whorled pogonia (*Isotria medeoloides*) are presumed extirpated in the state, further searches for populations should still be conducted in potential, as well as known, habitat.
- Continue to closely monitor Mead's milkweed plants and their habitat. The prescription for burning the plant's habitats should be updated, along with tree and shrub removal as needed. The Forest is involved in the national recovery effort of this species and should be making every effort possible to use the latest species discoveries and information to encourage and maintain populations with better health and vigor.

### **Plant Species Analyzed for Projects**

There are 165 plant species are analyzed for projects across the Forest. They are listed in the FY01 Monitoring Report.

## **SPECIAL AREAS MANAGEMENT**

### **Conclusions**

- FY03 monitoring has shown that the marking with signs of most of the natural areas' boundaries has protected the sites from additional natural resource damage.
- Monitoring and patrols have indicated that unauthorized activities are at a minimum, except at a couple of locations. Most of the public appears to be respecting the closure order.
- User-developed trails are "healing" and vegetation is re-establishing itself.
- Observations indicate that many of the rare community types, such as seep springs and barrens, are being invaded by aggressive woody and NNIS. These rare community types, which are home to many threatened, endangered and sensitive plant and animal species, will be lost from the Forest if active management, to include prescribed fire and selective tree and shrub removal, is not implemented soon. Glade and open barrens areas at Simpson Barrens and Dean Cemetery East Ecological Areas are quickly succumbing to successional species and will soon lose or suppress the more rare and conservative species. Active management is necessary in order to perpetuate these rare community types. Areas such as Massac Tower Springs have hydrologic disturbances (over-shading and de-watering of the land by aggressive trees, shrubs and exotic species) that may lead to the near-future demise of this area if management is not implemented soon.
- NNIS and their threats to native plants and communities continue to be a concern. IDNR and Nature Preserves Commission personnel continue to work with the Forest Service in understanding specific species, such as eulalia, kudzu, garlic mustard and Chinese yam. Hand-pulling of eulalia and garlic mustard at some locations has aided in the retarding of seed dispersal. Propane torching of Chinese yam is being monitored for success rates. All kudzu populations in the state are being aggressively eradicated with the use of herbicides. The Forest is in the progress of producing an environmental impact statement for the use of herbicides to eradicate kudzu.

## **Recommendations**

- Natural areas must continue to be marked (flagged, painted, posted and GPS-ed) on the ground.
- Boundaries that have been vandalized must be repaired and signs replaced promptly. Monitoring has shown that if an area is repaired shortly after it has been vandalized, the chances of repeat vandalism are reduced greatly.
- Monitoring and law enforcement should continue to be a priority in the protection of these areas during periods of high use.
- Education should be the key in aiding different user groups' understanding of the scientific, educational and intrinsic values of natural areas. A brochure on natural areas should be developed in the future to help in these efforts.
- Natural area and interpretive signs that were purchased several years ago should be constructed and erected at key entry points to help alert the Forest visitor that they are entering special areas of interest.
- An environmental assessment of the active management of 28 of the Forest's 80 natural areas is in progress. This analysis should be completed during FY04 so that the management might be implemented as soon as possible. Several rare and sensitive plant species have vanished from these natural areas and it is suspected that, if they are not extirpated, they are suppressed and may reappear following prescribed fires.
- A thorough analysis is needed to identify the best way to eradicate non-native invasive plant species that threaten the integrity of native communities and natural areas. Partnerships with other agencies have been initiated and knowledgeable individuals will be involved in the planning and implementation of eradication methods. Monitoring should be done following all eradication and/or control measures regardless of the means.

## **SOIL**

### **TIMBER MANAGEMENT ACTIVITIES**

#### **North End Sale**

The North End timber sale was partially harvested before activities were abandoned in 1995. The three landings at the sale were monitored in December 2003 to evaluate Plan management prescriptions. The previous visit was in June of 2002.

#### **West Landing**

A small area (25 percent) of the west landing was reseeded to Korean lespedeza in 1999 because of absence of sufficient vegetation. This was likely due to compaction. Additional tillage, along with liming and fertilizing, would have enhanced revegetation and reduced compaction. A few oak and hickory seedlings have regenerated. Bromesedge, locust trees, blackberries and lezpedeza comprise the vegetation on the landing. No active erosion was evident.



**Pictures above:** West landing (left) and oak seedling and groundcover growing at the landing (right). Photos taken in December 2003.

### Middle Landing

This narrow landing is flat with a seasonally high water table. Shortleaf pine seedlings have regenerated on the landing. The mitigation prescription was effective at controlling erosion.

**Picture at right:** The narrow middle landing along the road has revegetated with shortleaf pine seedlings. Photo taken December 2003.



### East Landing

This landing is also in good shape and has revegetated. There is no active erosion. Regeneration of black locust, a few oaks, ash, bromesedge, honeysuckle and blackberries comprise most of the vegetation. This landing does not show compaction effects as does the west landing. Mitigation prescription was effective. Some tire tracks are evident near the road, and there is a user-developed trail through the middle of the landing.

**Picture at right:** The east landing, with a path mowed along the user-developed trail. Photo taken December 2003.



**Cripps Bend Sale**

The Cripps Bend sale was completed in 1995. The sale is located in T10S R3W Sections 26 and 27. This sale area was monitored in December of 2003. The site was revisited and additional pictures were taken in June 2004.

**Cutting Unit # 1**

This unit was cut using a group-selection technique. Regeneration of hardwoods and herbaceous plants is effectively controlling erosion. The prescription was effective.

**Picture at right:** Regeneration in one of the areas of group selection in cutting unit #1. No accelerated erosion was evident.

Photo taken in June 2004.

**Cutting Unit # 2**

This unit was also cut using a group-selection technique. Regeneration of hardwoods and herbaceous plants is effectively controlling erosion. The prescription was effective.

**Picture at right:** Cutting unit # 2. Hardwood regeneration around a stump from one of the trees cut as a result of the group selection. No accelerated erosion was evident. Picture taken in June 2004.



**Log landing # 3**

The three log landings were stabilized and well vegetated. Any residual compaction from harvest activities has not negatively affected revegetation of the site.

**Picture at right:** Log landing #3 has revegetated with hardwood seedlings and herbaceous vegetation. Photo taken in December 2003.

**Ridgetop Sale**

The log landing at the Ridgetop Sale has regenerated with mainly shortleaf pine seedlings. The road through the cutting unit was spot-graveled before the gate was installed, and the road is in good shape. The road crosses an intermittent stream. The crossing was in good shape with no evidence of sedimentation.

**Picture at right:** The specified road at the Ridgetop Sale crosses an intermittent stream. Photo taken in December 2003.

**Recommendations**

- Monitoring at the Cripps Bend Sale shows that shelterwood cutting practices have not adversely affected soil productivity or water quality.
- At the North End Timber Sale, reseeding lespedeza was effective in revegetating the west landing.
- Continued annual monitoring of these old timber sale sites is not needed.

**TRAIL USE**

**River-to-River Trail  
(Vienna-Elizabethtown Ranger District)**

Four sites along the River-to-River trail in a wilderness on the Vienna-Elizabethtown Ranger District were monitored in January 2004.



**Picture at right:** The River-to-River trail in a wilderness on the Vienna-Elizabethtown Ranger District. Fallen leaves covered the trail tread.

Photo taken in December 2003.

**Table 7. River-to-River Trail monitoring (Vienna-Elizabethtown).**

Site	Date of measurement	Entrenchment at Center of Trail (in inches)	Percent slope	Width of Trail (in inches)
1	9/12/2001	1.0	2	29
2		3.0	33	59
3		4.5	25	122.5
4		2.5	18	114.5
1	9/6/2002	2.2	2	29
2		3.5	33	94
3a		3.75	25	93
3b		3.0	25	52
4		2.6	18	127
1	12/19/2003	3.6	4	72.6
2		2.4	30	71.4
3a		6.36	24	109.2
3b		6.0	24	80.4
4		7.2	16	141.6

**River to River Trail  
(Jonesboro-Murphysboro Ranger District)**

Five sites along a system trail in a wilderness on the Jonesboro-Murphysboro Ranger District were monitored in December 2003.



**Picture at right:** A system trail in the wilderness on the Jonesboro-Murphysboro Ranger District.

Photo taken in December 2003.

**User-Developed Trail  
(Vienna-Elizabethtown Ranger District)**

Three sites along a user-developed trail in the Lusk Creek Wilderness were monitored in January 2004.

**Picture at right:** A user-developed trail in Lusk Creek Wilderness. Fallen leaves covered the trail tread.

Photo taken in January 2004.



**Table 8. River-to-River Trail monitoring (Jonesboro-Murphysboro).**

Site	Date of Measurement	Entrenchment at Center of Trail (in inches)	Percent Slope	Width of Trail (in inches)
1	9/12/2001	2.5	4	25
2		2.8	15	52
3		3.8	23	54
4		1.5	17	41
5		3.5	22	37.5
1	8/15/2002	2.5	4	25 (43-ATV)
2		3.0	15	52
3		3.0	23	44
4		2.0	17	42
5		3.8	22	52
1	12/23/2003	2.4	4	67.2
2		3.6	15	72
3		6.0	23	61.2
4		2.4	17	76.8
5		6.0	22	101.4

**Table 9. User-developed trail monitoring (Vienna-Elizabethtown)**

Site	Date of Measurement	Entrenchment at Center of Trail (in inches)	Percent Slope	Width of Trail (in inches)
1	9/12/2001	1.5	2	35
2		7.5	25	32
3		7.5	30	40
1	12/19/2002	2.25	2	39
2		8.5	25	38
3		8.0	30	46
1	12/19/2003	6.0	5	72
2		3.0	21	117
3		7.2	26	61.2

### **Conclusion**

- Monitoring data collected at the three trail segments indicates a general trend toward widening and deepening of both the system and user-developed trails.

### **Recommendations**

- Implementing trail maintenance or improvements to reduce widening and deepening of system trails. This includes tread maintenance for drainage and/or hardening with gravel.
- The Forest should designate non-system trails and improve and maintain them, or close and rehabilitate them to reduce soil erosion.
- Although data show that the trails are generally widening and deepening, this preliminary data is not conclusive, and monitoring should be continued annually.

### **NINE-DAY TRAIL RIDE**

The Nine-Day Trail Ride is an annual event that occurred in late July through early August this year. The event was monitored at seven sites both before and after. The post-event photos show that the trails had a lot of traffic, but there was little evidence of additional erosion damage due to the event.

July 24, 2003 (before event) Site 4



July 28, 2004 (before event) Site 4



August 12, 2004 (after event) Site 4



### **Recommendations**

- Continue to monitor the trail sites and the Nine-Day event annually. Trail maintenance, including waterbar installation, would help control erosion.
- Mitigate potential erosion resulting from bare soil in the campground area by grading, reseeding and mulching.

### **WATER RESOURCES**

#### **IEPA**

The IEPA rates the water quality in many streams and lakes across the State. Ratings include “full support,” “threatened,” “partial support” and “nonsupport.” The “full support” rating indicates water quality is presently adequate to maintain designated uses protected by applicable water quality standards. The “threatened” rating indicates that water quality is presently adequate to maintain designated uses, but if a declining trend continues, only partial support may be attained in the future. “Partial support” indicates water quality has been impaired, but only to a minor degree.

The IEPA’s *Illinois Water Quality Report: 2002* includes assessments of many segments of the perennial drainages throughout the Forest.

The *Illinois Water Quality Report: 1998* update follows USEPA guidelines for reporting water quality conditions in terms of degree of support. Within the proclamation boundary, only segment of partial support is rated as such due to a variety of sources including non-irrigated agriculture, past and present mining activities, and channelization. Site specific monitoring data and causes of impairment are found in the IEPA 2002 *Illinois Water Quality Report*.

**Table 10. IEPA water quality ratings for segments of perennial streams that drain both private and Forest land (IEPA, 2002).**

Watershed/Main Stream	Water Quality Rating—Overall Use
Barren and Dog Creeks	Not assessed
Big Creek	Full support
Big Grande Pierre Creek	Full support
Big Muddy River	Partial support
Cedar and Sugar Tributaries	Partial and full support
Cedar Creek	Partial support
Clear Creek	Partial and full support
Dutch Creek	Full support
Dutchman Creek	Partial support
Eagle Creek	Full support
Hosick and Peters Creek	Not assessed
Indian Creek	Full support
Kinkaid Creek	Full support
Lick Creek	Full support
Little Grassy Creek	Partial support
Lower Bay Creek	Partial support
Lower Cache, Mill Creek	Partial and full support
Lower Cache, Sandy Creek	Partial support
Lower South Fork, Saline River	Non-support
Lower Saline River	Partial support
Lusk Creek	Full support
Massac Creek	Not assessed
Reeds and Degonia	Not assessed
Running Slough	Not assessed
Seven-Mile Creek	Not assessed
Upper Bay Creek	Full support
Upper Cache River	Partial and full support
Upper South Fork, Saline River	Partial and full support

**Table 11. Illinois EPA 305b water quality ratings for lakes with which are a catchment for both private and Forest land (IEPA, 2002).**

Lake	Water Quality Rating- Overall use
Cedar	Full support
Dutchmen	Partial support
Glendale	Full support
Lake of Egypt	Full support
Little Cedar	Partial support
Kinkaid	Partial support
Pounds Hollow	Full support
Sugar Creek	Partial support

### Illinois IDNR RiverWatch Program

Illinois RiverWatch citizen scientist volunteers monitored three sites on the Forest in 2003. The results of these recent monitoring efforts can be found on the IDNR website. The volunteers follow established procedures, including macroinvertebrate collection. The IDNR uses this data to analyze long-term trends in water quality conditions. The macroinvertebrate biotic index, or MBI, is an aggregate score based on the relative pollution tolerances of macroinvertebrate taxa present in a given stream. It is essentially the average tolerance value for all organisms collected at a site. In general, a lower MBI score indicates better water quality. The calculation of site

MBIs is based on IEPA tolerance values for each macroinvertebrate taxon. An index of <6 indicates good water quality. Values between 6.1 and 7.5 indicate fair water quality. Values between 7.6 and 8.9 indicate poor water quality. Values > 9 indicate very poor water quality. All three sites monitored in 2003 on the Forest have a MBI of less than 6. Values for 1998, 2000-2003 are as follows.

**Table 12. IDNR RiverWatch monitoring data/MBI scores from the Forest (1998 and 2000-2003).**

Site No.	County	Stream	MBI 1998	MBI 2000	MBI 2001	MBI 2002	MBI 2003
R1002301	Johnson	Bay Creek	5.21	--	5.67	5.94	4.04
R1002302	Pope	Bay Creek	4.66	4.43	--	--	--
R1003702	Hardin	Big Creek	5.48	5.10	5.77	--	--
R1003701	Hardin	Big Creek #1	4.53	4.84	--	--	--
R1002801	Johnson	Cedar Creek	5.44	--	6.42	--	--
R1008401	Union	Clear Creek #1	5.08	4.77	4.37	--	--
R1008101	Union	Cypress Creek	--	--	5.43	4.05	--
R1016701	Pope	Hill Branch	4.63	4.64	--	--	--
R1016801	Pope	Hunting Branch	3.00	4.81	--	--	--
R1008702	Union	Hutchins Creek	--	--	5.42	5.17	5.21
R1019201	Jackson	Johnson Creek	--	5.01	7.03	5.06	--
R1019001	Jackson	Little Kinkaid Creek	--	4.60	4.39	4.66	--
R1019101	Jackson	Sharp Rock Falls Creek	--	4.77	4.32	4.72	--
R1006502	Williamson	Sugar Creek	--	9.75	9.46	--	4.00
R1016401	Alexander	Wolf Creek	--	5.39	6.21	5.31	--

### **Recommendation**

- Continue to review the monitoring results of the IEPA Water Quality Report publications and the river sites monitored by the IDNR River Watch Program for potential changes. The three river sites monitored in 2003 indicated good water quality.

### **AIR**

#### **Illinois EPA**

Good air quality is important to human and plant health and is an important aspect of wilderness quality. Recognizing the importance of air quality, the Forest Service developed a National Strategic Plan for Air Resource Management. The mission of this Plan is to protect Forest Service land from the negative effects of anthropogenic air pollution, ensure management activities on the Forest are compliant with national and local standards, and protect visibility in the Class I wilderness areas (Forest Service, 1994). Airsheds are classified as Class I or Class II. Class I areas are basically large national parks and wilderness areas. The Forest Service manages eight Class I airsheds, approximately 907,319 acres, in the Eastern Region. Class II airsheds are all areas of the country not designated as Class I. Class II air quality standards are not as restrictive as Class I standards. The entire Forest is located in a Class II airshed.

Forest wilderness air quality management must comply with several laws and regulations.

- National Forest Management Act (16 U.S.C. 1602)
- Wilderness Act
- Federal Clean Air Act (as amended)
- Applicable state laws and regulations

The Wilderness Act regulates activities in wilderness areas, particularly “air quality related values” (AQRV’s) in Class I wilderness areas (Fox, 1987). The Forest has no Class I wilderness. The National Forest Management Act (NFMA) includes direction to protect air resources (FSM 2580). The Forest Plan (ALRMP) Standards and Guidelines, guidance that is a product of NFMA, states that “mitigating measures...will be developed on a case by case basis to insure compliance with applicable State of Illinois standards” (ALRMP). The IEPA has been designated by the state to administer the laws and regulations required by the Clean Air Act.

All air pollution emissions from the Forest Service projects and activities are designed to meet applicable pollution control requirements. Forest management activities that have the potential to affect air quality are prescribed fires. Wildfires can also affect air quality. Between 1994 and 1998 the Forest averaged 18 wildfires per year. In the early 1990’s the Forest Service used prescribed burning on an average of 1300 acres per year but in the late 1990’s the average dropped to just a few hundred acres. Prior to each burning season a burning permit is obtained from the IEPA that includes all areas that are prescribed for burning. In addition to the state permit, burn plans are written to comply with Forest Service regulations. Permit and burn plans help ensure that emissions are low and that smoke is dispersed in a safe manner.

### **Monitoring Sites**

In 2002, the Illinois EPA monitored 2 sites near the forest. One is in Carbondale, IL in Jackson County. Particulate matter (PM10) is monitored at this site. The other site is located near State Hwy 142 at Dale, IL in Hamilton County. Ozone is measured at this site. The Carbondale site is approximately 5 miles from the forest boundary and the Dale site is 33 miles away.

### **Air Quality Standards**

The Illinois and National Ambient Air Quality Standards consist of a primary and a secondary standard. The primary standard is designed to protect public health. The secondary standard protects crops, vegetation, wildlife, visibility and climate. The secondary standards are the same as the primary standards for ozone and particulate matter that is less than 10 micrometers in size, and the newer standard for particulate matter less than 2.5 micrometers. Data for PM2.5 was not monitored at Carbondale, but PM10 was and the data is published in the 2002 IEPA report.

### **Particulate Matter Standards**

Particulate matter is comprised of small solid particles and liquid droplets. At certain levels, it scatters enough sunlight to cause climatic effects and reduced visibility. The smaller particles can be inhaled and deposited in the respiratory system. The IEPA primary and secondary standard for particulate matter that is 10 micrometers in size (PM10) is 150 ug/m<sup>3</sup> per day. The newer, more sensitive standard for particulate matter that is less than 2.5 micrometers in size (PM 2.5) is 65 ug/m<sup>3</sup> per day. In 2002, the particulate matter (PM10) did not exceed exceeded the standard (see table 1). The IEPA considers all areas of Illinois except Metro East St. Louis and Chicago to meet the 2.5 micrometer particulate matter standard. Only Federal Reference Method monitoring was done for PM 2.5, and specific data was not available for the Carbondale or Dale sites (IEPA, 2001).

Table 13. 2002 particulate matter (PM10) monitoring results at Carbondale, Illinois (IEPA, 2002). Units are in (ug/m<sup>3</sup>).

Monitoring Year	Sampling Frequency	Sample Number	Days >Standard (150 ug/m <sup>3</sup> )	Highest	2 <sup>nd</sup> Highest	3 <sup>rd</sup> Highest	4 <sup>th</sup> Highest	Mean
2002	1 day	59	0	57	43	42	35	19
2000	1 day	60	0	56	55	51	48	23
1997	6 day	58	0	49	45	41	39	22

### Ozone Standards

Ozone is a molecule that can cause respiratory irritation and injury to vegetation when it is present in the air at certain levels. There are now two ozone standards used by IEPA: a 0.12 parts per million (ppm) standard—an hourly measurement called the primary 1-hour standard—that is not met when, in any 1-hour period of any day, the 0.12 ppm standard is exceeded; and an 0.08 ppm standard—the primary 8-hour standard—that is compromised when, in an 8-hour period of time, the 0.08 ppm ozone standard is exceeded.

The 8-hour standard is a more sensitive test than the 1-hour standard, and will better protect vegetation from ozone damage (Federal Land Managers Air Quality Related Values Workgroup, 2000). In 2002, the 1-hr standard for ozone was not exceeded. The 8-hour ozone threshold was exceeded on eight occasions (Table 14). This means that, although the 8-hour ozone standard, which is the four year average of the high values, was not exceeded, the air was unhealthy for 8 days. Ozone data from 2000 and 1997 is included in Tables 15 and 16. The standard was met by all areas in Illinois except Chicago, East St. Louis and Jerseyville (IEPA, 2001).

Table 14. 2002 ozone monitoring results at Dale, Illinois (IEPA, 2002). Units are in parts per million.

	Days > Standard	High	2 <sup>nd</sup> Highest	3 <sup>rd</sup> Highest	4 <sup>th</sup> Highest
Primary 1-Hour Standard	0	0.101	0.101	0.099	0.098
Primary 8-Hour Standard	8	0.094	0.091	0.09	0.089

Table 15. 2000 ozone monitoring results at Dale, Illinois (IEPA, 2002). Units are in parts per million.

	Days > Standard	High	2 <sup>nd</sup> Highest	3 <sup>rd</sup> Highest	4 <sup>th</sup> Highest
Primary 1-Hour Standard	0	0.097	0.096	0.095	0.093
Primary 8-Hour Standard	2	0.088	0.085	0.081	0.08

Table 16. 1997 ozone monitoring results at Dale, Illinois (IEPA, 2002). Units are in parts per million.

	Days > Standard	High	2 <sup>nd</sup> Highest	3 <sup>rd</sup> Highest	4 <sup>th</sup> Highest
Primary 1-Hour Standard	0	0.09	0.089	0.084	0.083
Primary 8-Hour Standard	0	0.079	0.078	0.076	0.074

### Conclusion

- The Carbondale and Dale sites monitored by the IEPA are the sites nearest the Forest. The Carbondale site measures particulate matter and the Dale site measures ozone. The urban location of Carbondale and the proximity of highways to both monitoring sites should represent the range of conditions in southern Illinois that have the potential to produce unfavorable air quality. Recent data from these two sites show compliance with the 1-hour ozone standard, and eight days that the air had lower quality, but did not exceeded the 8-hour

ozone standard. The PM10 monitoring data at Carbondale shows low levels of particulates, and the IEPA expects that these areas will also attain the PM2.5 standard. The data indicates that the air quality in the wilderness areas of the Forest is good, and continued monitoring and evolving standards should ensure good air quality in the future.

### **Recommendation**

- The Forest should continue to review the monitoring results by the U.S. Environmental Protection Agency for air quality. In 2003 there were no sites monitored.

### **LAND OWNERSHIP**

The Forest lands program involves land purchase activities, land exchange activities, land donation activities, land transfer activities, resolution of land status questions, administration of the Forest Special Uses Program, right of way acquisition, landline maintenance, landline recovery and resolution of trespass/encroachments.

During FY03, the Forest did not acquire land due to funding constraints. The Forest is progressing toward optimum land ownership as funding for land purchase allows. Land exchange activities remain controversial with many groups interested in Forest management; however, some exchanges that would provide public benefits are being evaluated.

Land ownership efficiency on the Forest can only be achieved through incremental actions. Actions during FY03 provided a minimal enhancement to land ownership efficiency. The Forest did not acquire rights-of-way during FY03 that would enhance accessibility. Land status analysis assisted in developing a transportation plan that enhances accessibility. The resource management and protection benefits that resulted from the land adjustment activities during FY03 were focused on support for other resources.

Monitoring regarding land ownership covers five major program areas: (1) land adjustment {purchase, exchange, donation, transfer and encroachment resolution – includes title claims}, (2) right-of-way acquisition, (3) special uses, (4) status and (5) landline location.

#### (1) Land Adjustment:

Purchase: No cases were completed. The Forest continued work with partners in anticipation of future land purchase activity.

Exchanges: No cases were completed.

Donations: None in FY03.

Transfers: None in FY03.

Encroachment Resolution: No title claims were resolved; however, analysis of two potential encroachments continued. A few potential encroachments were analyzed and resolved without formal consultation. No Small Tracts cases were completed.

#### (2) Right-of-Way Acquisition: None in FY03.

#### (3) Special Uses: In FY 2003, the Forest administered 186 permits authorizing occupancy and use of national forest land.

#### (4) Status: During FY 2003, Lands personnel provided research and investigative services to the private sector and Forest personnel related to such topics as historic use and occupancy of national forest land, road jurisdiction and mineral estates.

- (5) Landline: Seventeen miles of landline recovery and maintenance were completed during FY03.

### **Conclusions**

- Forest Officers suspect that up to 300 encroachments involving unauthorized use and occupancy of Forest land exist. Confirmation of encroachments is verified during landline recovery activities. Some of these cases could have their origins prior to the time that the United States acquired the land. The Forest's present encroachment resolution program continues to be reactive rather than proactive.
- During FY 2003, the Forest budget for land adjustment activities was relatively low level. Administrative funds were used to consult with landowners and not-for-profit organizations like The Nature Conservancy and The Conservation Fund to discuss future land adjustment activities. Lands personnel consulted regarding revision of the Forest Plan. The Plan is expected to provide revision of some management areas, which could lead to different priorities for future land adjustment activities. The Forest budget did not allow for extended land adjustment activities which would make progress towards the optimum landownership objectives which promote efficient land management and accessibility to national forest lands.
- The number of special use permits administered by the Forest increased during FY 2003. Additionally, the number of special use applications needing detailed analysis increased. The number of special use permits administered by the Forest does not reflect the number of permits amended each year, particularly those permits dealing with quasi-public utilities (water, telephone and electric). Utility permit amendments are increasing with upward trends in development of rural lands for private residences, recreation retreats and commercial developments. A permit amendment generally costs as much money to process and administer as a permit.
- Land exchanges are very expensive and complicated. The Forest requires exchange proponents to incur some of the expense of processing a land-for-land exchange proposal. This decision has reduced the number of land exchange proponents, but some exchanges appear to be in the best interest of the United States and warrant detailed analysis. A contract for biological and archeological evaluation of national forest land being considered for exchange was offered during FY03.
- The Forest has not received funding for right of way acquisition.
- There have not been opportunities for land transfers or donations during the past several years.
- The Forest pursued one opportunity to complete approximately 1.5 miles of landline recovery in cooperation with the adjacent private landowner.

### **Recommendations**

- Verification and resolution of encroachments is largely dependent on two types of activities: (a) an active Forest landline program coupled with immediate case work following confirmation of a specific encroachment; and (b) negotiations leading to resolution without survey or case processing between Forest officials and suspected encroachers. A high degree of public sensitivity will be required by Forest officials in implementing a proactive encroachment resolution program.

- Forest managers have made and should continue to make a concerted effort (within legal opportunities offered the agency) to obtain purchase and exchange funding for acquisition of those private and public properties which contribute to optimum land ownership.
- The following should be included in Plan standards and guidelines: 5400 Landownership, Surface Ownership. Eliminate unauthorized uses and occupancy of national forest land. Emphasis should be placed on resolving those encroachments involving residences and land uses degrading natural resources. Eliminate the Forest Consolidation Map and revise the prioritization list. Emphasize the acquisition of fee title or all available property rights during land adjustment activities.
- Processing and administration of special use permit amendments should be recognized in Forest planning and funding processes. Include amended special use permits as a required monitoring activity in the revised Plan. The preceding would be entered under Requirement "Determine the success in establishing desired surface and subsurface ownership patterns."

### **GEOLOGY AND MINERALS**

The Forest minerals program is operating at a low level due to the combination of a court injunction related to oil and gas leasing along with other sources for fluorite, coal and tripoli. The Forest is currently under Court injunction related to authorizing the issuance of oil and gas leases. Forest Plan revision is proceeding. Completion is expected during FY 2005.

The Forest does not provide adequate access to allow for mineral discovery, especially the discovery of oil and gas. Mineral prospecting for hardrock mineral has been a historic land use on the Forest; consequently, discovery of marketable minerals is not expected. Surface mining for coal and tripoli is occurring near the Forest. There is no evidence that these surface mining activities have encroached on national forest land. Mine subsidence is a threat to national forest surface based on historic deep mines for coal and tripoli.

Forest monitoring regarding Geology and Minerals covers four major program areas (1) oil and gas leasing (2) hardrock minerals leasing (3) reserved/outstanding rights and (4) providing geologic services.

- (1) Oil and Gas Leasing: Currently, the Forest has seven oil and gas leases covering an estimated 5,353.42 acres. No prospecting or development occurred within the leased area during FY03. The Forest is enjoined from authorizing the issuance of new leases by Court Order.
- (2) Hardrock Minerals: Currently, the Forest has one hardrock mineral lease for the mineral tripoli covering an estimated 10.01 acres and two hardrock mineral leases for the mineral fluorite covering an estimated 228.08 acres. No prospecting or development occurred during FY03. The Forest is working on analyses for leases on additional hardrock mineral prospecting applications.
- (3) Reserved and Outstanding Rights: The Forest did not analyze a proposal to occupy national forest surface to recover outstanding minerals during FY03. A congressional response was prepared related to the analysis of outstanding mineral rights that had been prepared during FY00.
- (4) Geologic Services: During FY03, the Forest shared a geologist with the Mark Twain National Forest. The shared services geologist prepared analysis of the disposal of land

in Elizabethtown, Illinois, along with input to two environmental assessments. The primary role of the shared services geologist was support for the revision of the Plan.

### **Conclusions**

- The hardrock mineral fluorite remains abundant on the Forest; however, national needs for this mineral are being met through imports. The demand for domestic supplies of this mineral is expected to remain low.
- The hardrock mineral tripoli remains abundant on the Forest. Analysis of national forest sources for this hardrock mineral may be needed during the next five years.
- Approximately 30 percent of the mineral estate beneath the national forest surface is reserved or outstanding. Nearly all of these privately held mineral estates prohibit surface mining. Land exchanges may be sought related to the development of private mineral estates that require the use of surface mining techniques, especially coal and tripoli.
- Oil and gas interest in the Forest may be increasing. The revised Forest Plan is expected to address oil and gas exploration related to federally owned minerals.

### **Recommendations**

- Revision of the cumulative effects section of the EIS that is a companion document to the revised Plan related to oil and gas leasing is a very high priority.
- Analysis of hardrock mineral application submitted through the Bureau of Land Management should consider the potential markets for the identified minerals.
- Reserved and outstanding rights are not adversely affecting the management of national forest surface; consequently, federal acquisition of these rights should be considered a low priority in all areas except the Ripple Hollow Wilderness Study Area.

### **TRANSPORTATION SYSTEM**

The Transportation System Management identified in the Forest Plan consists of managing a system of roads and trails that provide safe and efficient access for general public use and enjoyment of the Forest. The transportation system is to enhance all types of recreation opportunities, such as fishing, hunting, horseback riding, and wilderness visits.

The Forest continued to manage and maintain the transportation system in accordance with the Forest-wide standards and guidelines for FY2002. Due to funding constraints, no timber sales, and fire-borrowing needs, any reconstruction and/or maintenance work on existing roads and trails was performed at a minimum.

The Forest will continue to monitor the transportation system to compare the existing level of management and use to the original design standards. Any part of the transportation system not being managed as originally constructed for the Forest will use traffic rules to control or restrict its use in accordance with required regulations.

The Forest continues to decommission roads based on a 5-year schedule (FY02 to FY05) as submitted by the Districts.

The Forest had no right-of-way (ROW) needs since all roads that were either reconstructed and/or maintained abutted Forest land.

The Forest continues to address unknown road jurisdiction issues. A review and comparison of the road inventory data and GIS maps a majority of the unknown roads lead to Forest food plots.

Table 17. Forest transportation system accomplishments.

System	FY03 Miles	Forest Plan Proposed Miles
Road Construction	0	65
Road Reconstruction	2.0	129
Road Decommissioning	5.3	100
Equestrian/Hiking Trail Construction/Reconstruction	17	118
ATV/OHM Trail Construction/Reconstruction	0	140

### **Conclusion**

- Construction, reconstruction and maintenance levels on the transportation system were below the average Plan level due to low funding levels, fire-borrowing and no timber-sales. ATV/OHM trail construction/reconstruction has been put on hold due to a court injunction.

### **Recommendation**

- Increase budget levels to increase road construction, reconstruction and maintenance levels to meet Forest Plan goals.

## **FIRE MANAGEMENT**

### **Fire Occurrence**

During the spring fire season of 2003, fifteen fires totaling 48.1 acres occurred on or threatened national forest land. During the summer, two fires totaling 3.2 acres occurred on or threatened national forest land. In the fall fire season two fires for a total of .2 acres occurred on or threatened national forest land. Forest Service crews suppressed all fires. The total for the year was nine fires for 51.5 acres. The average size of these fires was 5.72 acres.

Assistance with suppression, mop up, staffing and initial attack efforts was provided by firefighting resources from the Golconda Job Corp Center, SIU, Hiawatha National Forest and Midewin National Engine Contract.

Table 18. Five-year average fire occurrence.

Fire Size Class	A	B	C	D	E	TOTAL
1999 Fires	9	10	7	0	0	26
Acres	6	31	159	0	0	196
2000 Fires	3	8	17	1	0	29
Acres	<1	17	450	106	0	573
2001 Fires	7	11	15	0	0	33
Acres	1	45	467	0	0	513
2002 Fires	8	18	3	0	0	29
Acres	2	44	44	0	0	90
2003 Fires	4	3	2	0	0	9
Acres	.5	11	40	0	0	51.5

**Fire Training Courses**

Basic firefighter training was provided through participating agreements with SIU and Southeastern Illinois College. No courses were offered this year.

**Prescribed Burning**

In 2003, prescribed burns for a total of 432 acres were accomplished.

**Dispatching**

During 2003, the Forest accepted the responsibility and role as the Illinois Interagency Dispatch Center through the development of an Inter/Intra Agency Agreement between the USDA Forest Service – Shawnee National Forest and Midewin National Tall Grass Prairie, USDI National Park Service – Lincoln National Historic Site and the USDI Fish & Wildlife Service – Region 3.

**Protection Area**

The Forest protects only national forest lands within the Forest boundary. We have mutual assistance agreements with Crab Orchard National Wildlife Refuge and Cypress Creek National Wildlife Refuge. In 2003, a total of 277,645 acres were protected. We do not protect private, county, state or other federal lands within or outside of our protection boundary. No Forest land is protected by other agencies.

**LAW ENFORCEMENT**

The Law Enforcement Organization on the Forest is comprised of a Patrol Captain, a Supervisory Law Enforcement Officer and two Law Enforcement Officers. The Forest is part of the Southwest zone that encompasses both the Shawnee and Mark Twain National Forest and Golconda Job Corps center for Law Enforcement Management. The program's main goal is to provide for visitor safety along with Forest resource protection.

During FY03 the law enforcement officers encountered 492 violations occurring on national forest land. Of those 492 violations 74 individuals were issued violation notices, 46 individuals were given written warnings. The other 372 violations were captured on incident report form to document the violations and to help management assess violations and address areas of concerns in protecting the forest resources and visitor safety.

Table 21 shows the number of incident reports (IR) and the number of violation notices (VN) by fiscal year, beginning in 2001.

Table 19. Law enforcement incident reports (IR) and violation notices (VN) 2001-2003.

Incident Type	FY01	FY02	FY03
Alcohol	IR-0 VN-0	IR-0 VN-0	IR-0 VN-2
Assault	IR-2 VN-0	IR-3 VN-1	IR-2 VN-0
Civil	IR-54 VN-14	IR-0 VN-3	IR-0 VN-0
Cultural	IR-0 VN-1	IR-3 VN-0	IR-0 VN-0
Drug Possession/ Use	IR-39 VN-0	IR-18 VN-0	IR-10 VN-10
Drug Possession/ Distribution	IR-2 VN-0	IR-9 VN-0	IR-15 VN-0
Fire	IR-0 VN-0	IR-45 VN-0	IR-15 VN-0
Fish and Wildlife	IR-0 VN-0	IR-3 VN-0	IR-14 VN-0
Forest Roads and Trails	IR-3 VN-6	IR-3 VN-0	IR-15 VN-0
General Forest Products	IR-0 VN-0	IR-1 VN-0	IR-0 VN-0
Interference with Officials	IR-0 VN-1	IR-0 VN-5	IR-1 VN-7
Livestock	IR-35 VN-0	IR-4 VN-0	IR-4 VN-0
Occupancy and Use	IR-0 VN-23	IR-37 VN-11	IR-41 VN-10
Off-Highway Vehicles	IR-2 VN-1	IR-74 VN-25	IR-113 VN-18
Other	IR-34 VN-2	IR-67 VN-2	IR-75 VN-7
Paleo	IR-0 VN-0	IR-2 VN-0	IR-0 VN-0
Real Property	IR-3 VN-3	IR-59 VN-6	IR-32 VN-1
Sanitation	IR-2	IR-39	IR-49
Special Uses	IR-1 VN-0	IR-0 VN-0	IR-15 VN-0
Threat/Intimidation	IR-0 VN-0	IR-2 VN-2	IR-0 VN-0
Timber	IR-0 VN-0	IR-2 VN-2	IR-0 VN-0
Unknown	IR-217 VN-39	IR-0 VN-0	IR-1 VN-0
Wilderness	IR-0 VN-0	IR-2 VN-0	IR-2 VN-0

## **RURAL AND COMMUNITY DEVELOPMENT**

This year saw some major accomplishments in the rural development arena with the granting of economic recovery grant funds to several proposed projects and the initiating of Fish Tales, a conservation education program. Following is a synopsis of accomplishments for this fiscal year.

Our highly successful partnership with University of Illinois Extension Service, USFWS Cypress Creek National Wildlife Refuge, Southernmost Illinois Delta Empowerment Zone, IDNR, Shawnee Community College and Coalition for Community Services in hosting Fish Tales continued this year. This is a conservation education program targeting underserved children in Polaski and Alexander counties. The program has three objectives, (1) to provide a recreational opportunity for underserved children by teaching them how to fish, (2) to use fishing as a springboard for teaching conservation stewardship and ethic, particularly related to aquatic ecosystems and (3) to provide a positive experience with memories to last a lifetime. This program won a Regional Honor Award and a Rise to the Future Award.

The Forest worked with Alexander, Galletin, Hardin, Pope, Polaski and Saline Counties to develop and submit economic recovery plans. We worked with these same counties to submit three Economic Recovery Program grant proposals. We participated in Johnson County Chamber of Commerce supported community events. We have made contact with Southern Illinois Tourism Council to identify possibilities for partnerships. We have an agreement with the Elizabethtown Smiley Christmas Community Cookout. This is an organization that makes certain that every child in the county has a Christmas present and if a home burns down, the family is aided to getting immediate relief for clothing and food. And, finally, we have a grant with Vienna School to build a Smokey fire sign.

### **Conclusion**

- This program demonstrates a successful and continuing opportunity for Forest Service staff to help rural communities in and around the Forest to form community action teams, to develop or update existing community plans and to continue implementing projects identified in certified community action plans that will foster sustainable economic development based on natural resources.

### **Recommendation**

- Continue this program.

## V. REFERENCES

- Fox, Douglas G; Bernabo, J. Christopher; and Hood, Betsy. 1987. Guidelines for Measuring the Physical, Chemical, and Biological Condition of Wilderness Ecosystems. General Technical Report RM-146. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO 80526. 48 pp.
- Illinois Department of Natural Resources. 1998, 2000-2003. RiverWatch Data.
- Illinois Environmental Protection Agency. 1998. Illinois Annual Air Quality Report 1997. IEPA/BOA/98-013.
- Illinois Environmental Protection Agency. 2001. Illinois Annual Air Quality Report 2000. IEPA/BOA/01-007.
- Illinois Environmental Protection Agency. 2003. Illinois Annual Air Quality Report 2002. IEPA/BOA/03-015.
- Illinois Environmental Protection Agency. 2004. Recommended Nonattainment Boundaries in Illinois for the PM<sub>2.5</sub> National Ambient Air Quality Standard. Available online at <http://www.epa.state.il.us/public-notices/2003/particulate-matter-recomendations/>.
- Illinois Environmental Protection Agency. 2002. Illinois Water Quality Report 2002. IEPA/BOW/02-006.
- USDA Forest Service. 2000. Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report. USDA Forest Service. 1992. Shawnee National Forest, Amended Land and Resource Management Plan, Harrisburg, Illinois.
- USDA Forest Service. 1990. Forest Service Manual 2500, Chapter 2580-Air Resource Management.
- USDA Forest Service. 1994. National Strategic Plan for Air Resource Management: Ensuring Effective Integration of Air Resource Considerations in Ecosystem Management of Natural Resources. U.S. Department of Agriculture, Forest Service, Washington Office, Air Resource Management Program. 11 pp.
- USDA Forest Service. 2004. Letter from Don English. Visitor Number Revisions for National Visitor Use Monitoring by Forest. Available at the Jonesboro-Murphysboro Ranger District Office.
- USDA Forest Service. 2002. National Visitor Use Monitoring Results. Shawnee National Forest. August, 2002. ([www.fs.fed.us/recreation/programs/nvum](http://www.fs.fed.us/recreation/programs/nvum)).
- USDA Forest Service. 1998. Sign and Poster Guidelines. EM-7100-15, Chapter 5. pp. 5-1 to 5-76. [http://fsweb.wo.fs.fed.us/eng/roads\\_trails/sign\\_poster\\_98/Ch5.pdf](http://fsweb.wo.fs.fed.us/eng/roads_trails/sign_poster_98/Ch5.pdf)