Daniel Boone National Forest

The Licking River Region

Daniel Boone National Forest

In the early 1930's, a number of farsighted Kentuckians, realizing that water, timber, and other of our natural resources were not inexhaustible, encouraged the State administration to take advantage of a Federal law enacted in 1911 that would provide for protection and management of forested areas of Eastern Kentucky. By 1934, when the first tracts were purchased creating the Cumberland Purchase Unit, the Weeks Law began to serve the people of Kentucky through its provisions protecting watersheds of navigable streams and insuring production of timber.

Since 1934, the Daniel Boone National Forest has grown to more than 584,155 acres, located in 21 Eastern Kentucky counties. The Proclamation Boundary (area in which the Secretary of Agriculture is authorized to purchase land) encloses 1,948,431 acres. Federal ownership represents about 35% of the land area. The Land & Water Conservation Act of 1965 has provided funds for the acquisition of lands which are primarily of value for outdoor recreation purposes.

To the east of the original Forest Proclamation Boundary are 4 of the 21 counties which collectively form a new unit, the Redbird Purchase Unit. Established in early 1965, this new unit includes Bell, Clay, Harlan, and Leslie Counties. Within the 4 counties are found headwaters of the South and Middle Forks of the Kentucky River. Of the 591,342 acres - within the Purchase Unit Proclamation Boundary, 96,345 acres are now under Forest Service management and protection. Lands within this Purchase Unit are purchased with funds provided by the Weeks Law of 1911.

The Forest Supervisor, as chief Forest Officer, representing the Forest Service of the Department of Agriculture, administers the lands within the National Forest. A staff of professional foresters, engineers, landscape architects, surveyors and teachers, as well as business management and clerical personnel, plus 7 District Rangers, and a Civilian Conservation Center Director, aid the Forest Supervisor in fulfilling his responsibilities in managing and protecting National Forest property.

Operating funds for the Daniel Boone National Forest amounted to $3,724,000 for fiscal year 1972. 179 full-time and 65 part-time people are employed on the Forest. Towns and cities within and near the Forest Proclamation Boundary benefit from money spent by these Forest workers for supplies and services required by their families. Money spent beyond salaries and wages also finds its way into hands of local business through purchase of supplies and equipment used on National Forest projects, and for a Civilian Conservation Center operated by the Daniel Boone National Forest.

The Forest Supervisor is responsible for supervision and guidance of the Pine Knot Civilian Conservation Center in McCreary County. Operating funds allotted to this Center in the amount of $1,035,000 represent money to be spent in fiscal year 1972 for salaries, services and supplies. A major portion of these funds is expended in Kentucky, and benefit Kentucky communities and Kentucky businesses. The living allowance granted to Corpsmen at the Center ($59,000 annually) also represents money spent in Kentucky communities for personal supplies, services, and for recreation.

The presence of a National Forest in Kentucky attracts numerous projects authorized by Congress for emergency and rural area development. Among those programs of past years that made a direct contribution to local communities of Eastern Kentucky is the Accelerated Public Works Program (APW), in which the Daniel Boone National Forest participated extensively. Present programs in which the Forest participates include: Mainstream, Neighborhood Youth Corps and Youth Conservation Corps.

Sound forest management practices dictate the conditions under which National Forest land is protected and improved. To supplement this concept of management, Congress passed the Multiple Use-Sustained Yield Act in 1960, which now governs the protection and improvement of all forest resources -- timber, water, wildlife, and recreation. The aim is to manage forest land to produce the maximum values in products and services in a harmonious relationship.

In fiscal year 1971, more than 31,000,000 board feet of National Forest timber were marked and sold to support wood-using industries of Eastern Kentucky. Under revenue-sharing regulations of the Department of Agriculture, 25% of money received from timber sales is returned to counties in proportion to the number of National Forest acres in the respective counties. In 1970, the sum of $83,258.86 was sent to the Kentucky State Treasurer for distribution to 21 counties for benefit of public school and public roads.

An intensive survey of soil restoration needs to protect and improve the soil and water resources of the Daniel Boone National Forest and adjacent areas has been made. Many acres of eroded gullies on abandoned farmland and mining areas were seeded to check waterflow, and to stabilize soil. To improve stream channel stability and water quality, sediment and debris were cleared from 10 miles of trout streams located within the Daniel Boone National Forest. During the harvesting of timber and construction of logging roads, every effort is made to prevent loss of water-holding capacities of the forested areas, and the eroding of roads used for timber hauling.

An agreement between the Daniel Boone National Forest and the Kentucky Department of Fish & Wildlife Resources has resulted in the coordination of the Forest's timber management program with wildlife habitat improvement. The work of maintaining high water quality in the streams and lakes is instrumental in providing Kentucky and out-of-State fishermen with good fishing. Management for deer, turkey, squirrel, grouse, and other forest game is another important phase of the cooperative work with the Department of Fish & Wildlife Resources. It accounts for many of the dollars that are spent in Kentucky in payment for hunting and fishing opportunities found on the Daniel Boone National Forest.

There are now 69 developed recreation sites on the Forest which provide numerous opportunities for outdoor enjoyment. These sites provide facilities for boat launching, camping, picnicking, and viewing of outstanding scenery. In addition, the entire Forest acreage provides many opportunities for hunting, fishing, hiking, sightseeing, picture-taking, nature study, and general enjoyment of the natural environment. During 1970, the Daniel Boone National Forest received 988,600 visitor days of

recreation use. Of this amount, 21.2% represented hunting and fishing activities. It is expected that recreation use on the Forest will double or triple in the years just ahead. Plans are being prepared to provide additional recreational facilities at existing, as well as at newly designated, sites.

The ultimate worth of the Daniel Boone National Forest rests in its presence as a demonstration of what can be accomplished through management of its resources to improve the natural environment. No less important is the protection that is given to the headwaters and watersheds of the major streams that now form the principal source of water for cities and towns.

September, 1971

THE DANIEL BOONE NATIONAL FOREST
KENTUCKY

General Report to the Public
for 1992

To Our Friends

Dear Friends:

I'm pleased to share with you a summary of the Daniel Boone National Forest's 1992 accomplishments and to provide you with an update on the progress that we are making in implementing our Forest Land and Resource Management Plan.

I'm very proud of the resource management that is occurring on the Forest. The goods and services provided by the Daniel Boone National Forest enrich the lives of citizens of the Commonwealth and the Nation.

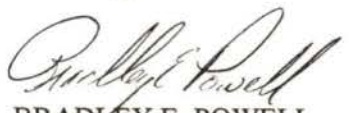
We continue to make innovative changes in our management to meet the changing needs of the American people. A highlight of this year's accomplishment is the emphasis that we are placing on an ecological approach to management. This approach insures that all aspects of the Forest ecosystem are integrated into our decisionmaking process.

Some other highlights of this year's program are the continuing restoration of Gladie Cabin and the Tater Knob Fire Tower and also, creation of artificial wetlands, inventory of hundreds of caves, and thousands of acres surveyed for cultural resources and threatened and endangered species. We are continuing to use a shelterwood system for the harvest of timber. We will continue to strive for innovation in Forest management but our management actions will be biologically sound and be beneficial to the long-term health of the Forest ecosystem.

Working in cooperation with groups and individuals who have an interest in the management of the Daniel Boone National Forest has been a priority for us. I want to thank those who have worked as partners with us during 1992. Without your help many of our accomplishments would not have been possible. We look forward to continuing these cooperative efforts in the future.

I invite you to come by and visit us. We welcome the opportunity to discuss the management of Kentucky's only National Forest. Please contact us if you have any questions concerning this Report. We look forward to working with you in the future.

Sincerely,



BRADLEY E. POWELL
Acting Forest Supervisor

Daniel Boone National Forest

ABOUT THE DANIEL BOONE NATIONAL FOREST

The Daniel Boone National Forest is located in the eastern Kentucky mountains and covers portions of 21 counties and over 670,000 acres. The land is generally rugged and characterized by steep slopes, narrow valleys, and over 3,400 miles of cliffline. The Forest has the distinction of being located within a six hour drive of 23 million people. Popular activities include fishing, horseback riding, rock climbing, sightseeing and more. The Forest is actively involved in the protection and inventory of cultural resources, wilderness, watershed protection and monitoring, mineral leasing, wildlife management, and timber management. The most valuable resources on the Forest are the employees and volunteers of the Daniel Boone National Forest.

The Daniel Boone National Forest is administered by a Forest Supervisor, seven District Rangers, and two Job Corps Civilian Conservation Center Directors whose offices are at the following locations:

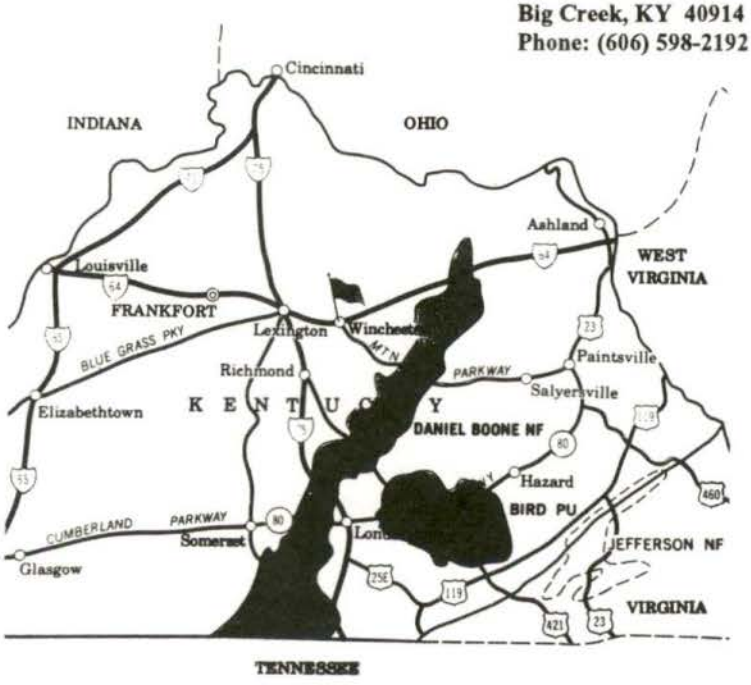
Forest Supervisor's Office
Forest Supervisor Richard Wengert
Daniel Boone National Forest
100 Vaught Road
Winchester, KY 40391
Phone: (606) 745-3100

Berea Ranger District
District Ranger Richard Wilcox
U.S. Forest Service
1835 Big Hill Road
Berea, KY 40403
Phone: (606) 986-8434

London Ranger District
District Ranger John Strojan
U.S. Forest Service
U.S. Highway 25 South
P.O. Box 907
London, KY 40743
Phone: (606) 864-4164

Morehead Ranger District
District Ranger Dave Manner
U.S. Forest Service
P.O. Box 910
Morehead, KY 40351
Phone: (606) 784-6428

Redbird Ranger District
District Ranger Dennis Daniel
U.S. Forest Service
HC 68, Box 65
Big Creek, KY 40914
Phone: (606) 598-2192



Somerset Ranger District
District Ranger Jerry Stephens
U.S. Forest Service
156 Realty Lane
Somerset, KY 42501
Phone: (606) 679-2018

Stanton Ranger District
District Ranger Donnie Richardson
U.S. Forest Service
705 W. College Ave.
Stanton, KY 40380
Phone: (606) 663-2852

Stearns Ranger District
District Ranger Mike Melton
U.S. Forest Service
Hwy. 27 North
P.O. Box 429
Whitley City, KY 42653
Phone: (606) 376-5323

Pine Knot Job Corps Civilian Conservation Center
Center Director Omar Rogers
Pine Knot, KY 42635
Phone: (606) 354-2176

Frenchburg Job Corps Civilian Conservation Center
Center Director Andrew Cainion
Highway 77
HCR 68, Box 935
Mariba, KY 40345
Phone: (606) 768-2111

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Summary of Monitoring and Evaluation Efforts

All implementation monitoring on the Forest continues to indicate a very high level of compliance with Forest Plan direction.

During fiscal year 1992, Forest staff officers and resource specialists conducted a week-long integrated resource management (IRM) review on the Stanton and Somerset Districts. The Forest conducts these reviews on two or three Districts each year as part of the monitoring program. These IRM reviews accomplish two of the three types of monitoring the Daniel Boone is involved in, implementation and effectiveness.

Implementation monitoring verifies that the standards and guidelines in the Forest Plan are being applied as intended. Another way of looking at this type of monitoring is that it assures managers that the Forest is in compliance with its Forest Plan direction. Besides the implementation monitoring done during the IRM reviews, the Forest constantly monitors implementation of standards and guidelines through informal resource reviews and contract inspections. All implementation monitoring on the Forest continues to indicate a very high level of compliance with Forest Plan direction.

Effectiveness monitoring is conducted after implementation monitoring has verified that the intended standards and guidelines are being applied. This "second level" of monitoring is designed to verify that the standards and guidelines are having the desired effect when they are applied. For example, soil and water specialists determine whether the Forest Plan standards and guidelines for soil and water management are effective in protecting soil productivity and water quality. Effectiveness monitoring is commonly accomplished on a sample basis.

The third type of monitoring is called validation monitoring. This type is often research oriented and designed to determine whether certain assumptions and estimates in the Forest Plan were correct. Because this type of monitoring involves more formalized research, it is generally conducted by, or with the assistance of, the Research branch of the Forest Service or by research personnel from area universities. In fiscal year 1992 the Daniel Boone National Forest entered into an agreement with the University of Kentucky to conduct research into the effects of shelterwood harvesting as part of the Forest's New Perspectives demonstration area on the Morehead Ranger District. The study will look at the response of vegetation and wildlife to the harvest treatment.

Forest staff officers and resource specialists also conducted one-day reviews of the Morehead, Berea, Stearns, and Redbird Districts to examine their application of the requirements contained in the National Environmental Policy Act (NEPA). Two projects were examined on each District to see if the process dictated by NEPA was followed and whether the actions in the NEPA decision document were carried out as intended. The reviews found generally good application of the NEPA requirements at all four Districts. Forest-wide training in NEPA skills is scheduled for fiscal year 1993 to provide the necessary knowledge to newer employees and to provide for the continued enhancement of the environmental analysis and decision-making skills of our more experienced managers and specialists.

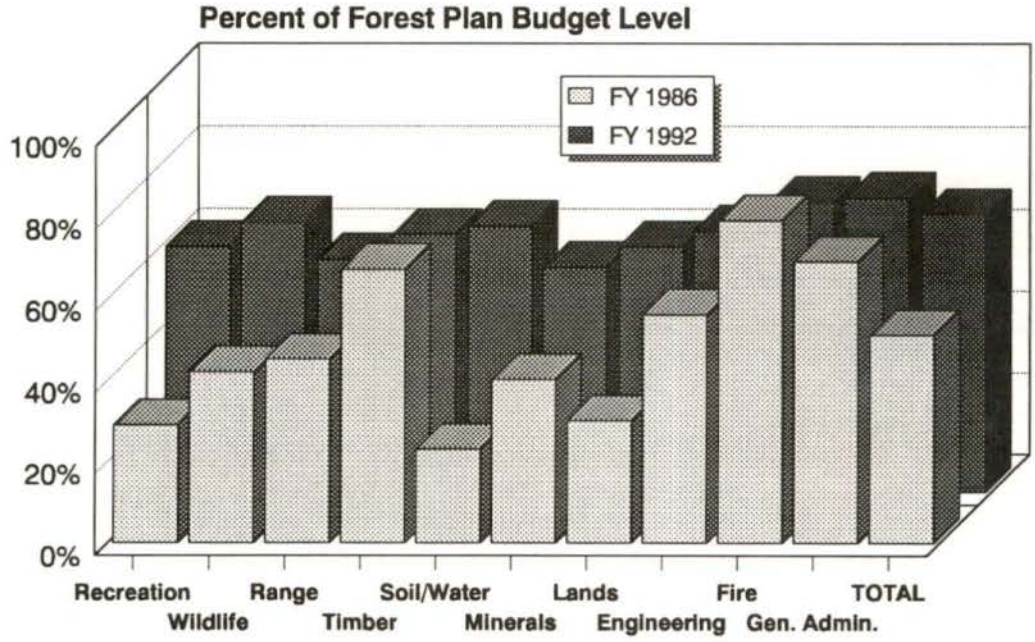
The Daniel Boone's budget, along with most National Forests across the country, continued a trend of increases in the budgets for recreation, wildlife, soil/water/air, minerals, and lands; and moderate decreases in the budgets for timber and engineering. This trend corresponds to two of the four high-priority themes for the 1990 Forest and Rangeland Renewable Resources Planning Act (RPA), which serves as a

long-term strategic planning guide for the Forest Service. Two of the identified themes are enhancing recreation, wildlife, and fisheries resources; and ensuring that commodity production is environmentally acceptable. The total budget for the natural resource programs decreased from fiscal year 1991 by 3.5 percent (after adjusting for inflation), although the total Forest budget, including the human resource programs, increased by 1.3 percent.

Funding for the natural resource programs as a percentage of the Forest Plan level budget dipped slightly from 70 percent to 69 percent. This means that the Forest was funded at 69 percent of the level estimated that would be necessary for full implementation of the direction and programs in the Forest Plan.

A summary of the outputs produced by the Daniel Boone National Forest in fiscal year 1992 can be found on Page 30 of this Report. Many of these accomplishments are also discussed in some detail in the narratives for the respective resource. A copy of the 1992 Monitoring and Evaluation Report for the Daniel Boone National Forest can be obtained by contacting the Daniel Boone National Forest, Forest Supervisor's Office, 100 Vaught Road, Winchester, KY 40391.

The balance of funding for the various resource programs has improved dramatically since 1986. In 1992 all programs were funded somewhere between 55 and 72 percent of the level that would enable full implementation of the Forest Plan. In 1986, the first full year of Forest Plan implementation, the range was from 23 to 79 percent.



Resource Accomplishment: Striking a Balance

The Daniel Boone, along with other Forests in the Southern Region, has started moving toward a more ecological approach to management. This means various resource areas are looked at in a broader context—all aspects of the ecosystem are taken into consideration when a decision is made. Knowledge of all resource areas is necessary in formulating decisions. For that reason, an interdisciplinary team of resource specialists is called upon to provide input and assistance on resource decisions. With the Forest Land and Resource Management Plan providing the framework, agency land managers seek to strike a balance among the resources that will best match the public's needs and values.

The Daniel Boone National Forest manages Cave Run and Laurel River Lakes--both well known for outstanding boating, fishing, and other water-based activities.

Recreation

Providing the Public with Developed Recreation Opportunities

Visitor use at developed campgrounds, picnic grounds and group use areas increased during fiscal year 1992. Swimming use, however, declined slightly.

The total recreation use of the Forest for both developed sites and dispersed areas was 2,111,100 recreation visitor days (RVDs). A recreation visitor day is the equivalent of one person using the Forest for 12 hours. The Forest hosted an estimated 5,278,000 visitors in fiscal year 1992. Although most of the use continues to occur between Memorial Day and Labor Day, observation indicates that there is an increase in visitor use in the fall, winter and spring seasons.

Efforts to provide a higher quality experience to users and to serve those with disabilities continued at an increased pace. Emphasis was placed on rehabilitating Koomer Ridge and Bee Rock campgrounds. Repairs of tornado damage at Sky Bridge continue and will be carried over into fiscal year 1993. Also, providing recreation facilities that are accessible to visitors with disabilities continues to be a priority.

The Cradle of Forestry in America Interpretive Association (CFAIA) continues to operate the Zilpo Recreation Area on Cave Run Lake and was recently awarded a new special use permit to continue operation of five recreation areas on Laurel River Lake.

Partnerships are providing the necessary grass roots support to develop facilities for visitors which are currently under-served. For instance, the Daniel Boone Distance Riders, representing the Kentucky Horse Council, are working with the Forest to construct facilities

designed to better serve visitors using horses. A shooting range in Whitley County was completed in cooperation with the Bald Rock Volunteer Fire Department. Another shooting range is being built on National Forest land by a partnership between the Pulaski County Fiscal Court, Beaver Creek Sportsman Club and the Forest.

Volunteers continue to provide valuable support to the developed sites program through service as Campground Hosts. Forest visitors welcome the ready source of helpful information and knowledge cheerfully supplied by the hosts.

Cooperative efforts by the Forest Service and its partners resulted in outstanding benefits for recreation visitors. The team concept provided higher quality facilities and a better level of customer service.

Telling the Forest Story

A program to revitalize the Forest interpretive program is well on its way to achieving its goals. For instance, an interpretive program guide was completed this year which gives guidance and establishes priorities to the overall program.

The following accomplishments were achieved in fiscal year 1992:

- Exhibits were installed in the Morehead District Office.
- Exhibits were installed as part of a community museum in the Old Stearns Hotel.
- Tater Knob Fire Tower was rehabilitated.
- Day and evening programs were presented at Twin Knobs Recreation Area and Holly Bay Campground.
- Interpretive programs, including night time canoe trips, were conducted on Laurel River Lake.
- Naturalists from Natural Bridge State Park and Koomer Ridge Forest Service Campground participated in interchange programs.
- Planning, construction and programs continue at the Gladie Historic Site on the Stanton Ranger District. An interpretive plan was completed for exhibit at the site. A contract for a visitor center design was awarded September 30, 1992.

The Forest Service offers opportunities for visitors to learn more about their environment through the enhanced interpretation program. The public gains a better understanding about natural interactions because of these interpretive efforts.

Tater Knob Fire Tower helps tell the story of fire suppression through the years.

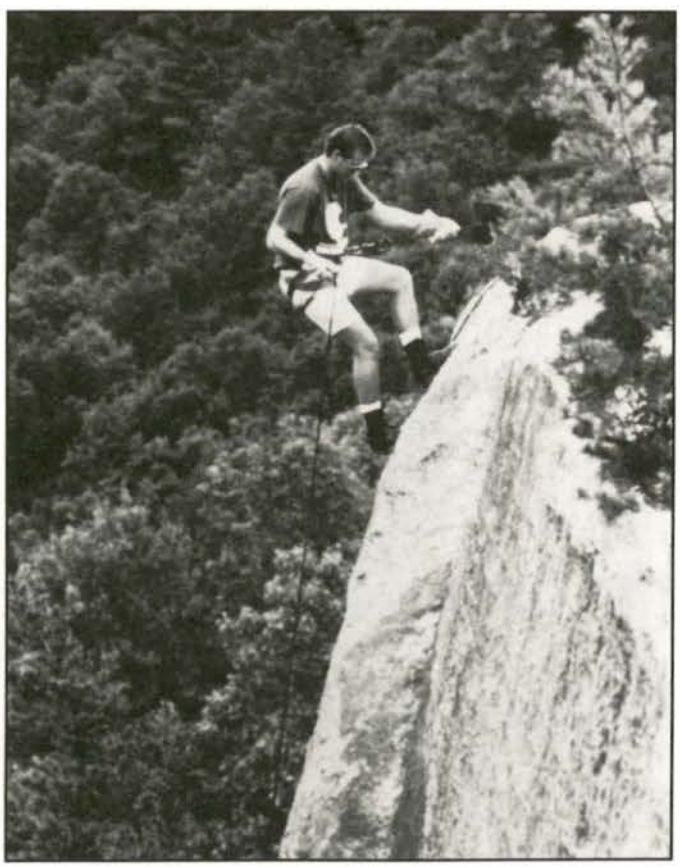
Dispersed Areas and Trails

Recreation use overall was less than predicted in the Forest Land and Resource Management Plan; however, use of the dispersed areas of the Forest continued at a high level. Dispersed recreation activities include hunting, fishing, hiking, horseback riding, off-highway vehicle use, gathering forest products and driving to view scenery and wildlife.

During the year, 208 miles of trails were maintained. This goal was accomplished not only through regular Forest Service programs, but also through contributions by participants in special programs, such as the Youth Conservation Corp, the Summer Youth Program, the Touch America Program and volunteers. Maintenance work focused on bringing trails up to a standard that will accommodate the targeted trail users and protect the natural resources. Maintenance consisted of brushing, reassurance marking, tread repair, reconstruction of segments damaged by severe storms in 1991, and reconstruction to assure some trails meet standards for off-highway vehicle use.

In fiscal year 1992, 19 miles of new trail were constructed. These new trails met a variety of needs. For instance, a section of the Sheltowee Trace National Recreation Trail was relocated from a highway to a forest environment. Other sections of the Sheltowee Trace National Recreation Trail damaged in a 1991 storm were reconstructed and loop trails were created—a need identified in the Forest Land and Resource Management Plan. Additionally, sections of the trail were made suitable for motorized use in appropriate locations.

A need to provide improved direction for implementing the Forest Plan direction in managing the trail systems on the individual Ranger Districts was identified in 1991. Individual district trail management guides were started in 1991 and completed in 1992. Implementation of guides will improve the trail management program on the Forest. The guide sets priorities for trail maintenance, reconstruction, construction, and operation that will respond to user needs and will be consistent with the direction provided by the Forest Plan.



Rock climbing is one of the many dispersed recreation activities available on the Daniel Boone.

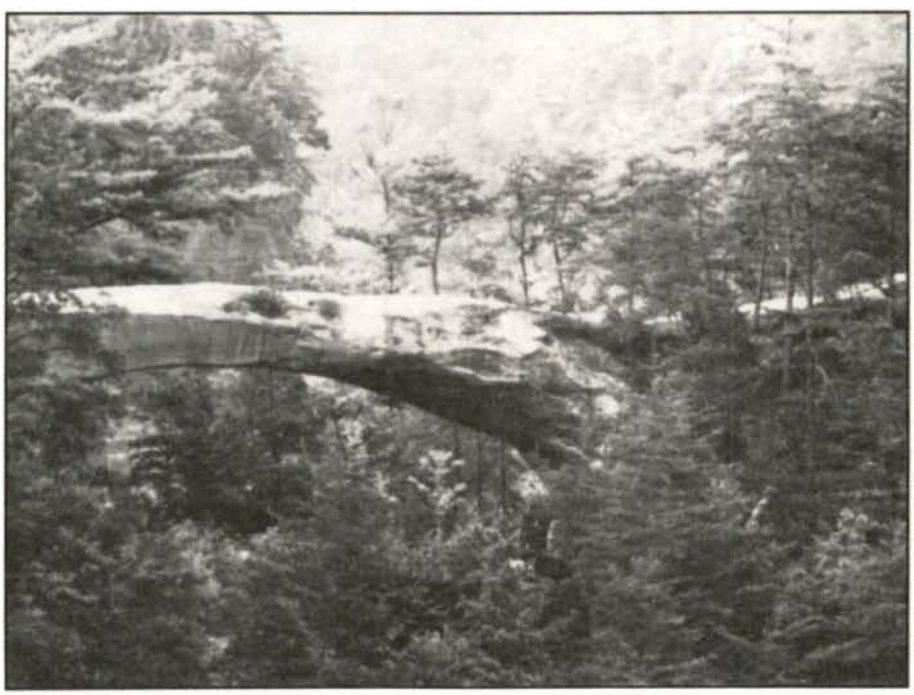
Wild and Scenic Rivers

A Wild and Scenic Rivers Environmental Impact Statement (EIS) and suitability study is in progress on the Daniel Boone National Forest. In 1991, eligibility and classification studies were completed on segments of six rivers on the Daniel Boone National Forest. Segments of the Cumberland River, Marsh Creek, Rock Creek, the Rockcastle River, South Fork of Station Camp Creek, and War Fork of Station Camp Creek are now under study for suitability. The result of the EIS and suitability study will determine which, if any, of the six study river segments should be recommended to Congress for addition to the National Wild and Scenic Rivers System. The draft EIS and suitability study will be completed in 1993.

Caves

The Karst topography and the associated cave resources are extensive on the Daniel Boone National Forest. The Forest Service is in the process of developing cave resources management regulations. These regulations will provide guidance for the implementation of the Federal Caves Resource Protection Act.

The Forest is working in cooperation with an organization called the Boone Karst Conservation Task Force, which was established to coordinate volunteer activities by the several caving clubs that use the area. Volunteer activities include locating caves on the Forest, surveying caves for the Forest Service, and participating in activities such as gating caves for the protection of threatened and endangered species.



Over 80 natural arches can be found on the Daniel Boone.

Wilderness

The Daniel Boone National Forest manages two Wildernesses, Beaver Creek (4,791 acres) and Clifty (11,662 acres). The areas are managed to preserve the natural environment, to provide solitude and challenge to recreation visitors and as a place for scientific study. In 1992, twenty-three miles of wilderness boundary in both Wildernesses were marked according to Forest Service standards. Camera points and monitoring sites were established to detect changes in the wilderness characteristics or condition. These additional sites were set up to supplement the camera points and monitoring sites established in 1990.

Visitors of all ages enjoy hiking, wildlife viewing, and solitude of the Forest.

A seasonal Wilderness Ranger was employed for the second consecutive year in Clifty Wilderness. The Wilderness Rangers for Clifty Wilderness and Beaver Creek Wilderness made contacts with wilderness users, implemented the Limits of Acceptable Change (LAC) Guide, and monitored camera points and campsites for changes that would require action. Several camping sites were closed and rehabilitated to re-establish a wilderness condition. Campsites closed and rehabilitated in 1990 and 1991 are monitored to determine if they are reverting back to a wilderness condition. Monitoring and rehabilitation (naturalizing) of other campsites continue, as directed in the LAC Guide, to protect the wilderness characteristics while providing adequate areas for campers.

Volunteers worked in both Wildernesses to pick up litter, rehabilitate frequently used areas, perform trail inventories, contact visitors, maintain trails, and talk to the public about low impact camping techniques. In cooperation with the public television station KET, a program on wilderness values was televised and copies of the video were made available to local schools.

A proposed amendment to the Forest Plan with Standard and Guidelines for improved management direction of these Wildernesses is under development.

Heritage Program—A Glimpse Into the Past

The principal goals of the Daniel Boone's Heritage Program are to: identify and protect historic and prehistoric cultural resources; increase the understanding of our nation's heritage; and provide for its future interpretation. To this end, the following program enhancements and accomplishments were completed.

A total of 11,405 acres were surveyed and reported to the State Historic Preservation Office, in keeping with Section 106 of the National Historic Preservation Act. During these surveys, 489 new archaeological sites were recorded, of which 252 are considered potentially eligible for listing on the National Register of Historic Places. The National Register of Historic Places is a distinctive list identifying properties worthy of saving for their historic value and documentation of the story of our nation.

Thirteen additional sites were evaluated to determine their eligibility for listing on the National Register of Historic Places. One of these sites produced some of the earliest evidence of the beginnings of agriculture in the eastern United States at around 1,000 B.C.

Three Challenge-Cost Share partnerships were implemented to evaluate and enhance the Forest's cultural properties in cooperation with universities, and historical and archaeological societies.

An ongoing and multi-faceted public education program continued including public awareness programs at campsites; a "Living Rockshelter Weekend" in the Red River Gorge Geological Area; presentations to schools, historical societies, professional and amateur archaeological organizations; and a mentor program for high school seniors. Volunteers have assisted the cultural resource program in field inventory, drafting, artifact illustrations and report preparation which greatly facilitated accomplishment of cultural resource projects.

An archaeologist will work on each district of the Daniel Boone National Forest beginning in fiscal year 1993.

Public Awareness programs such as the "Living Rockshelter Weekend" are unique ways to spread the word about the values of cultural resources.

Timber

Improving Forest Health

Aldo Leopold once said, the best definition of a conservationist is written not with a pen, but with an axe. The axe has been replaced by the chainsaw, but the timber management program continues to be the vehicle for accomplishing a number of conservation goals, not the least of which is improving the health of the Forest.

As portions of the Forest mature, the trees are carefully harvested and regenerated to a new Forest for future generations. This regeneration process requires professional coordination among several disciplines in deciding which trees to leave and which to harvest. Last year, a new Forest was begun on 4,919 acres, less than one percent of the land suitable for timber production on the Forest. The timber harvested last year sustained 410 jobs and generated $14,180,000 in income. Over 1,000 families obtained firewood from the National Forest.

About 79 percent of the volume harvested was utilized for lumber. Prices paid to the Forest Service for sawtimber have increased dramatically over the past year. Of the $2,160,829 received for the sale of timber last year, $534,924 was returned to the counties for schools and roads.

The overall health of the Forest continues to improve through careful management. Each year, scars from pre-National Forest management land abuse are eliminated.

Timber is primarily harvested through a two-age shelterwood method such as this.

Caring for the Land

As in past years, the two-aged/ shelterwood method of timber management was the primary method of timber harvesting on the Forest. The key feature of this system is that trees are left after harvest for another century, while at the same time, a new forest grows from the forest floor. Additionally, a wide array of wildlife species benefit from this method.

A research project, in cooperation with the University of Kentucky, was installed last year on the Morehead District to test the effects of the two-aged/shelterwood method on all types of wildlife. We are eagerly awaiting the results of this project so we can continue to improve our management.

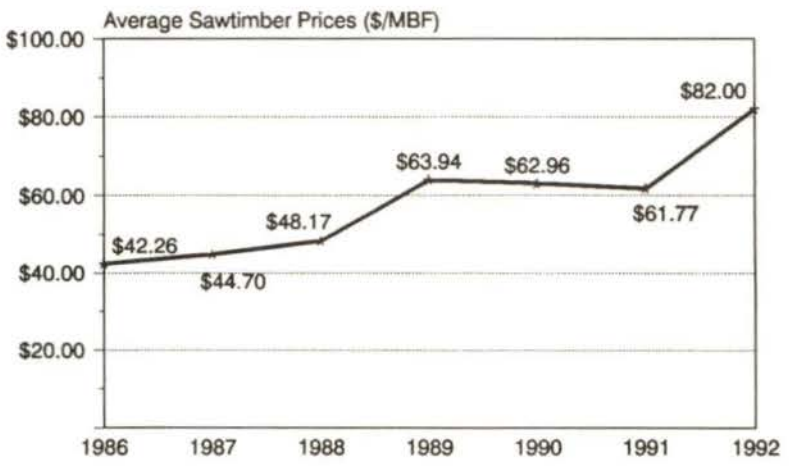
As the Forest continues to implement ecosystem management, the timber management program is becoming a cooperative effort among foresters, wildlife and fisheries biologists, archeologists, landscape architects, botanists and other specialists. Last year, funds from the timber program were used to survey over 5,000 acres for threatened and endangered species and approximately 10,000 acres for cultural resource sites. Over 426 archeological sites were discovered and protected in conjunction with the timber program.

We are keenly aware that each management action, or lack thereof, has an impact on future generations. We are committed to good land stewardship and are determined that the forest our children inherit will be diverse and productive.

Producing Forest Products

Last year 38.3 million board feet of timber was harvested from the Daniel Boone National Forest. Of this amount, 79 percent was sawtimber and the remainder was small roundwood used for producing wood chips, posts and poles, and firewood. Most of the sawtimber was manufactured into hardwood lumber which, besides being utilized by local industries, enjoys a strong world-wide market. The remaining sawtimber, about 30 percent, was comprised of yellow pine and hemlock, species which are used locally for barn and house construction. Of the $2,160,829 received from the sale of this timber, $534,924 was returned to the counties for use in both road and school projects. It is estimated that over 410 people were employed locally to harvest and manufacture this resource.

As the Forest continues to implement ecosystem management, the timber management program is becoming a cooperative effort among foresters, wildlife and fisheries biologists, archeologists, landscape architects, botanists and other specialists.



The average price paid for a thousand board feet (MBF) of sawtimber on the Daniel Boone National Forest has nearly doubled between 1986 and 1992.

Timber Sale Program Information Reporting System, Fiscal Year 1992

The Timber Sale Program Information Reporting System (TSPIRS) is an accounting system, developed under the oversight of the General Accounting Office, which addresses the costs and revenues associated with the management of the National Forest timber sale program. There are three parts to the report: One part is the yearly cash-flow, which displays revenues and expenses for the timber program only. Another section displays the present net value of future effects of the current year timber program on a variety of resources—both market and non-market. The final part gives an estimate of the value of the timber sale to the local economy. (Reports one and two can be found on pages 28 and 29.)

Each of the three report sections is related. To simplify, they will be called report one, two or three. When report two (the present net value of future effects) and report three (the value of the timber sale to the local economy) are considered along with the cash-flow report, the timber sale program clearly is beneficial. A great deal of the overall wildlife habitat work is accomplished through the timber sale program, allowing the Forest to spend limited wildlife funds on habitat work in areas where timber is not being harvested. Most of the surveys for threatened and endangered species, as well as archeological resources, are accomplished in connection with the sale of timber. Each sale area is routinely surveyed prior to any action. Most of the archeological sites and endangered species habitat known to exist on the Forest were discovered in conjunction with timber sales.

Twenty-five percent of all our timber sale revenue goes to counties in which the National Forest is located, and is to be used for roads and schools.

Another factor affecting current cash flow is the extra expense associated with bringing the lands that are suitable for timber production into a managed condition. Many of the Forest's acres were abused prior to the establishment of the National Forest. The result today is a higher number of trees of poor quality for producing timber products. Revenues from the timber program will be affected until a forest with higher quality timber is established.

Local counties received $646,280 from all Forest revenues generated in 1992.

The Forest is continuing to aggressively cut costs of the timber program and to enhance revenue. The net results in report one for fiscal year 1992 shows an improvement of $22,190 over 1991.

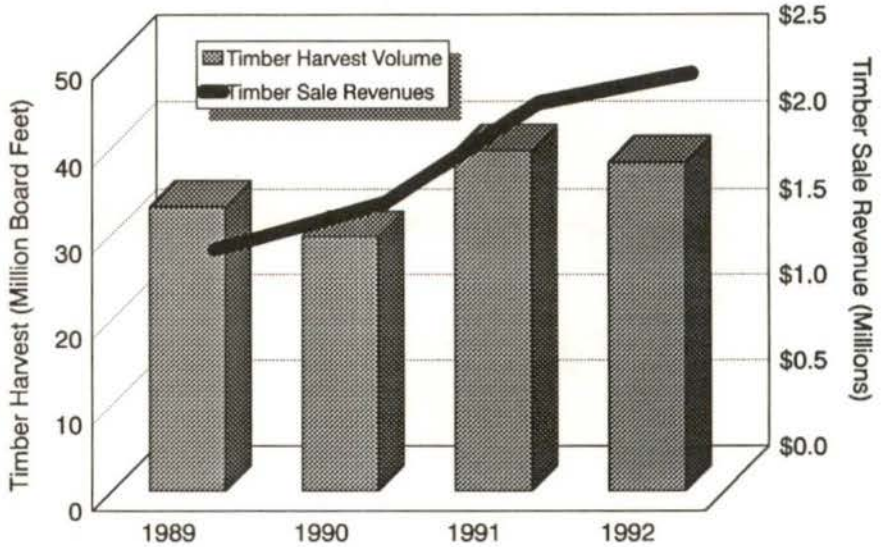
Wildlife Benefits Related to Forest Regeneration

It is important to note that timber is not harvested solely to produce products. Fundamentally, timber harvest and regeneration recycles mature stands of trees back to young seedlings and saplings. This provides habitat for a group of wildlife species not found in the mature forest, including some of the neotropical migrant songbirds. The variety of age-classes and vegetation types results in habitat for wildlife as described in the Forest Plan. Thus, timber harvesting favorably affects some species and negatively impacts others, but continuously provides habitat for all forest species. This harvesting process mimics natural disturbance processes, while providing products for the American public. This renewal process must occur in order to maintain and enhance the diversity of the Forest.

It is virtually impossible to assign an economic value or measure the wildlife benefits of the timber sale program—after all, wildlife is valuable for a multitude of reasons. Therefore, only the projected habitat change in primary forest game species and improved opportunities in non-game viewing were estimated and valued.

The variety of age-classes and vegetation types results in habitat for wildlife as described in the Forest Plan.

Timber sale revenues on the Forest increased for the fourth straight year, even though the level of harvest decreased slightly from 1991. This continued increase was a result of increases in the value of the products harvested.



Contributing Pure Water, Air and Stable Soil

The Forest is firmly committed to maintaining and/or enhancing soil productivity, water quality and air quality. The fiscal year 1992 Soil, Water and Air Program was supported by a $684,632 budget.

This year's activities included:

- Conducting soil surveys and stream inventories
- Monitoring timber harvesting and other activities
- Watershed improvement and restoration of abandoned roads and acquired lands
- Watershed improvement maintenance on past project work
- Floodplain and wetland analysis of land adjustment proposals
- Watershed inventory and analysis
- Water quality monitoring
- Operation and maintenance of an artificial wetland completed in fiscal year 1988 to treat acid mine drainage
- Coordination and cooperation with federal and state regulatory and resource agencies in support of soil, water and air programs
- Improving the Forest Land and Resource Management Plan's Standards and Guidelines for soil and water
- Utilization of two soil scientists, a hydrologist and an air resource specialist in support and evaluation of other resource programs

Over 500 miles of streams such as this can be found on the Daniel Boone National Forest.

Soil/Water Cooperators:

Soil Survey

The Soil Conservation Service, under a reimbursable agreement, continued an update or modernization of older soil mapping on about 18,000 acres of National Forest System lands in Rowan County and 18,000 acres in an update program in McCreary County.

Soil/Water Improvement

The Forest treated approximately 400 acres of abandoned logging roads, timber skid roads, log landings, and sites damaged by past mining. This work was completed on recently acquired lands to control erosion, stabilize slopes, restore productivity and improve water quality. In addition, fertilization continued on 219 acres to help sustain past revegetation projects.

Water Resource Inventory/ Investigations

Two water resource inventories were active in fiscal year 1992 on approximately 35,500 acres of the Berea and Morehead Districts. These inventories provide reliable data of existing water quality conditions and possible effects on threatened and endangered species, fisheries and other consumptive and non-consumptive uses. Land use activities in these monitored watersheds historically included coal exploration and development; silvicultural and agricultural activities; and dispersed recreation and residential development.

Sampling stations were established at 19 locations throughout both watersheds to obtain information on flow regimes, macro-invertebrate populations, and 37 water quality constituents. Monthly water quality data will be characterized and assessed to determine which stream segments or sub-watersheds are meeting state and federal water quality standards. Information gathered from the sampling stations will be incorporated into the Forest's Geographical Information System (GIS). Of 19 sampling stations, nine were terminated at the end of fiscal year 1992.

A water quality monitoring report for the Beaver Creek watershed on the Somerset Ranger District was approved by the Forest Supervisor in October, 1992. The study involved impacts of a privately owned strip mine on the Beaver Creek Wilderness. The results showed that the water quality in Cane Branch, which is in the headwaters of Beaver Creek, has improved since mining has stopped, however, it is still extremely poor. The mining is located on private land just above the Forest Service boundary and is responsible for several violations in state water quality standards. These violations have resulted in a serious degradation of aquatic biota and esthetic values in the Beaver Creek Wilderness.

Stream Inventories

Riparian areas on the Daniel Boone National Forest—and across the nation—are locations of extreme importance to many wildlife, fisheries, and vegetative species. The Forest Service has been very active in protecting and maintaining these fragile areas. In addition to the wildlife and plant species that thrive there, riparian areas are also essential for flood control, providing clean water, erosion control and as a place for recreation visitors to enjoy. In an effort to better understand these stream habitats, the Forest has developed and instituted a state-of-the-art stream inventory system. This inventory measures fish habitat, fish populations, macro-invertebrates, channel stability, valley segment types, and riparian vegetation in several regional reference streams.

During fiscal year 1992, stream inventories were concentrated on the Morehead and Redbird Districts. The streams that were inventoried included Stonecoal, Slabcamp, and Clear Creeks on the Morehead Ranger District and Bear and Katie's Creeks on the Redbird Ranger District. With the help of students from Eastern Kentucky University, Vanderbilt University, and Cumberland College more than 40 miles of stream were inventoried. This inventory will continue on the Stanton and Somerset Ranger Districts in fiscal year 1993.

A water quality monitoring report for the Beaver Creek watershed on the Somerset Ranger District was approved by the Forest Supervisor in October, 1992. The study involved impacts of a privately owned strip mine on the Beaver Creek Wilderness.

Lands and Minerals

Mineral resources continue to be an important multiple-use of the Forest. As with timber sales, a portion of the revenue generated from mineral activity returns to the counties to be used for roads and schools. The rest returns to the U.S. Treasury.

Approximately 28 percent of the mineral reserves on the Daniel Boone National Forest are federally administered. There are 57 federal oil and gas leases on the Forest. In 1992, four requests to lease federal minerals were received, totaling 2,941.39 acres. Eight gas wells were drilled and completed on our Redbird Ranger District. Drilling on reserved and outstanding minerals increased slightly in 1992. Nine wells were approved and drilled on the Redbird Ranger District.

Efforts to plug wells which have been abandoned or have potential to cause harm to the environment continued on the Forest. Sixteen abandoned wells were plugged in cooperation with the Environmental Protection Agency on the Stanton Ranger District this year. An additional seven wells were plugged under a separate program administered by the State of Kentucky's Division of Oil and Gas.

The coal program on the Daniel Boone, as well as in most areas of the eastern United States, continues to show little activity. A major reason for the inactivity is the stringent emissions requirements in the Clean Air Act. Kentucky coal traditionally contains high sulphur levels. When burned, this coal does not meet the Clean Air Act standards. The Bureau of Land Management received one coal lease application in 1992. One federal lease continued to operate on the Forest while a second federal lease remains inactive.

Five leases on reserved and outstanding minerals operations were active on the Forest in 1992.

Land Exchange

The land exchange program provided some of the most beneficial results in the history of the Daniel Boone National Forest in 1992. The Forest acquired 3,276 acres with a net gain of some 2,800 acres of National Forest land. Tremendous public benefits were gained, particularly for threatened and endangered species. The lands acquired included habitat of the endangered Gray Bat, Indiana Bat, and Red-cockaded Woodpecker as well as an entrance to the Sloan's Valley cave system. Another aspect of public benefits was the great cost-savings by eliminating boundary lines, corner monuments, rights-of-way across private lands, and claims.

The land exchange program will continue to experience lean years and years of great accomplishment. It is an important program because many critical tracts which are not available for direct purchase can be added to the National Forest and some tracts which better serve local economic development in private ownership can be removed from National Forest ownership.

Exchanges planned for 1993 will net some 200 acres in additions to the National Forest.

Land Purchases

The Forest acquired a total of 12,960 acres which included 8,983 acres of coal rights under the Daniel Boone National Forest with $1,974,800 of Land and Water Conservation Funds.

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The lands purchased included:

- Endangered Red-cockaded Woodpecker habitat
- Endangered Little-winged Pearly Mussel and Cumberland Bean Pearly Mussel habitat
- Frontage on the Cumberland River
- Frontage on Spaas Creek near the Red River Gorge Geological Area
- Extensive clifflines which are likely habitat to many threatened and endangered species

Acquisition of these tracts protects Kentucky's vital natural resources, provides additional opportunities for public recreation, and facilitates management of the Daniel Boone National Forest.

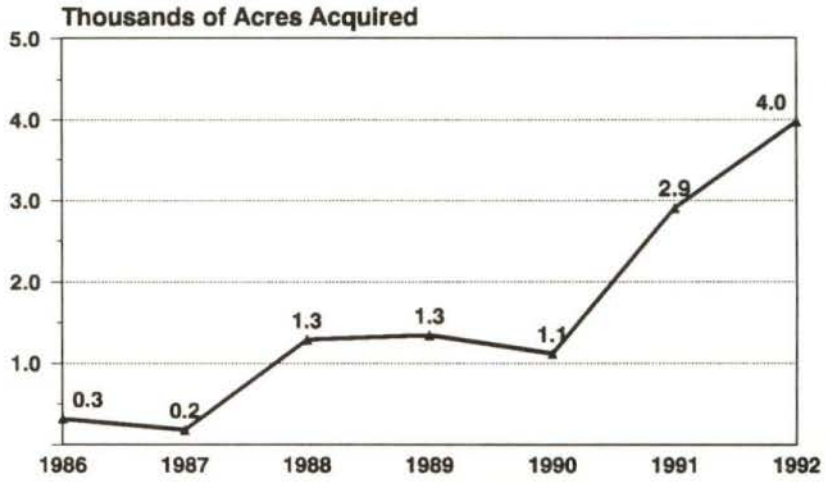
Purchases planned for 1993 will add 2,400 acres to the National Forest.

Cooperators in Land Acquisition

Cooperators in land acquisition include The Nature Conservancy and The Trust For Public Land. The Trust For Public Land is presently attempting to purchase nearly 5,500 acres in Whitley, Rockcastle, Lee, and Estill counties. Habitat of several protected, threatened, or endangered species including the Cumberland Bean and Little-wing Pearly Mussels, the Red-cockaded Woodpecker, the Rafinesque Big-eared Bat, the Eastern Woodrat, and the Black-sided Dace are part of the exchange.

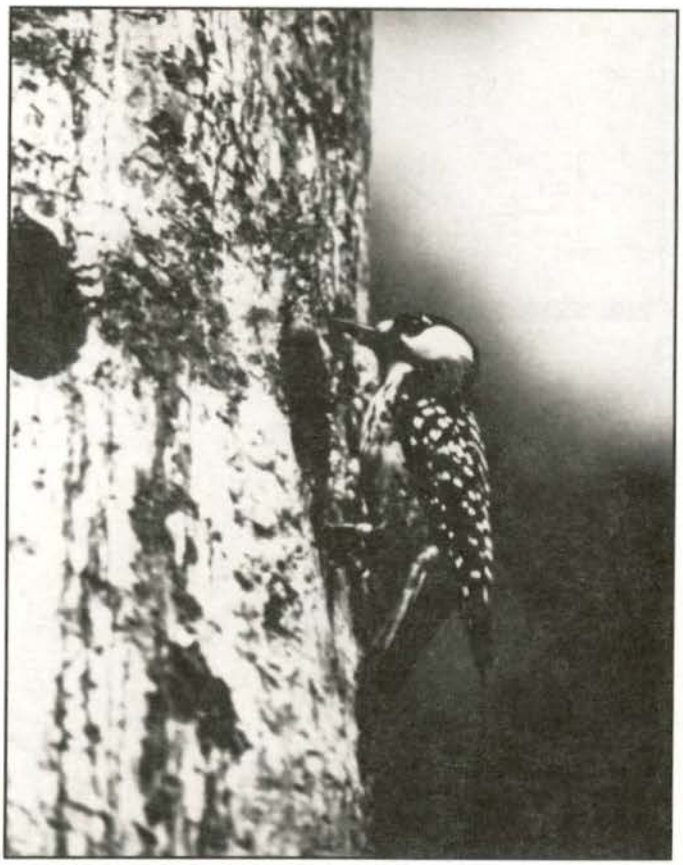
Cooperators that play a significant role in land acquisition include the League of Kentucky Sportsmen, Sierra Club, Kentucky Resources Council, Kentucky Environmental Quality Commission, Sierra Club, and Trout Unlimited. Our thanks go as well to the many private landowners who have cooperated in ensuring protection of our vital natural resources by making their lands part of the Daniel Boone National Forest.

Land acquisition using Land and Water Conservation Funds has increased more than ten-fold since 1986, assuring protection for some of the more sensitive lands within the National Forest.



Maintaining and Enhancing Wildlife Habitat

The Daniel Boone National Forest is preparing for ecosystem management by acquiring personnel with additional skills in this area of expertise. In addition to a Staff Officer for wildlife, fisheries, botany and range and a Forest Biologist, biological technicians now work on the London and Stanton Districts. The Berea Ranger District employs a Forest threatened/ endangered species biologist, fisheries biologist, botanist, and botanist trainee. In addition to wildlife biologist trainees at the London and Stearns Districts, there are wildlife biologists to serve Morehead, Berea-Stanton, Somerset-Stearns and London-Redbird Districts. On the London Ranger District, a wildlife cooperative education student is working to complete an osprey hacking project.



The London Ranger District is home to the last remaining colonies of red-cockaded woodpecker in the Commonwealth of Kentucky.

Skilled wildlife employees, along with contractors and cooperators, have enabled us to use state-of-the-art information in making land management decisions. We have a two-year lead time now in searching habitat for red-cockaded woodpecker colonies, for example. Surveys for threatened, endangered, and sensitive species are now completed before decisions are made, and our knowledge about species such as mussels, snails, and insects is rapidly increasing.

A survey of threatened and endangered terrestrial species on the Redbird Ranger District was completed through an ongoing partnership agreement with The Nature Conservancy. A scheduled 1993 survey of the London District will complete the Forest-wide project.

The Daniel Boone National Forest continued to emphasize providing habitat for endangered, threatened, and sensitive species. At least two of the five active red-cockaded woodpecker colonies reared a total of five young. This year we gained new knowledge into the nesting chronology and adult behavior of the birds.

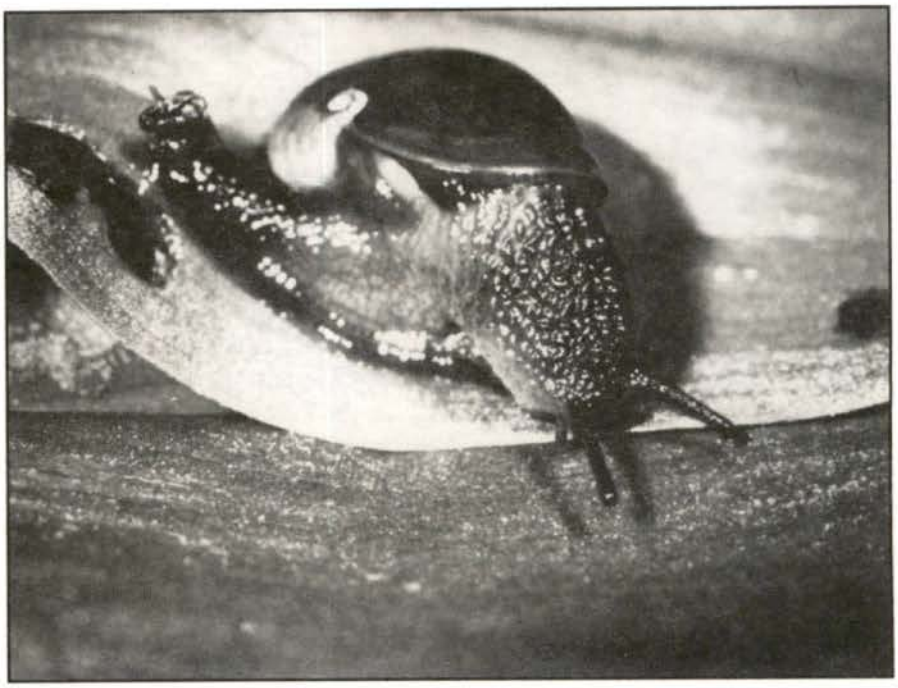
Unfortunately only one bald eagle returned to the territory on Laurel River Lake, so nesting was not attempted in 1992. Several eagles were observed during a winter census, and we are hopeful another pairing will take place this winter.

One of the largest cave gates in the nation was installed in Ox Yoke Cave to protect bats from disturbance on the Stanton Ranger District. The Forest continued to support cooperative research

on the Virginia Big-eared bat by the University of Kentucky and Eastern Kentucky University. Both Universities also conducted surveys for red-cockaded woodpeckers.

Fiscal year 1992 work accomplishments include:

- Construction of 87 acres of new permanent forest openings
- Maintenance of 729 acres of existing openings
- Wildlife habitat improvement on 65 acres, by partners, through volunteer agreements or Challenge-Cost Share agreements
- Completion of 65 acres of habitat improvement
- Construction of 419 structures
- Fisheries improvement on 97 acres
- Construction of 141 fisheries structures
- Habitat improvement for endangered, threatened or sensitive species on 1,055 acres
- Construction of 70 structures to benefit threatened, endangered or sensitive species



The Glassy Grapeskin or Blue Ridge Snail is one of Kentucky's rarest land snails. It was discovered on the Redbird Ranger District during the 1992 survey and proposed for listing as a sensitive species.

Fiscal Year 1992 Wildlife and Fisheries Partnership Accomplishment

Projects	F.S. $	Partner $	Acres Improved	Structures Improved	Acres/Mile Inventoried
FISHERIES					
5	$15,000	$17,000	396	15	19,490
WILDLIFE					
30	$91,000	$201,600	612	711	15,165
PETS SPECIES*					
31	$99,700	$114,900	2	4	22,711
TOTAL					
66	$205,700	$333,500	1,010	730	57,366

*PETS - Protected, Endangered or Threatened Species

Fire

This year, the Forest responded to 47 wildfires involving 585 acres—as compared to a ten year average of 144 fires a year. Calendar year 1992 was second only to 1973 for the lowest amount of fire activity on the Forest since 1970. Each district, however, reported fire activity. The Redbird Ranger District, where 20 fires burned 368 acres, had the most activity on the Forest.

Ninety-eight percent (46 fires) of all reported fires were human caused. One was ignited by lightning. Arson remained the primary cause of fire on the Forest. Sixty percent of the fires were attributed to arson.

Fires occurred according to the following seasonal breakdown:

- Spring Fire Season (03/01- 05/15) 16 fires (34% of total)
- Fall Fire Season (10/15 - 12/15) 10 fires (21% of total)
- Pre-season (January & February) 21 fires (45% of total)

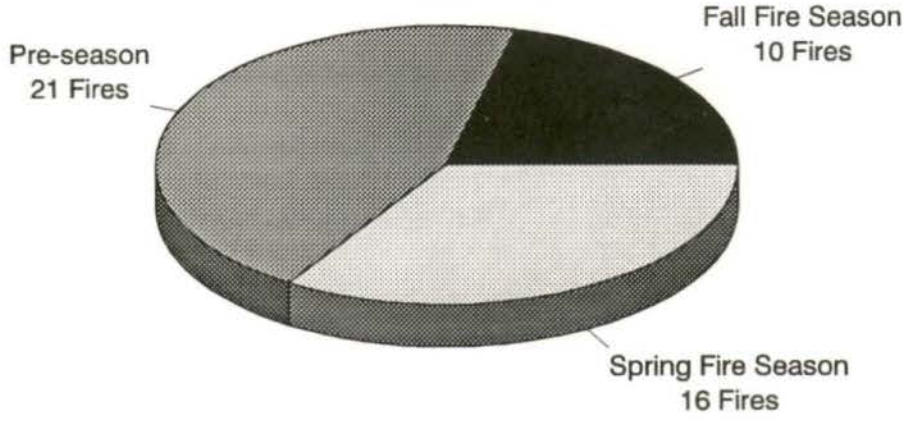
There were nine days when multiple fires occurred during the combined spring and fall fire seasons. No large fire activity occurred on the Forest this year and no resources from off the Forest were needed for extended attack.

The Forest continues to maintain two observer-read, daily fire danger weather stations. The London weather station was closed following the death of Kermit Hale, ending a 35-year period of weather services. Rainfall averages for the weather stations were near normal for the area (43.00 inches) with the following amounts having been reported as of December 31, 1992.

Stanton	41.50 inches
Somerset	46.42 inches

The Daniel Boone Coordination Center mobilized many resources in response to Hurricane Andrew for relief and recovery efforts in Louisiana and Florida. More than 135 individuals from Abraham Lincoln Birthplace, Big South Fork National River and Recreation Area, Cumberland Gap National Historical Park,

In 1992 the heaviest fire activity on the Daniel Boone was during the January and February pre-season. None of the fires in 1992 were classified as large fires.

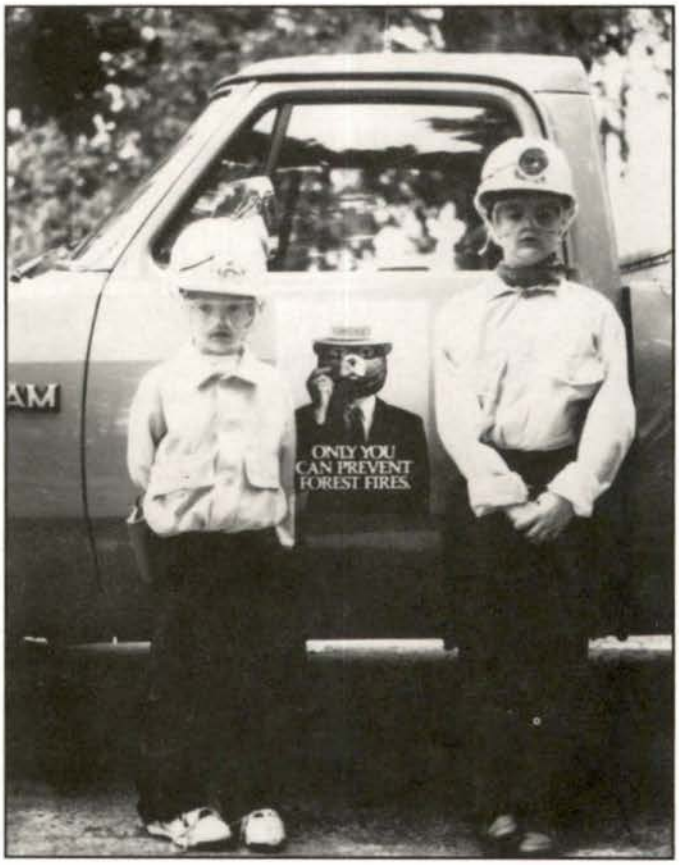


Mammoth Cave National Park, Obed Wild and Scenic River, and the Daniel Boone National Forest participated in the effort. One individual assisted the Washington Office following Hurricane Iniki and eleven employees were dispatched for fire assignments in the western United States.

The Kentucky Division of Forestry and the Daniel Boone National Forest jointly hosted three special fire prevention activities. The Morehead Ranger District coordinated an event with Morehead State University's football team; the Supervisor's Office assisted with an event with the University of Kentucky men's basketball team, and the Berea Ranger District coordinated an event with Eastern Kentucky University women's basketball team.

The Southern Interagency Cache at London processed over 189 resource orders during the calendar year, accounting for over 150,000 pounds of materials, with a value exceeding $1.8 million. The majority of equipment and supply orders were in response to Hurricane Andrew. The London Cache maintains an inventory of property items valued at over $7 million in its warehouses at London, Berea and in the six 250-person cache vans. Staffing for the Cache was increased with the addition of a permanent, full-time assistant Cache Manager and a call-when-needed warehouse worker.

Improvements to the Cache during the year include the refurbishing of the Cache Manager's office and the remodeling of a travel trailer to serve as the Assistant Manager's office. The communications trailer was completed, and three repeaters for the RCA radio kits are now on line. A truck tractor to move cache vans has been temporarily added to the Cache fleet.



The Fire Prevention message is taken to local schools and community groups.

The Daniel Boone Coordination Center mobilized many resources in response to Hurricane Andrew for relief and recovery efforts in Louisiana and Florida.

Forest Road System–Access to Your National Forest

The Forest road system is constructed and maintained to serve various resource needs such as timber harvest, access to recreation areas, management of wildlife habitat, and to provide hunter access. Vehicular traffic is restricted on many of the lower standard roads to limit environmental damage and better control maintenance costs. Foot traffic is welcomed on all roads. Those roads with limited use are signed and usually gated.

In fiscal year 1992, there were approximately 30 miles of road reconstructed in support of the timber resource at an average cost per mile of $9,100. An additional 30 miles were constructed for timber harvest at $12,850 per mile.

Two recreation road projects were completed in fiscal year 1992. The road to Keno Shooting Range was constructed and numerous pavement additions to the roads around Laurel River Lake were completed. Total cost for both projects was $109,069.

Two general purpose roads (a road which serves all resources) were reconstructed totaling 3.6 miles at a cost of $27,290 per mile. The road to the new Morehead Work Center was constructed and paved.

FY 92 Accomplishments

Transportation System

Road Construction	
General Purpose	0.3 Miles
Recreation	0.5 Miles
Purchaser Credit	30.1 Miles
Road Reconstruction	
General Purpose	3.6 Miles
Recreation	2.1 Miles
Purchaser Credit	28.7 Miles
Road Maintenance	1193.0 Miles

Human Resources–One of Our Most Important Resources

The Daniel Boone National Forest administers a variety of human resource programs for people of all ages in a natural resources environment. Many of these programs provide work experience, employment, training skills, supervision and education opportunities in a unique setting.

The Forest is one of only two National Forests in the country that administers two Job Corps Civilian Conservation Centers. Frenchburg, a co-educational facility, and Pine Knot, soon to be co-educational, have a combined rated capacity of 392 students. The two centers average over 370 students per year with an estimated work value of $1,810,398.

The students constructed many buildings on the Centers and numerous facilities within the Forest boundaries. Also, students actively participated in projects on public lands within the local communities. The students constitute a large part of the Forest's fire suppression capabilities and have assisted in many large fire suppression activities around the country.

The Senior Community Service Employment Program (SCSEP), Youth Conservation Corps, Hosted Summer Youth, and Volunteer programs employed 222 persons, plus 762 volunteers, with an appraised work value of $1,221,974.

The Forest has taken the lead in training several Native American Fire Suppression Crews (over 300 firefighters in Oklahoma and 40 in North Carolina). In 1988 the Forest consummated a written agreement with the Chief of the Cherokee Nation (in Oklahoma), to furnish firefighters for the Forest Service. This is the first written agreement with a Native American Tribe, east of the Rocky Mountains. The Cherokee Nation in Oklahoma is also the only major tribe with a female chief. The Forest has an agreement with Chief Wilma Mankiller for a cultural exchange, whereby they have furnished a group of firefighters who perform cultural and ceremonial dances for local communities and the Forest Service. The Forest has an agreement with the Lenape Tribe to furnish firefighters and presently has 10 trained. The Forest is also actively working with the Kentucky Indian Manpower Program (JTPA-Title IV) in Louisville, Kentucky.

The Forest is one of only two National Forests in the country that administers two Job Corps Civilian Conservation Centers.

A Job Corps student participates in one of the many vocational training courses.

Protection

In 1992, the Forest eradicated 337,726 marijuana plants with 26 felony arrests.

Marijuana cultivation on National Forest System land continues to be a problem across the country, but especially in Kentucky. Since 1986, the Daniel Boone National Forest has consistently eradicated more marijuana than any other Forest in the nation.

In 1992, the Forest eradicated 337,726 marijuana plants with 26 felony arrests.

The Forest continued to participate in the Governor's Task Force on Marijuana. This cooperative effort has been underway since 1990. The Task Force is made up of 12 federal, state and local law enforcement agencies. Daniel Boone officials held a briefing in September for Bob Martinez, former Director for the Office of National Drug Control Policy in Washington, D.C.—the position often referred to as the Nation's "Drug Czar." The briefing, held in Louisville, was an outstanding opportunity to explain the magnitude of the marijuana cultivation situation in the Commonwealth of Kentucky and highlight the cooperative effort of the Governor's Task Force.

In addition to eradicating marijuana, Forest Law Enforcement Officers were busy in other areas during fiscal year 1992. The large number of visitors to the Forest recreation areas provide many challenges for law enforcement. The Forest had two precedent setting fire-related convictions.

The Forest law enforcement program expanded their support for the DARE (Drug Abuse Resistance Education) program taught in area schools by expanding it to ten counties. The DARE program graduated more than 6,000 fifth and sixth graders during the 1992 school year.

The Forest Service recently restored two used Jeep CJ-7's into Project DARE vehicles. These vehicles are used in community parades and events to further promote the Project DARE program.

Marijuana Eradication Effort

Daniel Boone National Forest

	1987	1988	1989	1990	1991	1992
# of Plants Eradicated*	70,474	123,994	157,967	359,319	372,833	337,726
# of Plots Eradicated	520	1,354	1,480	2,269	3,895	3,448
Avg. # of Plants per Plot Eradicated	135	91	106	158	95	98
# of Booby Traps	11	33	145	27	83	26
# of Felony Arrests Made	5	16	20	25	21	26

* Plants average a street value of approximately $1,000 per plant

Daniel Boone National Forest
Acreage Summary Fiscal Year 1992

	Ranger Districts							
County	Morehead	Stanton	Berea	London	Somerset	Stearns	Redbird	Total
Bath	18,468							18,468
Estill		2,265	2,193					4,458
Jackson			57,094					57,094
Laurel				60,059				60,059
Lee		5,681	2,434					8,115
McCreary					40,644	98,456		139,100
Menifee	23,637	21,383						45,020
Morgan	12,948							12,948
Owsley			3,848				12,305	16,153
Powell		14,135						14,135
Pulaski				109	32,069			32,178
Rockcastle			8,092	4,312				12,404
Rowan	62,020							62,020
Wayne						642		642
Whitley				30,114		12,499		42,613
Wolfe		15,896						15,896
Clay							75,441	75,441
Harlan							803	803
Leslie							52,549	52,549
Perry							2,191	2,191
Knox							74	74
TOTAL	117,073	59,360	73,661	94,594	72,713	111,597	143,363	672,361

1992 Economic Summary

Expenditures and Receipts

Activity	Expenditure	Receipts
Timber	2,796,266	2,140,527
Wildlife	1,037,320	0
Recreation	2,732,766	294,682
Fire	677,020	0
Lands	580,783	29,350
Minerals	277,040	121,410
Road Maintenance	610,494	0
Facility Maintenance	113,410	0
Road Construction	1,685,768	0
Facility Construction	320,863	0
Soil and Water	706,944	0
Range	20,843	0
General Admin.	2,039,790	0
SCSEP*	587,195	0
Grazing	0	319
Job Corps	6,515,061	0
Law Enforcement	1,092,393	0
Total	21,793,956	2,586,288

*Senior Community Service Employment Program

Each year the Forest Service returns to the States part of the money received from the production of goods and services on National Forest System lands. Payments are made on a fiscal year basis and amount to 25 percent of the money National Forests received for timber sales, campground fees, special use permits and other sources. The funds are for the benefit of roads and schools in the counties where the National Forests are situated.

In fiscal year 1992, the Daniel Boone National Forest received $2,586,288 from all sources (including timber purchaser credits) and returned $646,280.09 to the State of Kentucky. The 25 percent funds are allocated to the counties based on the amount of National Forest System land in each county.

Payments to Counties*

Bath	$17,751.62
Clay	72,514.64
Estill	4,285.08
Harlan	771.85
Jackson	54,879.32
Knox	71.13
Laurel	57,729.30
Lee	7,800.23
Leslie	50,510.62
McCreary	133,704.30
Menifee	43,273.67
Morgan	12,445.75
Owsley	15,526.42
Perry	2,106.01
Powell	13,586.71
Pulaski	30,929.81
Rockcastle	11,922.85
Rowan	59,614.24
Wayne	617.10
Whitley	40,960.04
Wolfe	15,279.40
Total	$646,280.09

***Source: USDA Forest Service, Washington Office**

Timber Program Economics

Statement of Timber Sale Revenues and Expenses

DANIEL BOONE NATIONAL FOREST

PERIOD ENDING SEPTEMBER 30, 1992

(in 1992 Dollars)

I. REVENUES	
Timber Sales	$1,620,748
Purchaser Road Credits Established	520,025
Associated Charges	19,962
Interest and Penalties	94
TOTAL REVENUES	$2,160,829
II. DIRECT EXPENSES	
Timber Sales	$2,187,381
Timber Program	553,199
TOTAL DIRECT EXPENSES	$2,740,580
III. INDIRECT EXPENSES	
General Administration (Program)	$217,529
TOTAL INDIRECT EXPENSES	$217,529
IV. TOTAL TIMBER EXPENSES	$2,958,109
V. NET RESULTS	-$797,280
VI. VOLUME HARVESTED (MBF)	38,293

Economic Effects*

DANIEL BOONE NATIONAL FOREST
PERIOD ENDING SEPTEMBER 30, 1992
(in 1992 Dollars)

PRESENT VALUE OF BENEFITS

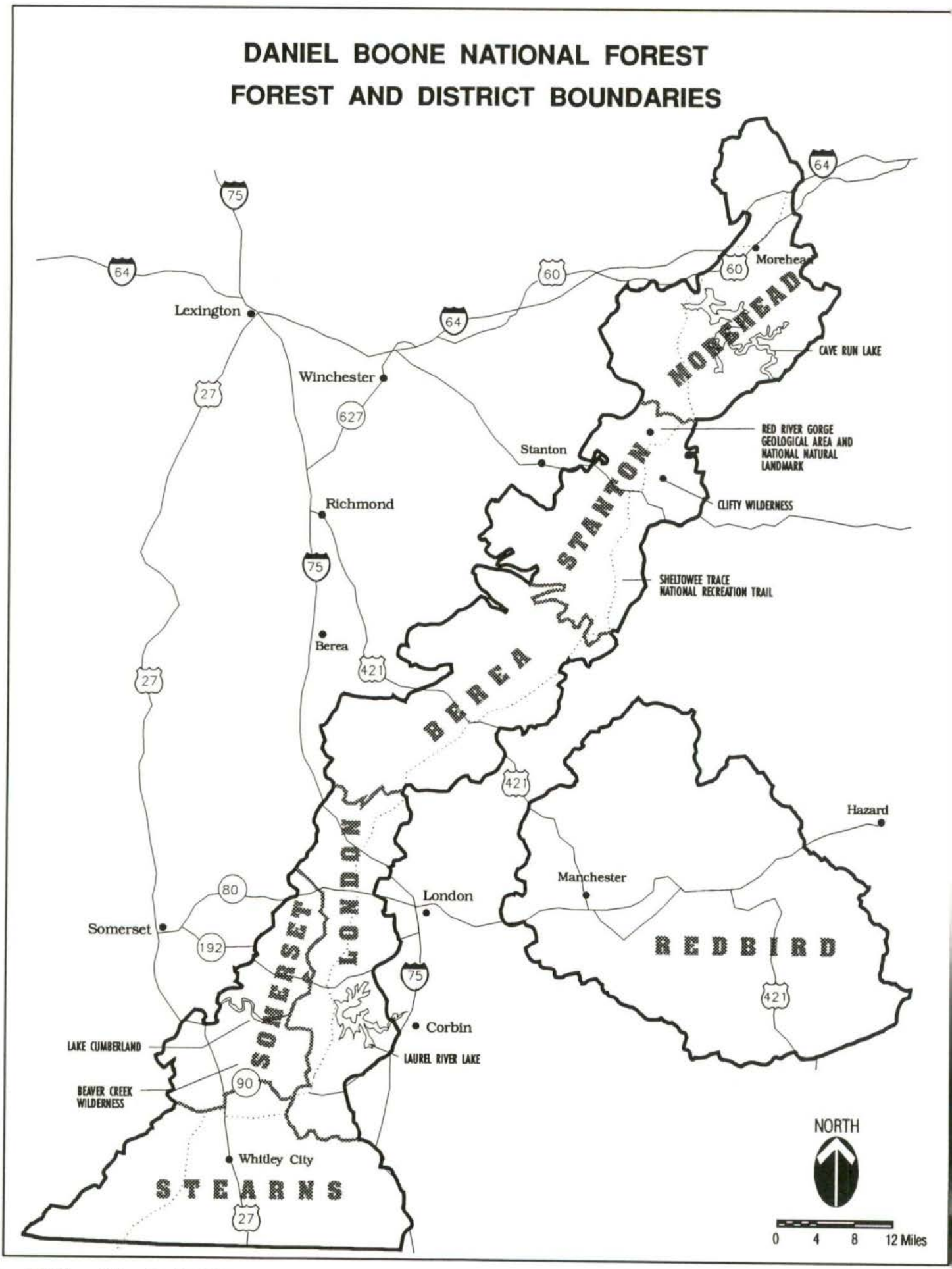
Positive Effects	
Timber	$2,615,482
Recreation	135,716
Wildlife	403,510
Fisheries	0
Grazing	0
Soils	0
Water	0
Total Positive Effects	$3,154,708
Negative Effects	
Timber	0
Recreation	0
Wildlife	51,085
Fisheries	0
Grazing	0
Soils	0
Water	0
Total Negative Effects	51,085
Total Present Benefits (positive less negative)	$3,103,623
PRESENT VALUE OF COSTS	
Timber	$2,056,270
Recreation	131,162
Wildlife	0
Fisheries	0
Grazing	0
Soils	0
Water	0
Roads	530,000
Total Present Costs	$2,717,432
Present Net Value (present benefits minus present costs)	$386,191

*The purpose of this report is to evaluate and account for all future net economic benefits (investment in the future) from the acres harvested in fiscal year 1992. This part specifically considers the economic value of all commodities, such as timber, and all non-commodities, such as recreation and wildlife habitat. Benefits are accounted for, whether they are positive or negative.

Daniel Boone National Forest Fiscal Year 1992 Accomplishments

Management Activities	Units	Accomplished FY 92
RECREATION		
Cultural Resource Survey	Acres	11,405
Cultural Resource Evaluations	Sites	13
Developed Recreation Management	RVDs	968,900
Dispersed Recreation Management	RVDs	1,117,100
Wilderness Use	RVDs	25,100
Trail Construction	Miles	19
Trail Maintenance	Miles	208
WILDLIFE		
WL Habitat Structural Improvements	Struct.	419
WL Habitat Non-Structural Improvements	Acres	484
WL Opening Establishment	Acres	87
Fish Habitat Structural Improvements	Struct.	141
Fish Habitat Non-Structural Improvements	Acres	97
T&E Habitat Structural Improvements	Struct.	70
T&E Habitat Non-Structural Improvements	Acres	1,055
RANGE		
Range Resource Structural Improvements	Struct.	1.3
Range Resource Non-Structural Improvements	Acres	5.3
TIMBER		
Silvicultural Prescriptions	Acres	64,123
Timber Sold	MMBF	41.8
Timber Harvested	MMBF	38.3
Timber Under Contract	MMBF	64.5
Reforestation	Acres	5,445
Timber Stand Improvement	Acres	2,803

Management Activities	Units	Accomplished FY 92
SOIL AND WATER		
Soil Inventory	Acres	35,500
Water Inventory	Acres	35,500
Watershed Resource Improvement - Construction	Acres	395
Watershed Resource Improvement - Maintenance	Acres	219
MINERALS AND GEOLOGY		
Minerals and Geology Resource Preparation and Administration	Cases	334
LANDS		
Special Use Administration	Cases	350
Landline Maintenance	Miles	204
Landline Location	Miles	97
Rights of Way	Cases	15
Land Purchases	Acres	12,960
Land Exchange	Acres	3,276
TRANSPORTATION SYSTEM		
Road Construction/Reconstruction		
General Purpose	Miles	3.9
Recreation	Miles	2.6
Timber	Miles	-0-
Total Appropriated Program	Miles	6.5
Purchaser Credit Roads	Miles	58.8
Road Maintenance	Miles	1,193
FIRE MANAGEMENT		
Prescribed Burning/Fuel Reduction	Acres	1,296
HUMAN RESOURCE PROGRAMS		
Job Corps Enrollees	Person -Yrs	358
Senior Citizens Employment Program	Person-Yrs	68
Youth Conservation Corps	Person-Wks	40
Volunteers	Person-Yrs	14


DANIEL BOONE NATIONAL FOREST
FOREST AND DISTRICT BOUNDARIES
Lexington
Winchester
Richmond
Berea
Stanton
Morehead
Somerset
London
Corbin
Manchester
Hazard
Whitley City
CAVE RUN LAKE
RED RIVER GORGE GEOLOGICAL AREA AND NATIONAL NATURAL LANDMARK
CLIFTY WILDERNESS
SHELTOWEE TRACE NATIONAL RECREATION TRAIL
LAKE CUMBERLAND
BEAVER CREEK WILDERNESS
LAUREL RIVER LAKE
MOREHEAD
STANTON
BEREA
SOMERSET
LONDON
REDBIRD
STEARNS
NORTH
0 4 8 12 Miles

An Invitation to Comment

This report will be published annually on the Daniel Boone National Forest. We also publish a quarterly schedule of work which lists all on-going projects on the Forest. You are invited to obtain additional information on any project and Plan implementation by contacting the Forest Supervisor's Office or the District Offices listed at the beginning of this report. We welcome your comments.

What management topics are important to you? Here are some you might consider.

- ❑ Forest Planning
- ❑ Wilderness
- ❑ Visual Resources
- ❑ Off-Road Vehicles
- ❑ Minerals
- ❑ Soil and Water
- ❑ Developed Recreation/ Campgrounds
- ❑ Dispersed Recreation/ Trails
- ❑ Caves
- ❑ Wild and Scenic Study Rivers
- ❑ Roads
- ❑ Timber
- ❑ Wildlife
- ❑ Fisheries
- ❑ Cultural Resources
- ❑ Other _____

Are you more interested in one or more of the Daniel Boone's administrative units, or the whole Forest? Here are the different units of the Forest:

- ❑ Berea Ranger District
- ❑ London Ranger District
- ❑ Morehead Ranger District
- ❑ Redbird Ranger District
- ❑ Somerset Ranger District
- ❑ Stanton Ranger District
- ❑ Stearns Ranger District
- ❑ Frenchburg CCC
- ❑ Pine Knot CCC
- ❑ Forest Supervisor

- ❑ Please keep or add my name to the Daniel Boone National Forest mailing list.
- ❑ Please remove my name from your mailing list.

Comments:

_____

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Please print clearly

_____ _____

Your Name Organization or Company

_____ _____

Street Address or P.O. Box City, State, ZIP Code

Cut Along Dotted Line

FROM:

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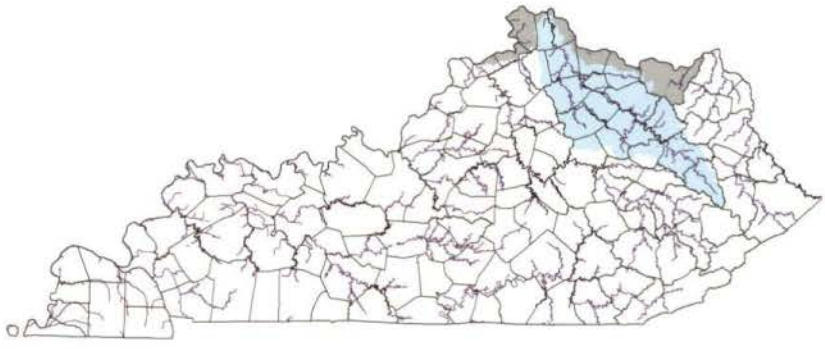
FOREST SUPERVISOR
100 VAUGHT ROAD
WINCHESTER, KY 40391

The Licking River Region in Kentucky:

Status and Trends

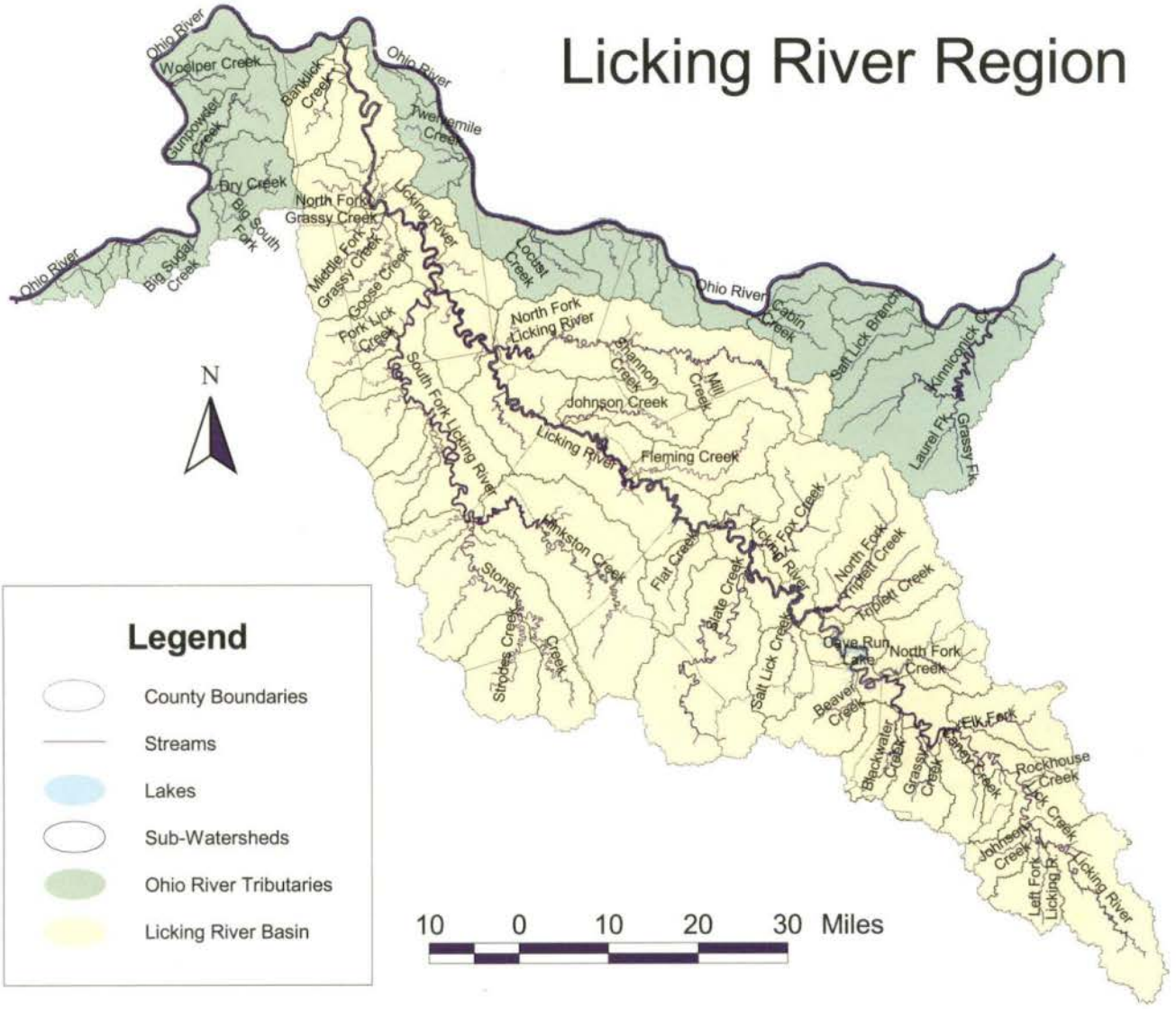


November 1998

We thank the Team members, the volunteers who have collected data and worked on watershed health issues, and Pamla Wood (coordinator), Barry Tonning (principal author), Maleva Chamberlain (layout), Rick Hill (cover), Lew Kornman (photos) and Kimberly Prough (maps).

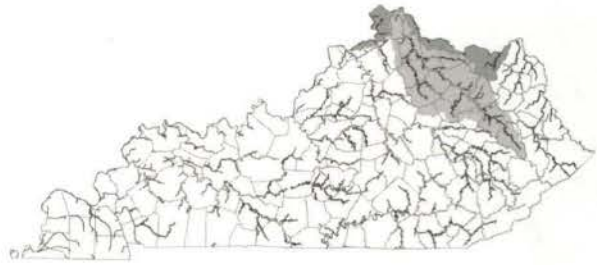
"I have really enjoyed working with a basin team composed of such knowledgeable, practical and generous people. Their commitment and desire to involve many, many more people in the watershed effort has been an inspiration to me and others working on watershed issues in the Commonwealth."

Pamla Wood
Licking River Watershed
Team Coordinator



Source: Natural Resources and Environmental Protection Cabinet Office of Information Services

The Licking River Region:
Status and Trends



This report covers the entire drainage area – or *basin* – of the Licking River and other streams north and east of the basin along the Ohio River. In this report, the entire area is referred to as the Licking River region.

Are the streams in the Licking River region healthy?

That is the main question this report explores. In order to determine if the region's streams are contaminated, we have reviewed water sampling data, assessments of stream and river bank conditions, discharge permits for sewage treatment plants, and activities like farming, development, logging, and mining. We have found that what happens in the river basin – or *watershed* – directly impacts water quality and habitat conditions. Some tributaries in the Licking River region are contaminated with bacteria from sewage or livestock; silt from erosion, construction or logging; algae blooms fed by nutrients from fertilizers or manure; and some pollution from mining and industrial or urban sewage plants. Most of the streams in the region, however, seem to be free of excessive pollution. Maintaining good water quality in the unpolluted parts of the river and cleaning up contamination in other sections will require a closer look at what is happening in the watershed, how it impacts watershed health and what can be done to improve conditions. That is what this report is all about.

Basin or Watershed?
The *basin* of a river or stream is all the land that is drained by a lake, river or stream. Another word for basin is *watershed*, which comes from the observation that water is shed from an area of land and flows downhill into a body of water.

Where did this report come from?

This report was produced by the Licking River Region Team, a group of people representing various agencies and organizations in the watershed. The analysis and recommendations in the following pages are an important part of the Kentucky Watershed Initiative, a statewide effort to assess and improve watershed health in the Commonwealth. The report examines existing conditions in the Licking River watershed and other streams that drain directly into the Ohio River in northeastern Kentucky.

The information and maps that follow were collected from a variety of sources. Federal, state and local agencies provided much of the data, with supplemental information coming from *water monitoring* volunteers organized by the Licking River Watershed Watch, public universities and other organizations. This report will give readers a good, general background on the river basin. Hopefully, it will also spark some interest in exploring conditions within the smaller watersheds that feed into the Licking and Ohio rivers. Addressing issues in these tributary watersheds will require constructive, cooperative local action.

Water monitoring
Water monitoring to determine watershed health can involve many different activities. We can find out if our waters are fishable, swimmable, and drinkable by testing for various pollutants, checking oxygen levels, measuring water clarity and temperature, observing aquatic and terrestial life, and assessing habitat conditions both in the stream and along the banks.

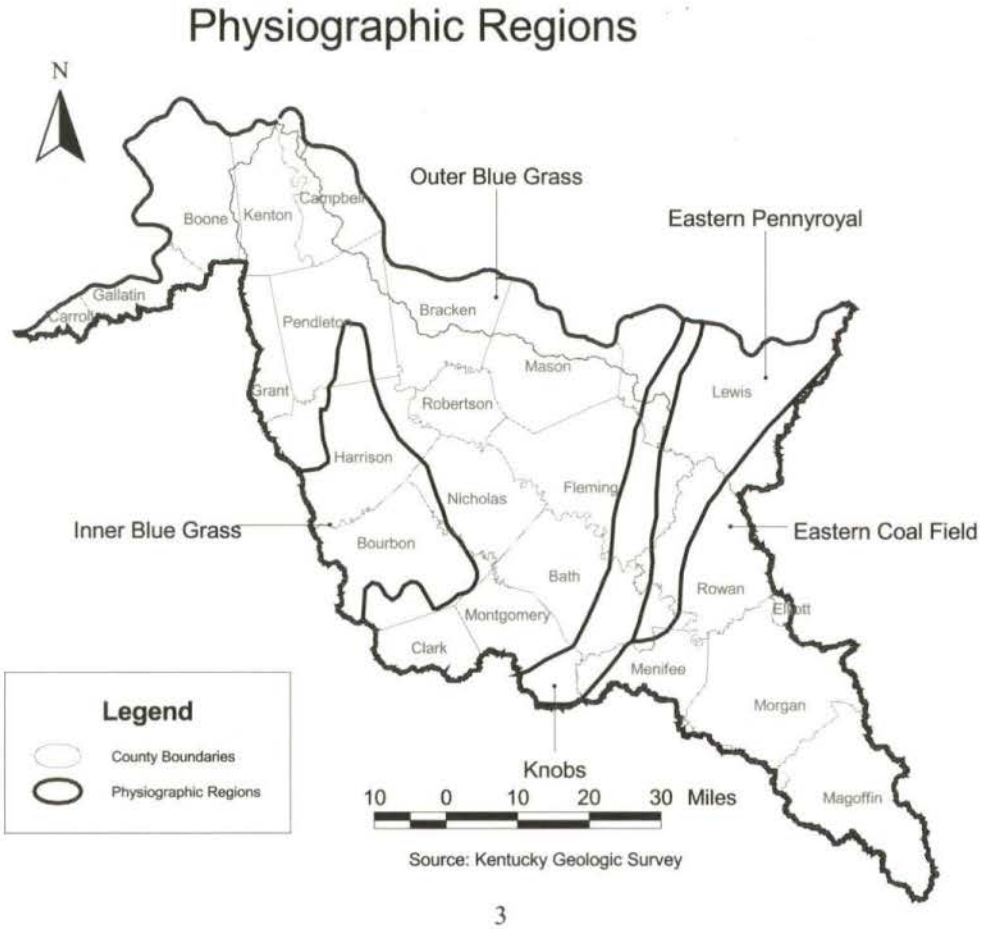
Low-water dams
Low-water dams are installed across a stream channel to create a year-round pool of water, usually to supply a drinking water treatment plant. Water flows over the top of the dams during heavy rains. During drier conditions in the summer, the dams hold back water that would normally flow downstream. While helpful for water supply, dams restrict movement of fish and other organisms.

Riffles
Riffles are short runs of rapidly flowing water, usually over rocks, downed trees and other objects in the stream channel. The churning waters of riffles create high-quality habitat for mussels, fish, and insects that live in the stream because of the higher levels of dissolved oxygen mixed into the water.

Land in the Licking River region

The Licking River and the smaller streams in the region drain a diverse watershed, with forested hills in the upper reaches, rolling farmland along the middle regions and urban/industrial development near the confluence with the Ohio River in Northern Kentucky. The Licking River – named for the mineral springs and salt licks that attracted buffalo and other animals – begins in the highlands of the Allegheny Plateau in Magoffin County. The river flows northwest through the Eastern Bluegrass for about 300 miles before emptying into the Ohio River between Newport and Covington. The two principal tributaries are the North Fork, which joins the main stem of the river near Milford, and the South Fork, which joins at Falmouth. The river drains an area of roughly 3,600 square miles, or about ten percent of the entire state. A dam near the town of Farmers on the Rowan-Bath county line – 173 miles upstream from the Ohio River – forms Cave Run Lake, an 8,300-acre reservoir that impounds 38 miles of the main stem and the lower reaches of several tributaries. Smaller, *low-water dams* are found on Slate Creek, Stoner Creek, the South Fork, and other locations.

The creeks, streams and rivers of the region are mostly upland types, with moderate to steep grades, well-developed *riffles* and shoals, rocky creek bottoms, and relatively narrow floodplains. Much of the lower half of the Licking River main stem below Cave Run Lake and the North and South forks are subject to excessive siltation linked to poor agricultural practices and land clearing activities and sewage pollution from a variety of sources. Coal-bearing regions in the upper reaches of the river have been affected by siltation from surface mining and brine from oil wells and now have less diverse communities of organisms than in the past.



Soils in the watershed range from thin silty clays in the hilly uplands to deeper loamy and sandier clays in the lower regions. Rock formations underlying the upland Eastsern Coalfield region include sandstone, siltstone and shale, with some interbedded coal deposits. The river flows though the Knobs Region near Cave Run Lake and enters the rolling, limestone hills of the Bluegrass Region. Especially in Bourbon County and much of Menifee County, limestone layers contain *sinkholes,* caves and underground flow channels. These formations make streams in these areas particularly sensitive to contamination from chemicals or other pollutants on the landscape, since groundwater moves much faster through the passages. The streams along the Ohio River drain mostly steep, hilly areas of pasture, small farm plots and some mixed forest lands.

The headwaters region is characterized by forest vegetation typical of the Eastern Mesophytic Forest, one of the most biologically diverse resources in North America. Current timber stands are second or third generation trees, with mixes of oak-poplar-hickory and pine species throughout the upper third of the watershed. While there is still a good diversity of tree species and some excellent stands scattered throughout the region, the quality of forest resources overall is mixed due to a general lack of resource planning, poor management practices and impacts from poor harvest techniques and skid roads. Pressure on forest resources is increasing as demand for timber rises and smaller trees become useable as chip or laminated beam stock.

Farms along the middle reaches of the river produce tobacco, corn, hay, and cattle, with much of the agricultural land in pasture year-round. Urban development is more extensive near the mouth of the Licking, particularly in northern Kenton and northwestern Campbell counties. Vegetation along the lower reaches is mostly turf, pasture and managed landscape, with a few remaining patches of unconnected forest. Impervious surfaces which shed water quickly – roofs, parking lots and roads – are more common and concentrated in the Northern Kentucky area, which lies across the Ohio River from Cincinnati.

Sinkholes

Sinkholes are openings that lead to underground passageways that can be very tiny or very large – even caves. The sinkholes and passages are created when rain dissolves limestone and flows beneath the surface along with other groundwater. Contaminants that flow into sinkholes easily pollute groundwater and the drinking water wells and streams they connect to.

Geography and Stream Health

How does geography affect the health of streams? The lay of the land, soil types, and vegetation in an area can directly affect water quality – especially when the land is cleared or tilled. For example, basins with loose soils, steep hills, or little vegetation are often severely eroded by rain storms, leaving streams and rivers muddy and subject to flooding from rapid runoff. Vegetation can reduce flooding by slowing down runoff from rain storms and can even filter out silt and other contaminants before they reach streams. Trees, bushes, and tall grass along stream banks also reduce erosion along the channel and create valuable habitat for birds, mammals, and other creatures.

Cardinal flowers and mist flowers on the Licking River in Bath County. - *Lew Kornman*

Permitted discharges

Discharge permits, provided for under federal and state laws, allow the disposal of treated *effluent* in the water. This effluent can be relatively clean wastewater from properly functioning municipal and industrial sewage treatment plants, discharges from sedimentation or treatment ponds near mines or oil/gas wells, or storm water from culverts that drain city streets.

Septic systems

Septic systems, help clean up sewage from homes and businesses in areas not served by sewage treatment plants. On most systems, the first stage of treatment is the septic tank, where sewage is digested in an oxygen-free or *anaerobic* environment. After the anaerobic process, the partially treated waste is directed to a drain field, lagoon or wetland for further treatment in a more oxygenated or *aerobic* environment. If the process is working correctly, the relatively clean wastewater then soaks into the ground. Septic tanks require periodic maintenance pumping. Illegal straight lines pipe semi-treated water directly to streams.

Sanitary Sewer Overflows

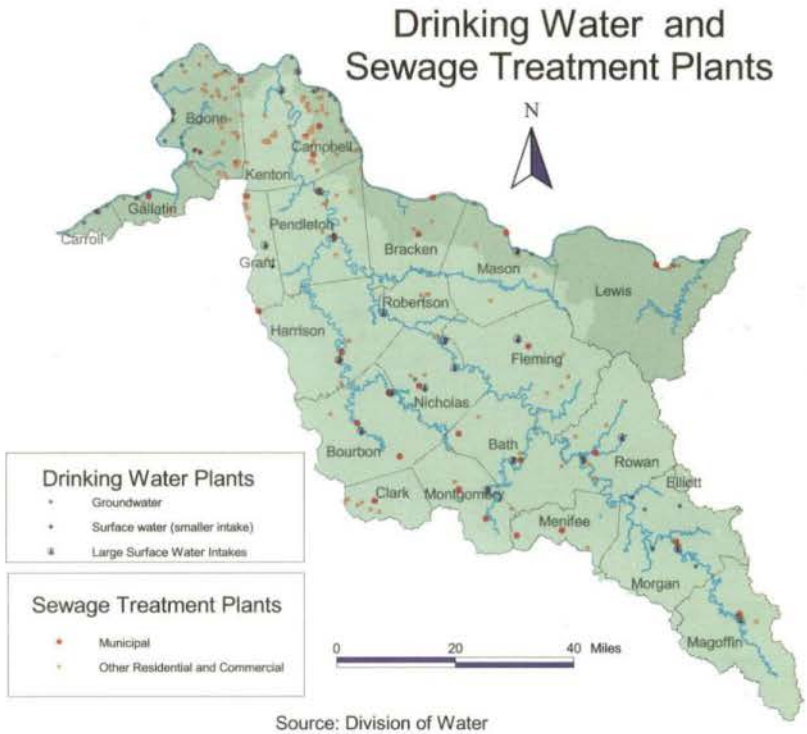
Newer sewers, called *sanitary sewer systems*, are not designed to handle rainwater. However, rainwater and groundwater seep or flow directly into the sewer lines through manhole covers and cracks in joints or lines. Surfacing of sewage or bypasses can occur when the sewage volume exceeds the pipe capacity. The sewage may actually surge from the tops of manholes or cracks in the manholes, or may flow from discharge pipes. These occurrences, referred to as *sanitary sewer overflows* (SSO's), occur throughout the state.

People and the river

The Licking River and its tributaries provide a source of drinking water for about 80 percent of the 340,000 residents of the basin. There are 20 drinking water plants that draw from the river or its tributaries, more than 30 systems using public wells. Some of the households in the Licking River region are connected to one of the Some of the households in the Licking River region are connected to one of the more than 30 sewage treatment plants that discharge treated *effluent* into the river and its tributaries (see map). Thousands of homes use on-site systems, usually *septic systems* with tanks with drainage fields. Some households illegally pipe wastewater directly from houses (straight pipes) or from septic tanks (straight-line septic) into streams. Other discharges affecting water quality include flows from *sanitary sewer overflows* or *combined sewer overflows* during times of heavy rains, briny effluents from old, abandoned oil and gas wells and some contaminated coal mine drainage in the headwaters region..

The effectiveness of waste treatment by individual residential septic systems varies greatly. Health departments are responsible for permitting, inspecting and responding to complaints regarding septic or *onsite wastewater treatment systems*, and they have stepped up oversight activities in recent years. However, straight-line and failing systems are still found in some areas, where they discharge bacteria, viruses, protozoa, and algae-feeding nutrients into streams. County health environmental staff are exploring the use of less expensive lagoon systems, wetland treatment and other alternatives to address issues related to system costs and limiting factors like high water tables, poor soils, rocks, and small lots. A pilot health department program to cost-share septic system installation for low income individuals proved very popular in Rowan County, and interest exists throughout the basin and state for an expansion of this approach.

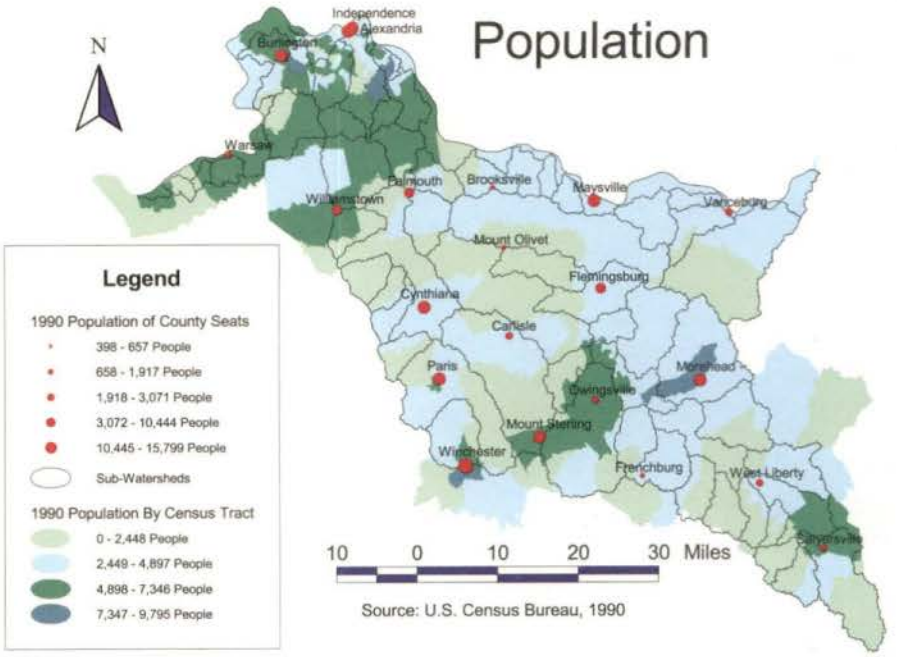
Sewage treatment plants also pose contamination problems. These may be undersized or poorly managed or maintained. This often happens with small "package"

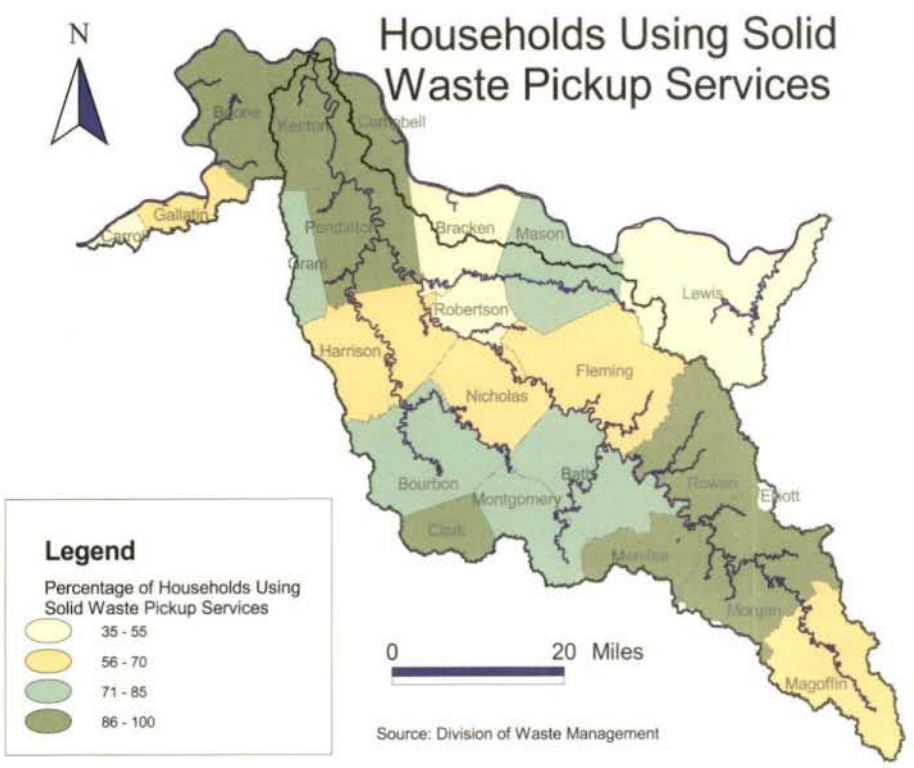


Source: Division of Water

plants which serve clusters of houses, schools or other facilities. Also, sewage plants may not be large enough to accommodate increases in population, resulting in release of raw sewage during high use.

Illegal dumping of solid waste in the watershed has been declining over the past five years due to new planning and management laws, increased enforcement, public outreach and education, and greater awareness of the environmental and economic development impacts. By law, solid waste removal and land disposal services are available in every county. However, not all households subscribe to these services (see map below). Some instances of dumping are still being reported, however, and littering is still very much a problem throughout the basin. Littering and dumping cost taxpayers in the region a considerable amount of money. For example, a single county can spend $6,000 to $20,000 annually to pick up litter, and during 1993-98 2,760 illegal dumps in the region were cleaned up at public expense. Schools, public agencies and non-governmental organizations are promoting personal responsibility and stewardship in their efforts to reduce dumping, septic discharges and environmental degradation.





Combined Sewer Overflows

In older sewer systems known as *combined sewers*, the system is designed to collect stormwater from city streets, catch basins, yard drains, etc. If the volume of sewage and stormwater exceeds the capacity of the sewer pipes or the treatment plant, a portion of the sewage-stormwater mixture is allowed to bypass the treatment process and is sent either directly to streams or rivers or is partially treated before release. Bypass pipes from combined sewer systems are known as *combined sewer overflows* (CSO's). In the Licking River region, these only exist in Campbell and Kenton Counties.

Organisms as indicators
Healthy streams have low levels of contaminants and contain a diversity of plants and animals. Certain mussels and insect larvae (caddisfly, stonefly, mayfly) are often used as indicators of good water quality, similar to the coal mine canaries used to detect poisonous gases. Since these mussels and larva can live only in relatively clean water, their presence usually indicates that problems are few in that section of the stream. Students and adult volunteers are monitoring watershed health in Kentucky by observing these indicators through the Kentucky Water Watch program.

Mayfly
Lew Kornman

Riparian area
Stream banks and the land along them are called a riparian area. With appropriate vegetation, riparian areas provide natural protection from pollutants that drain off the land. Good riparian management can prevent erosion and flooding. It also provides important habitat for wildlife because it offers food, water, shelter and a travel corridor.

How do we determine watershed health?

Healthy watersheds produce clean water – water that is fishable, swimmable and suitable as a drinking water source. Watersheds that meet these criteria support a wide variety of aquatic life and are a valuable resource. State agencies mostly follow the guidelines in the federal Clean Water Act to determine whether or not the quality of river and stream water is acceptable. Under the Clean Water Act, states set standards for the water based on how it is being used. These uses can consider the high-quality values of a wild and scenic river, a stream's importance as a drinking water source, wildlife habitat, or other uses. The standards include benchmarks for various *parameters* like dissolved oxygen, temperature, acidity, and other measurable qualities.

If a lake, river or stream meets the standards for fishing swimming, and drinking water sources, it *fully supports* its designated use (see map, centerfold). If it falls short on a few measures, it may only *partially support* its use. Failure on additional counts can mean that it is *not supporting* its designated use. Bodies of water that do not support their use must have cleanup plans that identify and quantify the problem pollutants and specify how they will be reduced. Sometimes the pollutants come from sewage treatment plants, other times they are carried into the water by runoff from towns, farms, new developments, or other areas.

Watershed health means more than good water chemistry. In addition to chemical analyses, watershed health can be measured by observing plant and animal life. For example, certain species are *indicators*. Also, habitat is important to watershed and stream health. Vegetation in the riparian area - especially shrubs and trees - provides food and cover for terrestrial and aquatic life.

While state officials have information from samples collected on the Licking River and a few of its tributaries, most of the water in the basin has not been tested. An interagency workgroup is coordinating to increase the amount of monitoring conducted in the region. By working together, tax dollars can be stretched and better information provided on the condition of the watershed. Also, citizens active in the Licking River Watershed Watch have collected data to supplement public agency information and raise public awareness. Efforts are underway to secure greater involvement from high schools, public universities and civic groups for long-term citizen monitoring in the region. Further testing may reveal other problem areas that need attention. Reducing concentrations of pollutants that exceed state standards will involve a considerable amount of cooperative action and analysis.

Kentucky Water Quality Standards

The following *parameters*, or measurable criteria, are only a few of those being used to define Kentucky's water quality standards. The standards and units for each parameter are listed below. For example, if a water sample shows more than 400 fecal coliform CFUs in a 100 milliliter sample, the water would be considered contaminated.

Parameter	Value	Units
Dissolved Oxygen	>4.0	Milligrams per liter (parts per million)
pH (measures acidity)	6-9	Standard units (7.0 = neutral)
Fecal coliform	400	Colony-Forming Units per 100 milliliters of water
Temperature	89	Degrees Fahrenheit

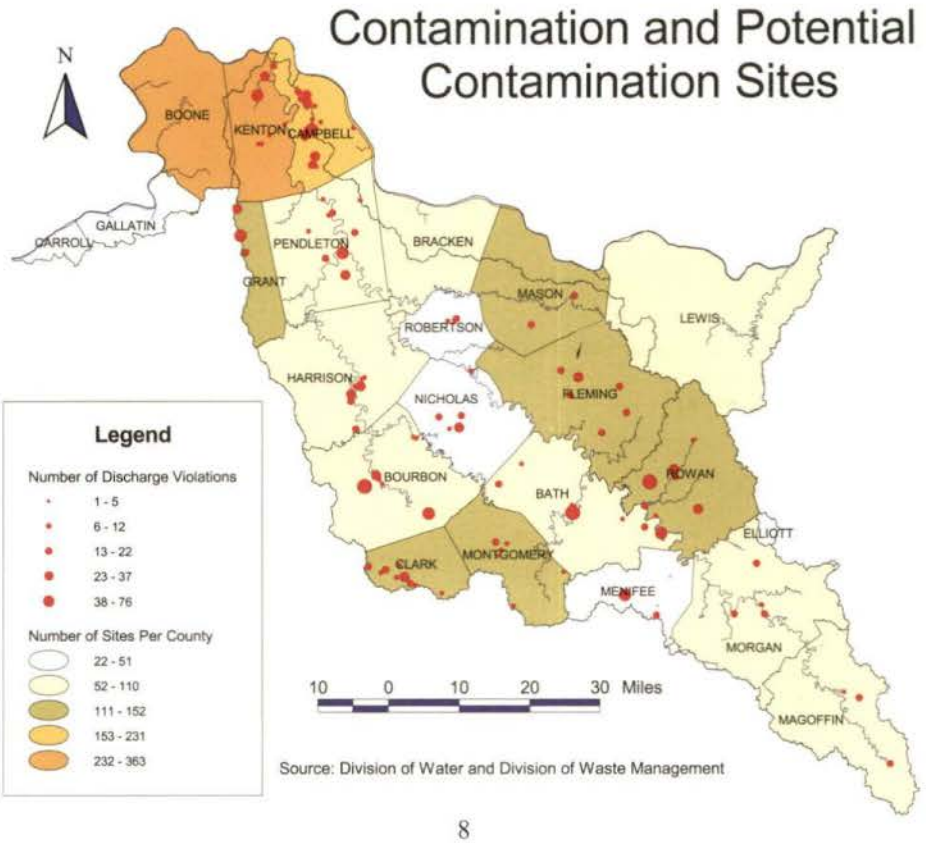
What are the water quality problems in the Licking River?

According to studies conducted over the past five years, the most common problems in the Licking River are nutrients, bacteria and sediments. Nutrients come from farm and residential fertilizers, livestock manure, faulty septic systems, and other sources. The phosphorus and nitrogen – nutrients – in fertilizers, manure and sewage cause algae to grow in the water. When the algae dies, it is decomposed by bacteria that use up the dissolved oxygen in the water. The loss of oxygen can cause fish to suffocate and die. Other bacteria – including some that may cause diseases in humans – can enter the water from inadequate septic systems, livestock manure or sewage plants and sewer lines that are bypassed or leak during heavy rains. These bacteria and the viruses and other germs that often accompany them pose a disease threat to swimmers, boaters and anglers. Sediment in the water causes muddy or cloudy conditions, interferes with fish reproduction and feeding, increases drinking water filtration costs, and generally degrades habitat. Sediment comes from poor farming, logging, development, and home building practices and stream bank erosion.

Other problems in the region come from clearing away vegetation on stream banks, straightening creek channels, undersized or poorly operated sewage treatment plants, and some industrial plants. Clearing trees and other vegetation from streams and straightening them is often done to reduce flooding, but usually only moves the floodwaters downstream and makes the situation worse elsewhere. In addition, removing trees that shade creeks and streams causes the water to become warmer, laden with algae and less suitable for fish and other organisms. It also causes streambank erosion, which can create further loss of land and add sediment to streams. Bacteria in the water means that sewage collection pipes and treatment plants in some areas need to be upgraded, along with some industrial wastewater treatment plants.

According to the Kentucky Division of Waste Management, there are many sites in the Licking River region that are contaminated or may be contaminated due to the presence of: underground storage tanks; hazardous waste facilities; landfills closed before July 1992; illegal dumps; and large tire piles, brine wells, or straight pipes.

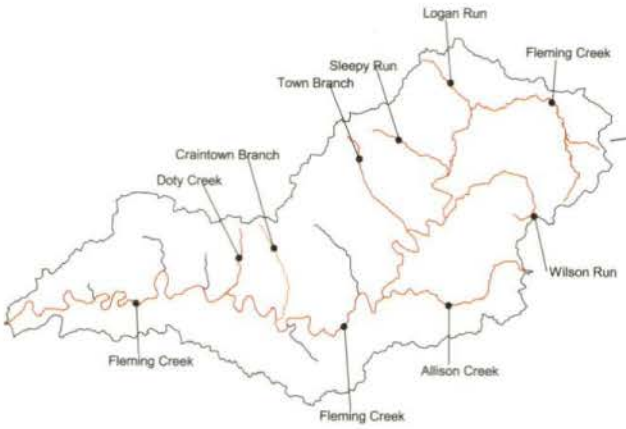
Dealing with water quality issues will take education, time, conscious change in human habits, and financial support.



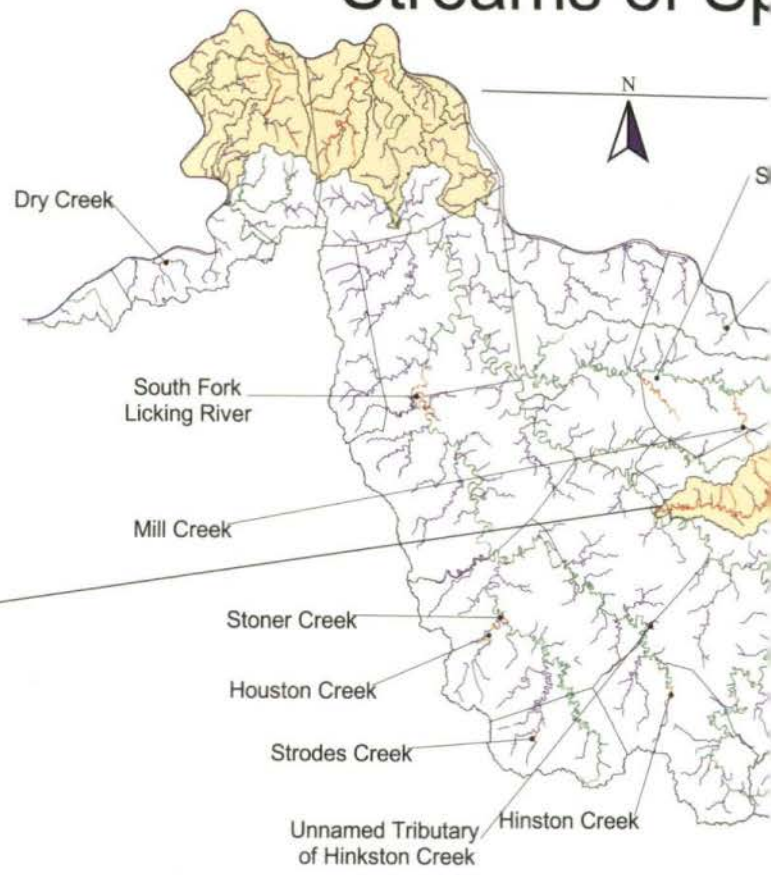
"We have the laws, regulations, statutory function, and highly qualified field and office personnel to survey, document and report the wonders and beauty of our land – and, unfortunately, the degradation of it. What is needed are committed elected officials that are dedicated to assuring that environmental laws and regulations are adhered to and properly enforced so that the wonders found within this region and throughout the Commonwealth remain wonders."

Lew Kornman,
Kentucky Fish and Wildlife Resources

Streams of Sp



Fleming Creek



Legend

- Good (Waters Supporting Uses)
- Fair (Waters Partially Supporting Uses)
- Poor (Waters Not Supporting Uses)
- Waters Not Classified
- County Boundaries
- Inset Areas

20

Source: Division of
for Biannual Report

Poor Quality Streams in the Fleming Creek Watershed

Stream (Fleming County)	Source of pollutants	Pollutants
Allison Creek	pasture grazing, intensive animal feeding operations	nutrients, organic enrichment/low oxygen, noxious native aquatic plants, pathogens
Craintown Branch	agriculture, pasture grazing, intensive animal feeding operations	nutrients, noxious native aquatic plants, pathogens
Doty Creek	pasture grazing, intensive animal feeding operations	organic enrichment/low oxygen, pathogens
Fleming Creek	agriculture	organic enrichment/low oxygen, nutrients, pathogens
Logan Run	land disposal	organic enrichment/low oxygen
Sleepy Run	agriculture, pasture grazing, intensive animal feeding operations	pathogens
Town Branch	agriculture, pasture grazing, intensive animal feeding operations	pathogens
Wilson Run	pasture grazing, intensive animal feeding operations	pathogens

All streams classified
supporting but not descri
classified by subjective
is no supporting data ab

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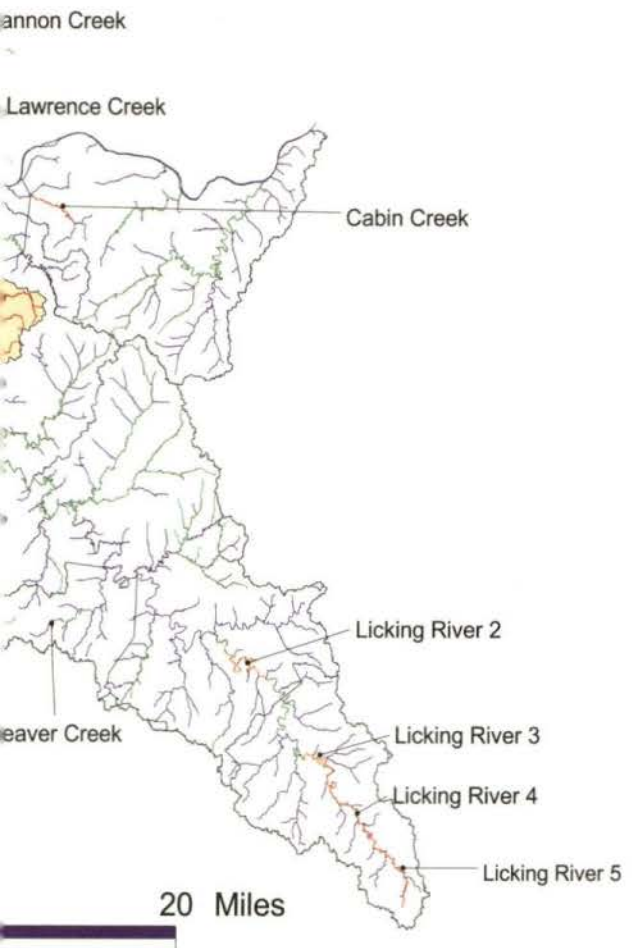

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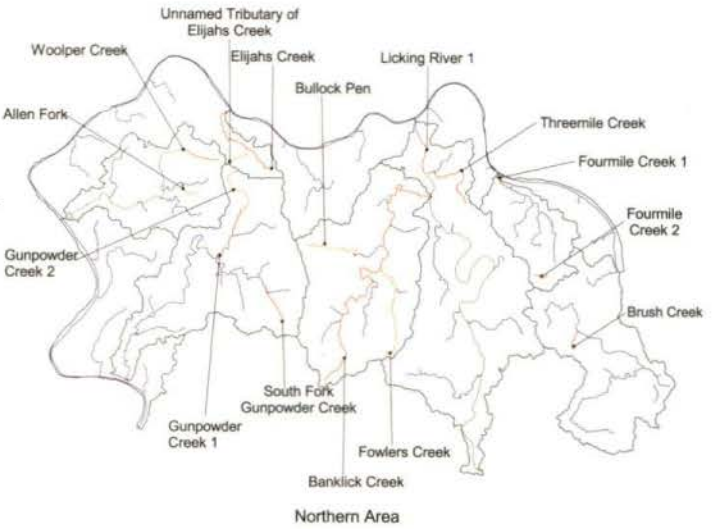

Northern Area

Poor Quality Streams in the Northern Area

Stream	Sources	Pollutants
ALLEN FORK (BOONE COUNTY)	urban runoff/storm sewers, habitat modification	siltation, habitat alteration, nutrients
BANKLICK CREEK (KENTON COUNTY)	municipal point sources, combined sewer overflow, urban runoff/storm sewers, flow modification	nutrients, organic , enrichment/low oxygen, habitat alteration, pathogens
BRUSH CREEK (CAMPBELL COUNTY)	municipal point sources	organic enrichment/ low oxygen
ELIJAHS CREEK (BOONE COUNTY)	industrial point sources	organics
FOUR MILE CREEK (CAMPBELL COUNTY) – 1	municipal point sources, small sewer plants, collection system failure	pathogens
FOUR MILE CREEK (CAMPBELL COUNTY) – 2	small sewer plants, municipal point sources, septic tanks	organic enrichment/ low oxygen
GUNPOWDER CREEK (BOONE COUNTY) – 1	urban runoff/storm sewers, industrial permitted discharges	unknown
GUNPOWDER CREEK (BOONE COUNTY) – 2	urban runoff/storm sewers, industrial permitted discharges	organics
THREE MILE CREEK (CAMPBELL COUNTY)	collection system failure	pathogens, organic enrichment/low oxygen, nutrients
WOOLPER CREEK (BOONE COUNTY)	municipal point sources, construction, flow modification, urban runoff/storm sewers	nutrients, habitat alteration, suspended solids,organic enrichment/low oxygen

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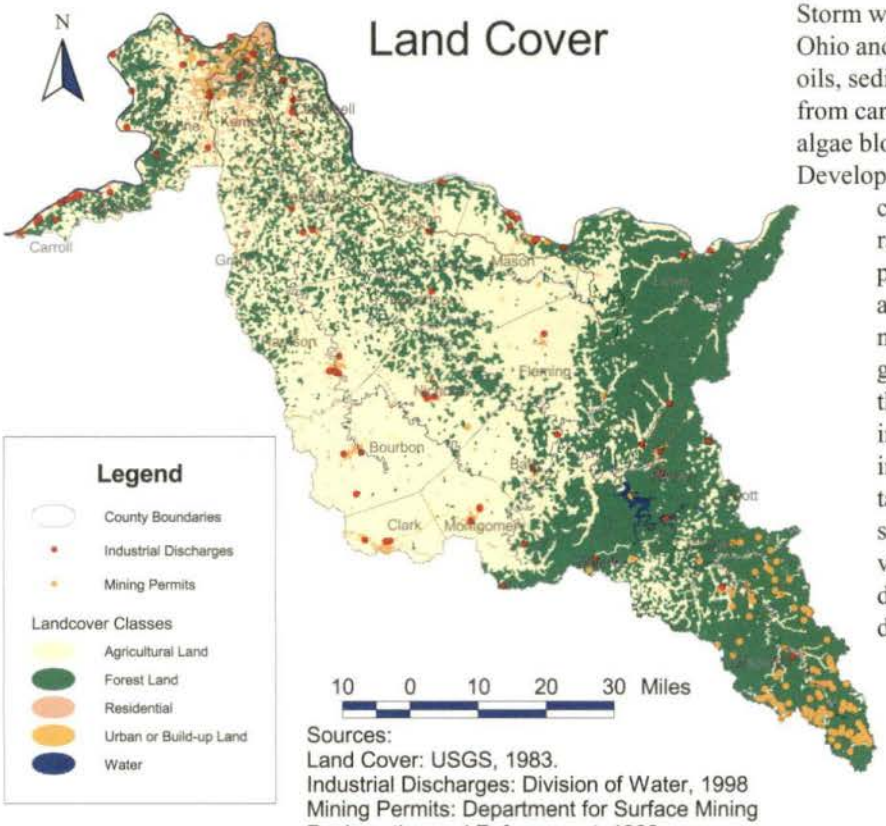
rofessional observations; there
ut pollutants and their sources.

Other Poor Quality Streams

Stream	Source of pollutants	Pollutants
CABIN CREEK (MASON CO., LEWIS CO.)	agriculture, habitat modification	siltation, habitat alteration
HINKSTON CREEK (MONTGOMERY CO.)	municipal point sources	nutrients, unknown toxicity
LICKING RIVER – 1 (CAMPBELL COUNTY)	municipal point sources, combined sewer overflow	pathogens
LICKING RIVER – 2 (MORGAN COUNTY)	municipal point sources	pathogens
LICKING RIVER – 3 (MAGOFFIN COUNTY)	municipal point sources	organic enrichment/low oxygen
LICKING RIVER – 4 (MAGOFFIN COUNTY	collection system failure	siltation
LICKING RIVER - 5 (MAGOFFIN COUNTY	collection sytem failure	siltation

How does land use affect watershed health?

Environmental studies in the Licking River region demonstrate the close link between land activities and water quality. Headwaters of the basin contain old oil and gas wells, abandoned coal mines, and logged areas, which can contribute brine, acidity and silt, respectively, to the river. The middle section of the basin flows through agricultural lands that produce row crops, livestock and their periodic by-products – water-borne sediment and manure. This manure can come from the horse farms in the South Fork watershed, dairies along the middle reaches of the river, beef cattle on farms in the Gateway Area, hogs, chickens and even household pets throughout the watershed.



Sources:
Land Cover: USGS, 1983.
Industrial Discharges: Division of Water, 1998
Mining Permits: Department for Surface Mining Reclamation and Enforcement, 1998

Storm water runoff from the cities along the Ohio and Licking rivers contains automotive oils, sediment from land clearing activities, soot from cars and other sources, nutrients that feed algae blooms, and other urban contaminants. Development and loss of greenspace also causes surges in stream levels due to rapid runoff - from roofs, roads and parking lots -which erodes stream banks and can cause localized flooding. Finally, the loss of trees, shrubs and grasses along stream banks causes further instability and erosion, with resulting increases in siltation and decreases in both instream and stream bank habitat. Channelization, the clearing and straightening of stream channels, aggravates both flooding and sedimentation, despite the common notion that it reduces flooding.

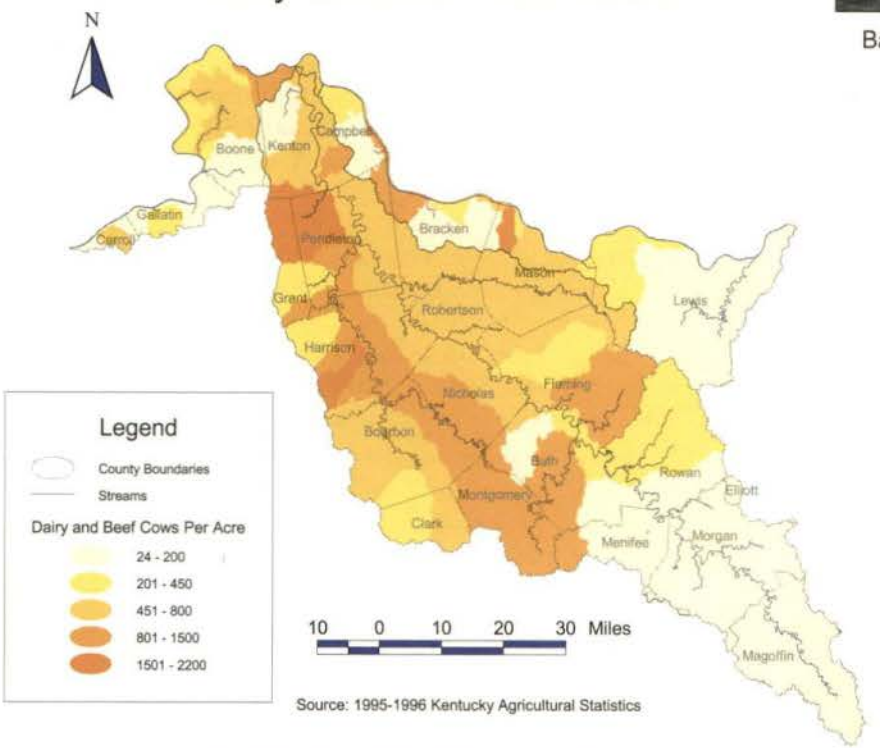
Land activities that can impact water quality

Activity	Impacts
Row cropping	Siltation, erosion, chemical and fertilizer runoff
Livestock production	Manure runoff (excessive nutrients and bacteria), damage to streamside vegetation, bank erosion
Logging	Loss of streamside trees, bank erosion, siltation from roads, increased runoff
Mining	Acidity and sulfates from iron sulfide rocks, sediment, runoff surges
Oil and gas drilling	Brine from drilling, sediments, oily runoff
Residential yards	Lawn and garden chemical and fertilizer runoff, higher runoff velocities
Urban development	Siltation from land clearing, runoff surges (oils and metals) from roofs, roads, parking lots
Industrial facilities	Chemical runoff from material storage areas, soot deposits, runoff surges, spills
Commercial development	Runoff surges (oils and metals) from parking lots, roofs; sediment from land clearing
Stream clearing	Sedimentation, loss of wildlife/mussel habitat, loss of shading (increased temp.), flooding
Channelization	Increased flooding, sedimentation, loss of fish/insect habitat, loss of mussel beds
Construction in floodplains	Increased flooding, siltation, danger to life and property

Logging in Rowan County - *Lew Kornman*

Bank failure on Banklick Creek (Kenton County) - *Lew Kornman*

Dairy Cows and Beef Cattle



Source: 1995-1996 Kentucky Agricultural Statistics

Practices that reduce impacts from land activities

Activity	Management practices
Row cropping	Use conservation tillage, targeted chemical use, strip cropping, and streamside buffers.
Livestock production	Move facilities uphill, install waste treatment systems, stream fencing, and setbacks.
Logging	Skid on the contour, avoid streams, preserve streamside trees, and install water bars.
Mining	Reclaim mined areas, mix acid and alkaline material, add erosion/sediment controls.
Oil and gas drilling	Store or treat wastes from drilling, control sediments and oils.
Residential yards	Reduce/eliminate lawn/garden chemical use, preserve streamside vegetation.
Urban development	Sediment/erosion/stormwater controls, minimize land clearing and pavement, preserve existing trees.
Industrial facilities	Cover stored materials, control/treat runoff, minimize air/water discharges.
Commercial development	Minimize land clearing, control/treat runoff, reduce parking lots/road sizes.
Stream clearing	Minimize clearing, preserve vegetation, promote greenways/buffers.
Channelization	Decrease flooding by reducing or slowing runoff, restore streamside wetlands.
Construction in floodplains	Limit or eliminate development in floodplains.

Broke Leg Falls (Menifee County) - *Lew Kornman*

Recreational resources

The rivers and streams of the Licking region provide a resource far beyond residential and industrial use. Healthy watersheds support fishing, boating, hunting, hiking, biking, and other outdoor activities important for recreation, social outings, community development, peace of mind, and other quality-of-life amenities. From the headwaters streams of Magoffin County, through the knobs and the Bluegrass regions and on to the Ohio River corridor, the waters of East Central Kentucky have always held a special place in the hearts of the people. Indeed, affection for the watershed and recreational resources has collided with mining, drilling, logging, development, littering, dumping, and inadequate sewage treatment in the watershed.

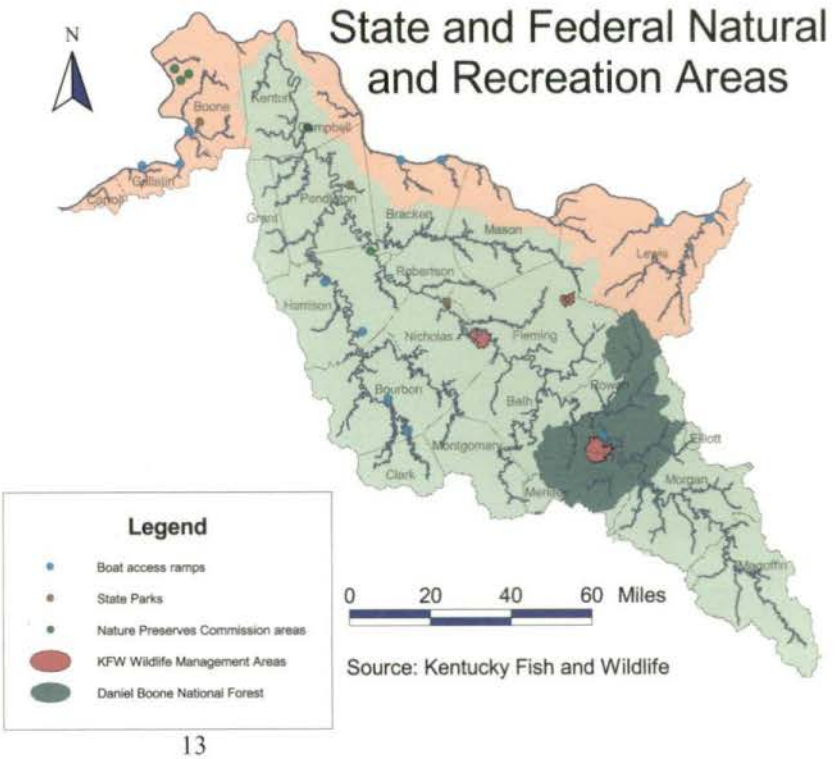
Opportunities abound for accessing and enjoying the rivers and streams of the region and appreciating the unique qualities they offer. Town parks along the Licking River and the smaller streams of the region can be found in West Liberty, Frenchburg, Morehead, Owingsville, Mt. Sterling, Paris, Cynthiana, and most of the cities in Northern Kentucky and along the Ohio River. Cave Run Lake, in the upper third of the Licking basin, is a tremendously popular recreational lake with catfish, largemouth bass, white bass, crappie, and an excellent muskellunge fishery. Hikers can travel throughout the Daniel Boone National Forest along the Sheltowee Trace or dozens of others around Cave Run Lake, or visit the natural areas and wildlife management lands scattered through the region.

"I've been to just about every state in the union, and I can tell you this: There's nothing more beautiful than the Licking River valley in the fall of the year. Nothing."

Barry Tonning,
Ky. Waterways Alliance

A canoe livery on the main stem of the Licking near Falmouth is popular during the warmer weather, along with swimming at Kincaid Lake State Park in Pendleton County, Lake Carnico in Nicholas County, Campbell County Lake south of Covington, Clear Creek and Rebel Trace lakes in Bath County (Daniel Boone National Forest), and Maysville/Mason Co. recreation lake. For larger boats and even more fishing and recreational opportunities, the Ohio River country in Carroll, Gallatin, Boone, Kenton, Campbell, Bracken, Mason and Lewis counties is hard to beat.

Kinniconick Creek: a living legacy. Kinniconick Creek in Lewis County drains one of the most beautiful and biologically rich watersheds in the east. A native "muskie" stream, Kinniconick is home to more than 60 species of fish including the popeye shiner, trout perch, longhead darter, and several species of bass. The 51-mile stream flows into the Ohio River near Garrison and is bordered by relatively steep terrain formed from shale, siltstone, and sandstone.



Living resources

The Licking River region drains the far western edge of the Eastern Mesophytic Forest, one of the most biologically diverse areas In North America. With its varied geography and wide range of plant and animal species, the region contains some highly valued habitat and important living resources. The Licking River, some of its tributaries, and Kinniconick Creek are rare examples of native muskie streams. A total of 110 species of fish inhabit the region. Largemouth, spotted and smallmouth bass, rock bass, bluegill, crappie and catfish are the most popular for fishing throughout the region. The basin also supports several unique fish species: redside dace, mimic shiner, streamline chub, slender madtom, blue sucker, an occasional paddlefish, and eastern sand, tippecanoe and sharpnose darters. Besides fish, the Licking River is home to more than 50 species of mussels, 11 of which are rare or endangered. Some of these mussels face reproduction problems from cool water discharges from the Cave Run Lake. The recent appearance of the non-native zebra mussel in the basin may also threaten native mussel species. In addition, other fish and mussels face threats related to habitat loss, siltation, and *algal blooms*.

Many birds live throughout the region, but loss of nesting habitat and predation have decreased native and migratory bird populations. Still, more than 248 species of birds have been seen over time at the Minor Clark fish hatchery and the Cave Run Lake area alone. Woodducks, warblers, belted kingfishers, Canada geese, and great blue herons are common; more rare are the tundra swan and marbled gotwit. Bald eagles also overwinter in this area. Woodland birds, including the wild turkey, grouse, and several species of owl, also make their homes in this part of Kentucky.

Wood ducks - *Lew Kornman*

Are algal blooms bad?
Algae is actually a mass of tiny plants that live in the water, and some algae is normal and even necessary for healthy streams. However, when high levels of nutrients – mostly phosphorus and nitrogen from manure and fertilizers – are washed into a stream, algae can become a problem. Since algae are plants, the nutrients (fertilizers) make them grow. Algal blooms can become quite large in the summer as they grow and reproduce, but like all living things they eventually die and decay. Algae is decomposed by bacteria that use oxygen dissolved in the water to breathe – the same oxygen that fish need to keep from suffocating. That's why warm weather algal blooms are sometimes followed by low dissolved-oxygen levels and fish kills.

Wetlands and watershed health
Wetlands help filter pollutants from runoff, reduce flooding, and provide valuable habitat for plants, animals, and other organisms. Kentucky has wetlands associated with rivers, lakes and forested areas, each with its own structure and particular function. While the Licking River region still has nearly 70,000 acres of valuable wetlands, this represents less than one-fifth of the wetland acreage that existed a century ago. Protecting the wetlands that remain and developing new wetlands in areas that were once drained can help ease flooding and improve water quality. Unfortunately, more and more is lost "a little at a time."

Threatened and endangered species in the region

Animals:
Bald eagle
Eastern small-footed bat
Grey bat
Indiana bat
Virginia big-eared bat
Yellow-crowned night-heron

Plants:
Canadian Yew
Cutleaf Meadow-parsnip
Grassleaf Arrowhead
Ground Juniper
Porter's Reedgrass
Rock Skullcap
Rose Pogonia
Rosy Twisted-stalk
Running Buffalo Clover
Short's Goldenrod
Spotted Pondweed
Sweet Pinesap
Wood Lily
White-haired Goldenrod
White Rattlesnake-root
Woodland Beakrush
Yellow Gentian

Mussels:
Elktoe
Fanshell
Salamander
Many other mussels are believed to be extinct

Fishes:
Slender madtom

Source: Kentucky State Nature Preserves Commission and U.S. Fish and Wildlife Service

"The Licking River supports at least one endangered mussel species which indicates water quality is good in some locations. Much data has been obtained which documents pollution impacts near the mouth. However, very little is known about water quality in other areas of the watershed. Hopefully, the information obtained through the Licking River Watershed process will provide a better, overall picture of water quality throughout the basin."

Kevin Flowers,
Ky. Division of Water

Amphibians such as the mudpuppy, hellbender, northern dusky, and northern red salamander and others are found near streams in the area, along with gray tree frogs, northern cricket frogs and spring peepers and turtles like the stinkpot, map, midland painted, and spiny softshell. Snake species include banded watersnake, garter, rough green, and black rat, copperhead and timber rattler. Mammals like the gray and fox squirrel, whitetail deer, chipmunks, gray fox, beaver, muskrat, mink, and river otter can also be seen along the streams and in upland areas.

Muskie - *Lew Kornman*

Kinniconick Creek (Lewis County)

Floods and Droughts:

Too much rainfall and too little rainfall are natural occurrences. However, the difficulties caused by these natural events can be exaggerated or limited by human activity. Most people understand the folly of building in the floodplain of a river, yet few understand that replacing natural vegetation with lawns and pavement can cause floodwaters to rise. There is much to learn about the nature of stream flow, and we are only beginning to understand how the sum of all of our activities affect floods and droughts.

The Drought of 1887 spurred construction of dams on the Ohio River to reduce the impact of periods of low flow on river boat navigation on which the region's economic health depended. Cave Run Lake, a popular recreational area, was constructed for flood prevention in the early 1970s.

The Ohio River is successfully managed for navigation, and Cave Run Lake meets many recreational needs. However, there are significant side effects. During periods of low flow, the water level of the Ohio and Licking Rivers near their confluence in Northern Kentucky is now maintained at least 20 feet higher than what it would be without controls. This elevated water level is common to each tributary to the Ohio River, and is also common to the streams that have been flooded by the construction of the dam at Cave Run Lake. These inflated streams have permanently submerged sand beaches previously used for recreation, wetlands once adjacent to the rivers, farmland, and wildlife habitat.

Fluctuations of rainfall impact groundwater storage and surface water flows. During droughts – especially in the 1980's, some areas of the Licking River region have suffered water shortages. During times of excessive rainfall, areas of the region flood. One devastating example of flooding occurred in the Licking River in March 1997. During a three day period it was estimated that more than 12 inches of rain fell. The streams and rivers of the Licking watershed swelled to record levels. In the city of Falmouth, at the confluence of the South Fork and main stem Licking River, hundreds were left homeless and four deaths were attributed to the flooding.

High flows and water quality

Watershed Watch volunteers collected samples during a rainstorm. The samples were tested to see how much fecal coliform was present in the water. This is a bacterial indicator of human or other animal waste. Fecal coliform was found in very high concentrations. A week later, when stream levels had subsided, volunteers returned to each site for another sample. This time, fecal coliform counts were only a fraction of the levels in the first sample. These results show that stormwater runoff is bringing fecal coliform into the stream from the land. Streams may also become muddier with heavy rainfall.

During times of low stream flow, which occur more often in the late summer and early fall, streams may be less muddy. During times of low flow, most of the water in streams comes from groundwater inflow.

Scene of flood at Cynthiana, Ky., 1997

"In 1746, Benjamin Franklin wrote, 'When the well's dry, we know the worth of water.' All of us have a mandate to remember that there is no price tag that can be applied to an adequate supply of water and water that is clean and healthy."

Tom Leith,
Licking River Valley RC&D

"We read in the Biblical creation story that God said, 'Let the waters abound with an abundance of living creatures, and let birds fly above the earth across the face of the firmament of the heavens.' Few places on earth have retained the rich diversity from those days when the earth was young. We who live in the Licking River region are fortunate to have such a place that has retained much of this diversity.

We must endeavor to make wise decisions with what we have been provided."

Mike Rice
Ky. Division of Water

What can I do to help?

A variety of actions are needed to improve water quality in the Licking River basin, and nearly everyone who lives in the watershed can help. Support, encouragement and financial assistance will be required to motivate farmers, loggers and developers to adopt erosion and sediment controls. Farmers, homeowners and golf course managers need to reduce the amount of fertilizers and chemicals they apply to their lands. People who own property along the creeks and rivers must recognize the importance of trees, shrubs and tall grasses along the banks and in the floodplains. Educational materials and technical information are needed on the importance of leaving streams alone – avoiding the temptation to channelize them, clear their vegetation, straighten them out, dig up their gravel bars, and control their flows. People who dump trash along creeks or toss litter from their vehicles have to be educated on how they are hurting the environment. Everyone can help.

Several new initiatives are underway to address water pollution caused by activities on the land. The 1998 *Forest Conservation Act* requires trained Master Loggers to be present where timber is being cut, skidded and loaded to ensure that proper measures are taken to preserve streamside trees, minimize road-building impacts and reduce erosion. The *Kentucky Agricultural Water Quality Act* provides that farmers must develop soil and water conservation plans to address impacts from plowing, fertilizing, chemical applications, livestock production, and other activities.

But progress cannot be realized just by passing laws – people have to get involved if improvements are to be made. Some people may want to help collect water quality information by becoming a monitoring volunteer, while others might spread the word that trees and native vegetation should be preserved, especially in new development tracts and along streams in our towns and cities. Those who care about the impacts of trash and other debris may wish to participate in cleanup projects to remove these eyesores from the river and its tributaries. We are beginning to have a pretty good understanding of how we should treat the land and its waters in order to maintain a high level of water quality in our Commonwealth.

If you would like more information, please contact the Kentucky Division of Water or other members of the Licking River Region Team listed on the back page of this booklet - or check out the Internet. Thank you for your interest, and your support of healthy watersheds in Kentucky!

Kentucky Watershed Management Framework

This report has been produced as part of Kentucky's Watershed Management Framework, which is a new approach to improving the health of the state's water bodies. 1998 is the first year of a five-year planning and management cycle for the Licking River region. During the second year, several agencies and organizations will conduct extensive monitoring in the region. During the third year, people throughout the region will confer to decide which small watersheds should receive intensified resources during years four and five of the cycle. In year four, improvement plans will be made for the small watersheds selected, and in year five, many agencies and organizations will implement those plans. The cycle then begins again in 2003, with a new evaluation and a new Status Report.

Get connected!

There is a lot of information on the Internet about the Licking River region, watershed health, and related matters. Check out these sites to learn more about the science and practice of watershed management in Kentucky and the nation.

http://www.lickingriver.org Licking River information
http://water.nr.state.ky.us/dow/watrshd.htm statewide context for Kentucky's watershed initiative
http://water.nr.state.ky.us/watch/licking.htm Licking River Watershed Watch volunteer monitoring project
http://state.ky.us/nrepc/water/wwhomepg.htm Ky Division of Water, Water Watch volunteer monitoring
http://water.nr.state.ky.us/dow/ Kentucky Division of Water
http://www.state.ky.us/agencies/nrepc/dnr/forestry/dnrdof.html Kentucky Division of Forestry
http://www.state.ky.us/agencies/nrepc/drn/FAC_flyer.html Ky. Div. of Conservation (agric. and water)
http://water.nr.state.ky.us/303d/ Kentucky list of priority impaired ("TMDL") streams
http://130.11.24.1 Kentucky district of the US Geological Survey
http://www.pipeline.com/~mrrunoff/ Center for Watershed Protection
http://ctic.purdue.edu/ Conservation Technology – good source for agricultural practice recommendations
http://www.usda/gov/stream_restoration/newtofc.html stream corridor restoration guide
http://www.bae.ncsu.edu/bae/programs/extension/wqg/ N. Carolina water quality research center – especially for agric.
http://earthl.epa.gov/owow/nps/ex-bmps.html photos of recommended resource management practices
http://www.epa.gov/owow/monitoring/vol.html volunteer monitoring information
http://www.lib.uconn.edu/canr/ces/nemo/nsmodule/nsdetail.html nonpoint source info for local officials
http://www.epa.gov/owow/nps/ US EPA nonpoint source pollution
http://www.epa.gov/owow/wetlands/ US EPA wetlands information
http://aquatl.ifas.ufl.edu/photocom.html aquatic plant photos, listed by common name
http://www.estd.wvu.edu/nsfc/ information about small-quantity wastewater treatment options
http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/Key1.html macro invertebrate key
http://www.epa.gov/owowwtr1/monitoring/AWPD/RBP/chlmain.html
US EPA rapid bioassessment protocols for characterizing habitat and other conditions
http://www.amrivers.org/ American Rivers, a river protection organization
http://www.rivernetwork.org/ River Network, a river protection organization

Telephone Contacts

Licking River Basin Watershed project (Pamla Wood):	(502) 564 – 3410
Licking River Watershed Watch (volunteer monitoring):	(606) 873 – 1340
Ohio River Valley Sanitation Commission: (volunteer monitoring)	(800) 359 - 3977
Water Watch (Ken Cooke): (water body adoption and river cleanups)	(502) 564 – 3410
Ohio River Sweep (Ohio R. Valley Sanitation Commission: (cleanups)	(800) 359 - 3977
Illegal dumping (Kentucky Division of Waste Management):	(502) 564 – 6716
Dead animal removal reports (Ky Dept. of Agriculture):	(502) 564 - 3956
Kentucky Waterways Alliance (river protection groups):	(502) 524 – 1774
Forest Conservation Act (Kentucky Division of Forestry):	(502) 564 - 4496
Kentucky Agricultural Water Quality Act:	(502) 564 – 3080
Kentucky Department of Fish and Wildlife Resources:	(502) 564 – 5448

Also try your local District Health Department (cleanup days, septic problems, and illegal dumping), Conservation District office (agricultural practices), RC & D office (agricultural practices), or county Solid Waste Coordinator (illegal dumping).

Licking River Region Team Members

Steve Alexander	U.S. Department of Fish and Wildlife
Dave Daniels	Gateway District Health Department
Kevin Flowers	Ky. Division of Water, Northern Ky. Regional Office
Jason Heath	Ohio River Valley Water Sanitation Commission
Rodney Hitch	Rowan County Government
Marc Hult	Daniel Carter Beard Environmental Education Center
Lew Kornman	Ky. Department of Fish and Wildlife Resources
Tom Leith	Licking River Valley Resource Conservation & Dev. Dist.
Mike Mattox	Slate Creek Nonpoint Source Pollution Project
Marty McCleese	USDA Natural Resources Conservation Service
Susan Patton	Licking River Watershed Watch
Brian Reeder	Morehead State University
Michael Rice	Ky. Division of Water, Morehead Regional Office
Barry Tonning	Kentucky Waterways Alliance
Nathan Sturm	Northern Kentucky Area Development District
Heidi Van Keuren	Northern Kentucky Area Development District
Jon Walker	USDA Forest Service, Daniel Boone National Forest
Pamla Wood	Team Coordinator, Ky. Division of Water

Natural Resources and Environmental Protection Cabinet

Kentucky Waterways Alliance

USDA NRCS Natural Resources Conservation Service

ORSANCO

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