

Watershed Plan for the Red River Gorge Watershed (051002-04-120) and Region

The Red River Gorge watershed is largely wooded, much of it is managed by the U. S. Forest Service, and its streams are mainly in good condition relative to the rest of the basin. Other watersheds in the Red River drainage are also mostly forested, with many healthy streams. Yet illegal dumping, the loss of streamside vegetation, erosion, and runoff from towns, fields, mines, and mills are a concern in many places in the drainage, and pathogens in several creeks threaten public health. The Red River Gorge watershed is in Wolfe, Menifee, and Powell counties.

The Red River Task Force seeks to improve watershed conditions in the entire Red River region while maintaining economic and recreational opportunities. One priority is to make it easier for landowners and homeowners to obtain funding for improvements that benefit both them and the watershed. Other priorities are to eliminate straight pipes and garbage dumping throughout the area, to promote awareness and appreciation of the watershed, and to minimize the adverse impact of outdoor recreation on the land and water. The means to all these ends will be a broad, locally based, regional network for communication and cooperation on watershed issues.

The following watershed plan emerged through the combined input of local task force members and agency personnel who participated in a series of meetings on this watershed, culminating in a planning workshop (see list of participants on page 30). Task force members and agency personnel examined monitoring data, agency programmatic information, and local knowledge assembled through the framework process as a factual background for the meetings. During the workshop, an independent facilitator asked planning participants to identify the issues they felt were most important. Next, the group went through a priority-setting process to highlight the issues and actions of greatest concern to the group. Finally, they discussed what steps should be taken next to address issues in the watershed.

Goals and strategies for action are listed on page 26. A color map of the Red River watersheds appears on page 129. The watershed summary for this watershed appears on page 260.

Assessment and Ranking (2000)

Ranking metrics

The Red River Gorge watershed ranked high in the protection category of the framework prioritization formula. The watershed includes the Red River Gorge Geological Area, the Clifty Wilderness, and parts of the Red River designated as an outstanding national resource water, a state wild river, a federal wild river, and a federal scenic river. The watershed ranked in the medium group for potential and

observed impacts. The adequacy of water supplies is an issue there. Permitted discharges and discharge violations in the watershed are both well above average. Population without access to public sewers is also above average for the basin, and nearly 300 straight pipes and failing septic systems have been identified in the section of the watershed served by Eastern Kentucky PRIDE.

Agency data assessment

Of 236.4 miles of streams in the watershed, 67.5 miles were assessed for the 2000 305(b) report. Only one 1.5-mile segment failed to support all uses: an unnamed tributary of Swift Camp Creek that runs through Campton does not support aquatic life, based on biological data. Sedimentation contributes to impairment of the stream. The other twelve assessed stream segments fully support aquatic life.

The unnamed tributary of Swift Camp Creek was not on the 303(d) list before the watershed management year 2 assessment, so there is not yet a TMDL. The Red River in Menifee County was listed as a second priority for TMDL analysis of aquatic life impairment by nutrients and sediment (river miles 59.9 to 94.2); a portion of the segment identified in 1998 fully supported aquatic life in the 2000 assessment (59.4 to 65.9). DOW plans to delist the entire segment. Another segment of the Red River—mostly in the Red River mouth watershed but partly in this one—that was a first priority for TMDL development in 1998 will also be delisted after being designated in full support in the 2000 assessment.

Volunteer data

During summer 1999, a Kentucky River Watershed Watch site on the Red River exhibited elevated chromium and selenium. A site on Swift Camp Creek showed elevated chromium. Sites sampled during 2000 and 2001 did not show detectable levels of these metals.

Identification of Issues and Opportunities (2001)

This watershed ranked seventh in the basin in protection score. Two-thirds of the watershed is managed by the U.S. Forest Service as part of the Daniel Boone National Forest. The Forest Service is interested in watershed management and willing to focus on this watershed, which already is among the most monitored in the basin because of USFS stream sampling. Jon Walker, the hydrologist for the Daniel Boone National Forest, strongly supports participation in the framework, and had undertaken a watershed analysis of the Red River Gorge watershed. USFS has authorized use of funding for water sampling and watershed inventory in support of task force activities. Other ongoing projects of USFS, such as a long-term plan for the gorge, will dovetail with framework goals. Watershed Watch also plans to expand its monitoring in this part of the basin, including a focused series of sampling for fecal coliform.

In much of the watershed, conditions are good. Twelve of thirteen assessed stream segments fully support aquatic life. The one that does not (in the town of Campton) could become a model for watershed task force work in addressing sedimentation. This watershed as a whole can also be a model application of the watershed approach to preservation of resources. Many places in the watershed are threatened by their very popularity as recreational sites: overused campsites and informal picnicking areas along waterways are becoming hot spots for erosion and direct contamination of streams. The Forest Service is seeking innovative ways to provide recreational opportunities while protecting the water, the stream banks, archaeological sites, and endangered species. Other local concerns include the impacts of dumping, all-terrain vehicles, and logging outside the national forest.

The watershed provides water to the Campton public water supply system and receives treated sewage. The sewage system has some problems, but it is in the process of being upgraded.

Community support for protection of the Red River has been strong in the past and should be strong in the future. The Friends of the Red River sponsors two annual tire roundups to remove junk from the riverbed. PRIDE projects have cleaned up dumps as well. Watershed Watch monitors sites in the region. The Forest Service, conservation districts, and various citizen groups provide a nucleus that will be expanded to include other stakeholders.

Although the Red River Gorge watershed is not a headwaters watershed, it is the portion of the Red River that is most feasible to protect. It is thus an important part of the Red River drainage. The Gorge watershed includes the Clifty Wilderness, the Red River Gorge Geological Area, and sections of the Red River designated a wild and scenic river. It receives water from the Stillwater Creek watershed and the Red River headwaters watersheds: there is very little data on water and habitat quality in these two headwaters watersheds, which are heavily wooded but lie outside the National Forest. Outreach efforts for the Red River might easily target all the watersheds within the drainage of the Red, even while more active management activities focus on the Gorge watershed. The tributary of Swift Camp Creek that is impaired is a headwaters stream. A restoration project focused here or on other such tributaries would be capable of clearly documented progress.

Planning Workshop (October 2001)

Goals and strategies for action

Priorities

- Promote awareness and appreciation of the watershed.
- Work to eliminate straight pipes and garbage dumping throughout the area.
- Provide opportunities and incentives for landowners to restore streamside vegetation.

- ❑ Moderate the impact of outdoor recreation by addressing overuse of trails and dispersed campsites.

Additional watershed issues

- ❑ Find ways to eliminate the problem of sawmill waste that blackens water, keeping in mind that logging is economically important.
- ❑ Evaluate the effects of stormwater runoff from Campton into Swift Camp Creek, including sewage during rain events.
- ❑ Take advantage of funding for stream restoration in old mined sites.

Jurisdictional challenges

Cross-county watersheds and a history of competition between counties pose difficulties in forging a collaborative effort. Counties differ in such areas as the qualifications for agricultural financial assistance. There are also jurisdictional differences between congressional districts: for example, PRIDE funding has not been available in Powell County in the past. Cooperation is further complicated by the fact that the drainage includes three area development districts (ADDs), three field offices for the state environmental protection agencies, two resource conservation and development districts (RC&Ds), and three area conservation districts (ACDs). Participation of local residents from every county is essential: “outsiders” won’t get the job done. Local citizens should direct the effort and keep government in the background.

First steps

- ❑ Expand the Red River Task Force. Include all those present, bring friends, involve the conservation districts, invite extension agents, educators, health departments, community groups, sporting clubs, churches, and others.
- ❑ Focus on the entire Red River drainage (including parts of Clark, Montgomery, Powell, Estill, Menifee, Wolfe, and Morgan counties.).
- ❑ Garner local support and participation across all counties. Don’t allow a stigma of “outsider” activists to develop.
- ❑ Address issues stemming from jurisdictional fragmentation and intercounty competitiveness. Need more coordination among groups and agencies.
- ❑ Hire a local watershed coordinator to enhance participation, education, and coordination.
- ❑ Boost low participation in programs (such as PRIDE and cost-sharing for BMPs) that could positively affect the watershed. The up-front money required for many programs is a barrier: find ways to ease this burden.
- ❑ Promote education (for children and adults) about this watershed and about interrelationships of land use and human activities with public health, recreation, water quality, and fish and other aquatic life.
- ❑ Build in a concern for private property and satisfy property owners.

Increasing coordination of ongoing activities and enhancing participation

The task force should pursue regional cooperation and promote more use of existing programs for farmers and landowners. Relevant programs include: phase one agricultural funds for forage improvement, etc.; statewide funds for ag water quality activities (reimbursable); Farm Bill appropriations, depending on what passes; EQIP funds; conservation easements under various programs; KDFWR private lands programs; CARA funds for cleanup of pollution; KDFWR In Lieu Fee funding for stream restoration; and USDA Forest Service programs for riparian areas. PRIDE now offers grants to pay for straight pipe elimination, and PRIDE funds dump cleanup projects on a reimbursement basis.

The Conservation Reserve Program is a central tool. A continuous signup process is available to protect streams and lakes, plant trees, build fencing (cost share at 90%), and provide funds for gravel access and city water for cattle. The off-stream filter strip (20-180 feet) or riparian buffer (50 feet on each side of stream) is more popular in Powell County and Bath County, where farms are larger. This program pays rental fees on cropland, based on soil type.

The task force should try to provide money up front to people using the reimbursable programs, perhaps through a non-profit trust fund with the ability to supply short-term loans or advances for future reimbursables. The Kentucky Waterways Alliance, local banks, and RC&Ds might be potential sponsors for this initiative. It might be possible to negotiate payments at the end of each phase of a project, rather than at completion.

Discrete projects at specific sites can serve as focal points for cooperative efforts. The recently completed USFS hydrologic condition analysis contains specific ideas for solving problems; restoration projects are planned along Swift Camp Creek. USFS is working in Spaas Creek to improve that area and monitor illegal off-road vehicle use. Local groups could influence increased funding for USFS management. USFS is committed to finishing the forest management report in 2002. Friends of Red River holds an annual river cleanup at two sites during May and June. Heartwood and Sierra Club have helped to clean up of Swift Camp Creek and Sand Hill dump.

Expanding local participation in the task force

- Approach people where they live.
- Hire a local coordinator. The Kentucky Waterways Alliance could act as tax-exempt umbrella for funding a watershed coordinator. They would also consider helping to secure funding for a coordinator. Contact The Nature Conservancy to find out how the local coordinator for Horse Lick Creek has succeeded.
- Private lands biologists and district conservationists are valuable resources.
- Stocking trout and muskie in the Gorge area and elsewhere has potential for gaining support from the fishing population, for water quality.

- Friends of Red River will meet to address the local participation issue.
- Make use of educational programs and materials from the Division of Conservation and USFS: the Gladie Cultural and Environmental Visitor Center provides an education outlet and source.

Watersheds to include in jurisdiction of the task force and watershed plan

- Red River headwaters watershed (051002-04-110)
- Red River Gorge watershed (051002-04-120)
- Stillwater Creek watershed (051002-04-130)
- Middle & South Forks of Red River watershed (051002-04-140)
- Cane Creek watershed of Red River (051002-04-150)
- Red River mouth watershed (051002-04-160)
- Hardwick Creek watershed (051002-04-170)
- Lulbehrad Creek watershed (051002-04-180)

Data Collection

- Assemble sampling results from USFS and Kentucky River Watershed Watch and examine these for future monitoring needs.
- Evaluate the effects of stormwater runoff from Campton into Swift Camp Creek, including sewage during rain events.
- Develop a better understanding of the sediment problem in the impaired Campton tributary of Swift Camp Creek.

Watershed concerns, by area

Upstream areas

It is important to include upstream areas that influence the lower watersheds, especially the agricultural areas of the Red River headwaters and Stillwater Creek watersheds and the mining impacts from upstream. Sediment from mining, agriculture, and logging needs to be addressed. Part of the headwaters of South Fork is used by off-road vehicles. Restoration of old mined sites is possible. There are straight pipes and garbage dumping above Lacy Creek. Establishment of riparian zones above Big Branch is important. At Big Branch there is a notably high cancer rate among women, but the significance of this has not been established.

Swift Camp Creek

In the Swift Camp Creek drainage, permitted and unpermitted sewage inputs and runoff from Campton need monitoring. Participants wonder how prepared the county is for spill incidents. The area contains many high-quality streams: Dog Fork is one of six brook trout streams in the state. Overuse of trails and dispersed campsites along the stream causes sedimentation, compaction of soil, accumulation of garbage, and contamination of the creek by food waste and human waste.

Indian Creek

In the watershed of Indian Creek, overuse of trails and dispersed campsites causes problems, as in Swift Camp. Old rock quarries and their impacts are not all known. Sawmill waste fouls some creeks. Stream crossings have become almost dams in places, posing barriers to fish migration. Off-road vehicle use is extensive.

Spaas Creek

Off-road vehicle impacts are significant in the Spaas Creek area. One county road was designated for four-wheelers by the fiscal court.

Downstream areas

Powell County and areas downstream of the Gorge watershed have more agriculture adjacent to the river than the upstream counties. Agricultural activity has multiple impacts, including sedimentation. From Stanton downstream, logging practices and sawmill waste piles may have an impact, particularly in Big Amos and Morgan Hollow. Fecal coliform bacterial contamination tends to increase from upstream to downstream.

Entire watershed

Watershed-wide issues include the loss of protective riparian vegetation along streambanks and the effects of erosion and sediment on aquatic habitat and on ecosystem function. Other concerns are the impacts of storms on the creeks, and concerns about health and safety related to drinking water quality, possible toxic sites, animal waste management, and visual blight from dumping of household garbage and solid waste. The side effects of natural gas drilling and exploration, include saline water, should also be considered, especially in the South Fork Red River. The potential mining of oil shale in the region might raise other issues.

Participants in the Red River Workshop Phase

Workshop was held October 9, 2001, at Campton

Local Representatives

Dan Dourson, Powell County resident

Kim Feeman, Friends of Red River

Wade Gibbs, Wolfe County PRIDE Coordinator

Jason Issac, Kentucky Division of Conservation regional office

Amy Kistner, Church of the Good Shepherd

Jim Lacy, Wolfe County Conservation District

Russ Miller, Wolfe County Solid Waste Coordinator

DuWaine Morton, Kentucky River Watershed Watch

Donnie Richardson, USFS, Stanton District Office

Randy Smallwood, NRCS, Menifee and Bath counties

Rita Wehner, USFS, Stanton District Office

State and Federal Program Representatives

George Chalfant, USFS, Daniel Boone National Forest

Jorge Hersel, USFS, Daniel Boone National Forest

Lew Kornman, Department of Fish and Wildlife Resources, Fisheries

Bill Sampson, Department of Fish and Wildlife Resources, Watersheds

Jon Walker, USFS, Daniel Boone National Forest

Staff

Jennifer Thompson, facilitator (Kentucky Natural Resources Leadership Institute)

Pamla Wood, workshop recorder (Licking River Basin Coordinator, DOW)

Greg Epp, Kentucky River Basin Coordinator (KWRRRI for KRA)

Lee Colten, Watershed Framework Manager (DOW)

Point of Contact

Rita Wehner, U.S. Forest Service, Stanton District Office

705 West College Avenue, Stanton, KY 40391

(606) 663-2852

Watershed Plan for the South Elkhorn Creek Watershed (051002-05-270)

The South Elkhorn Creek watershed is among the largest and most populous watersheds in the basin. It includes urban and suburban areas and agricultural land. The top priorities for the watershed are to mount a determined effort to reduce the pollution from urban stormwater runoff, to prevent flood losses, to safeguard public health by tracking and eliminating sources of pathogens in surface waters, and to reduce phosphorus loading that threatens the ecological balance of the streams. One strategy that addresses all of these goals is the adoption of new approaches to planning new development and designing drainage systems. Another is restoration of trees and other natural vegetation adjacent to streams. Educational outreach is critical for raising public awareness of the problems and solutions, in both urban and rural sections. More specialized training can help specific groups implement measures to prevent these problems.

The following watershed plan emerged through the combined input of local task force members and agency personnel who participated in a series of meetings on this watershed, culminating in a planning workshop (see list of participants on page 42). Task force members and agency personnel examined monitoring data, agency programmatic information, and local knowledge assembled through the framework process as a factual background for the meetings. During the workshop, an independent facilitator asked planning participants to identify the issues they felt were most important. Next, the group went through a priority-setting process to highlight the issues and actions of greatest concern to the group. Finally, they discussed what steps should be taken next to address issues in the watershed.

Goals and strategies for action are listed on page 35. A color map of the South Elkhorn Creek watershed appears on page 149. The watershed summary for this watershed appears on page 330.

Assessment and Ranking (2000)

Ranking metrics

Rankings of the South Elkhorn Creek watershed were high for every segment of the framework prioritization formula. Groundwater sensitivity is higher than almost anywhere in the basin (4.82 compared to a mean of 3.21 and median of 3). The numerous stream impairments demonstrate the stress placed on the watershed. In addition, potential impact scores suggest high risks to water resources: the concentrations of livestock are high for the Kentucky River basin, as is the population without public sewers and the projected rate of population growth. Only one watershed has more permitted discharges, and only three have accumulated more discharge violations. Only one watershed has more potential contamination sites.

Agency data assessment

Of 122 miles of streams in the watershed, 59.9 miles were assessed for the 2000 305(b) report, and six assessed creek segments (17.8 miles) did not fully support all of their designated uses, based on biological and water-quality data. Pathogens, organic enrichment, alterations of flow and habitat, agricultural practices, municipal point sources, storm sewers, and urban runoff contribute to the impairment of these streams. Specifically, the 2000 305(b) assessments show that: Lee Branch in Midway only partially supports primary contact, due to pathogens; Wolf Run in Lexington fails to support primary contact and only partially supports aquatic life; one segment of South Elkhorn Creek fails to support aquatic life due to siltation; and three segments of Town Branch in Lexington only partially support aquatic life; two of these segments of Town Branch were assessed for primary contact and failed to support it, due to pathogens. Several of these streams are already on the list of impaired waters for conditions identified in previous assessments. Total maximum daily load (TMDL) plans are under development by UK for low dissolved oxygen and high levels of nutrients in South Elkhorn Creek and Town Branch. UK is also undertaking TMDL studies on pathogens to address problems in Town Branch, Wolf Run, and South Elkhorn Creek.

Volunteer data

Kentucky River Watershed Watch samples seventeen sites in the watershed. Data for Beals Run, Steeles Branch, and one of the sites on South Elkhorn Creek show high levels of bacteria indicative of fecal contamination (above 200 colonies/ml). Lee Branch exhibited elevated sulfate levels. Phosphorus levels at every site where it was analyzed were well above the level that may cause potential nutrient enrichment problems (> 0.1 mg/l). Town Branch and three sites on South Elkhorn showed nitrate nitrogen concentrations above 10 mg/l, which is the drinking water supply standard and EPA's maximum contaminant level. Lead, copper, selenium, and thallium were significant in several samples. Traces of the organophosphate insecticide chlorpyrifos were detected at a few sites.

Identification of Issues and Opportunities (2001)

The watershed is among the most polluted and most populated in the basin, but it is also the focus of many efforts to prevent and reverse degradation. The Bluegrass Conservancy and Thoroughbred RC&D have secured \$100,000 for a program to purchase easements to reduce nonpoint source pollution specifically in the South Elkhorn, North Elkhorn, and Elkhorn Creek watersheds. The purchase of development rights program in Fayette County will also help preserve open space.

The Planning Committee of the Lexington-Fayette Urban County Council resolved at their session January 22, 2001 to support the city's involvement in a Framework task force for the South Elkhorn. Council members are concerned with

and active in issues such as stormwater management, greenspace preservation, and stream restoration projects.

Lexington's engineer in charge of water quality has implemented a number of programs to characterize and rectify water pollution in the city's streams. Public education and public involvement are an important emphasis in these programs.

The county has planning and zoning, and water and water quality management are central to the greenway master plan, now under development. Fayette County's water quality assessments and stormwater studies are conducted on a watershed basis. The county's Division of Engineering plans in the near future to inspect stormwater and KPDES permits, watershed by watershed, in a new initiative to encourage full compliance. An administrative procedure to deal with violations of the county's antidegradation statute has been proposed as a means to streamline proceedings that must now go to district court.

Potential partners in Fayette County, in addition to the urban-county government, include Town Branch Trail, a not-for-profit group whose object is to create a greenway along Town Branch. Rehabilitating the stream corridor, restoring natural habitat, and addressing water quality impairments in the creek are important to creation of the greenway. The group is dedicated and well organized, has already obtained grants and donations in excess of \$22,500 for the trail project, and is building impressive public support for the concept. There is great potential for synergy between goals for the trail and wider watershed management objectives, as is evident from the report prepared by the Environmental Quality Committee of Town Branch Trail (choose "Explore" at <http://www.townbranch.org/>).

There is significant interest in this watershed outside Fayette County. The basin team's regional meeting for the Bluegrass drew people from five counties, and the South Elkhorn watershed was the first priority of more than 75% of the participants. The watershed also received fully 50% of votes for participants' top three priorities, although nine of the eighteen watersheds in the region received votes. Those from Franklin and Scott counties supported attention to the South Elkhorn, but interest was especially strong in Woodford County.

Watershed Watch has more volunteer sampling sites in the South Elkhorn Creek watershed than in any other Kentucky River Basin watershed. Volunteers come from all five counties of the watershed. The local strength of this organization will be a significant asset in terms of both monitoring capability and citizen involvement. The group is producing Citizen Action Plans for both the South Elkhorn and the Town Branch/Wolf Run subwatersheds (see page 108).

In Woodford County, the Judge-Executive sees the Kentucky River basin as a useful basis for regional cooperation and planning. He chairs the Board of Health and is working to limit the collective impact of septic systems on water quality. The Board of Health and Fiscal Court have considered various means to ensure regular maintenance and inspections. The county engineer represented the judge at

our regional meeting and expressed further interests in parks and planning as they relate to water issues. Kentucky River Watershed Watch would like to focus on contamination of Woodford County streams by septic systems. Lees Branch and the South Elkhorn Creek itself are of particular interest to both the county and Watershed Watch.

The South Elkhorn Creek watershed represents a prime opportunity for inter-jurisdictional cooperation to solve water problems and protect land and water. Human and financial resources are more concentrated than in other parts of the basin, and awareness is high. Because the watershed is so large, it will make sense to focus early attention on the subwatersheds where impairments and local interest are both clustered: in Woodford County and central Fayette County. These areas can serve as proving grounds for approaches that can subsequently be applied to other parts of the watershed and adjacent watersheds in the counties. A focus on the watershed as a whole can be maintained for protection measures and public education efforts.

TMDL development is well advanced in this watershed in comparison to most of the basin, meaning that a task force here will have some analyses to work with in devising strategies for the restoration of impaired streams. Dr. Lindell Ormsbee of The Tracy Farmer Center for the Environment is directing the TMDLs for streams in this watershed and plans to engage the task force as an advisory body for the process. The South Elkhorn Creek watershed is a headwaters watershed. There is no USGS gage in the watershed, although there is one on the North Elkhorn and one on Elkhorn Creek.

Planning Workshop (September 2001)

Goals and strategies for action

Priorities

- Raise awareness about stormwater pollution to reduce contamination.
- Investigate stormwater treatment options.
- Strengthen spill prevention and response capability for Town Branch and elsewhere.
- Identify strategies to address stockyard and muck pile runoff.
- Determine nutrient load in South Elkhorn and how much comes from each source (TMDL is in progress, and sewage plant permit revision is coming).
- Promote planning, design, and development processes that take watershed issues into account.
- Facilitate development of a greenway along Town Branch, ensuring that the greenway is incorporated into the designs for both the landfill closure and the extension of Newtown Pike.

First steps, by issue

Watershed planning. Pursue a regional conference to exchange ideas with decision makers and implementers in local governments. Advocate the best construction practices. Address topsoil removal from construction areas, urban sedimentation from construction runoff, design of water retention structures for both flow control and water quality, and the importance of appropriate riparian buffers. Hold urban site design workshops and trainings: a list of watershed planning trainers is available on the Framework web site. Promote greater consideration of impervious surfaces and of soils and geology in planning. Develop and implement TMDLs, and address the Town Branch sewage discharge. Promote a greenway adjacent to Town Branch. Keep abreast of Ag Water Quality Act activities. Reduce livestock access to creek.

Urban stormwater. Install drain markers indicating the stream each street drain is connected to. Fayette County is beginning this in spring 2002 and other counties can take advantage of the program they have developed. Compile a map of watershed hotspots for potential water pollution. Review hot spots to determine whether facilities hold correct permits and to identify facilities that should have KPDES permits or should be routing effluent to sanitary sewers rather than storm sewers. Develop a call list for reporting incidents in each county to the appropriate authority.

Implement an educational outreach program on urban stormwater runoff, nonpoint source pollution, best lawn and garden practices, and proper disposal for homes and businesses. Target Town Branch and Wolf Run first.

Riparian buffers (streamside vegetation). Assemble riparian buffer articles and a database of property owners to send these articles to. Talk to neighborhood organizations or civic groups about riparian zones, building on Bev Juett's project. Establish buffers on government properties to demonstrate projects.

On-site sewage. Develop a program to disseminate information on the needed maintenance of septic systems. Increase communication and connection between this group and the state health department.

Organizational priorities

- Affected audiences need to be involved in order for the effort to succeed: there is concern that the framework process is agency driven. What is the appropriate role for the agencies and individuals present?
- Share information and networking to maximize existing efforts. Distribute the water quality data already collected more widely, and coordinate data collection to fill gaps in knowledge.
- Partner with existing programs on education and publicity.
- Meet on an interest group level: the whole group to meet less frequently; the smaller groups to meet more often. Priority interests are Town Branch,

urban stormwater runoff, on-site sewage systems and maintenance, riparian buffers (streamside vegetation), and flooding as it relates to watersheds.

- ❑ Establish a “working group” of county/city authorities and DOW authorities to work together for enforcement issues.
- ❑ Hold a regional seminar/conference/workshop for community planners and authorities to discuss land use issues and watershed management.
- ❑ Include landowners in the process.

Watershed priorities and actions by issue

Urban runoff

- ❑ Hold a regional conference to share ideas on urban runoff with decision makers and implementers in local governments.
- ❑ Install drain markers indicating the stream each street drain is connected to. Fayette County is beginning this in spring 2002, and other counties can take advantage of the program they have developed.
- ❑ Compile watershed hotspots for potential water pollution. Review these to determine whether they have the permits they should.
- ❑ Lawn care education campaign needs funding.
- ❑ Case studies from Lexington for other cities.
 - Herbaceous cover needs variance from noxious weed ordinance.
 - Detention/retention basin management (400 basins in Fayette County): planting trees on homeowner-held land.
 - Water quantity models are in development for Lexington, watershed by watershed, for retrofitting areas in Fayette County to minimize flooding.
 - Construction and lack of sediment control authority: an education for other communities. Training citizens on how to take people to court if they are improperly constructing.

Streamside vegetation zones

- ❑ Education is the key. Inform the public to stop mowing creekside areas in general and to let vegetation grow back naturally along the banks.
- ❑ Identify the areas of greatest need and focus there.
- ❑ Start by establishing buffers on local government property.
- ❑ Urban forestry grants are available for urban buffers.
- ❑ Buffer zones would benefit from increased rental rates for the Conservation Reserve Program (state funds; \$66/acre rental; cost share is \$99/acre).
- ❑ Bev Juett has a mailing list for riparian landowners. (She did an educational project in Woodford, Scott, and Franklin Counties on the South Elkhorn.) Get a newsletter article out as first step. Newspaper and newsletter articles for neighborhood associations, web resources, etc. are useful media.

Septic/onsite wastewater systems

- ❑ Need better standards for siting new systems and rehabilitation of existing systems, and need more uniform inspection by the local health departments.
- ❑ Need to review and revise standards for regulating installation and maintenance: state has the authority to do this. Must more clearly define the division of authority and responsibilities between DOW and Department of Public Health. An action plan developed for the Kentucky Environmental Quality Commission is an attempt to help with this.
- ❑ The educational process for the owners, installers, and regulators of septic systems should be ratcheted up.
- ❑ Prioritize and then target problem areas for more intensive new outreach programs.
- ❑ Health departments could distribute educational materials with inspections.
- ❑ The secondary home market could provide educational materials during the transfer of property. Materials are available from DOW. Potential legislation would require inspection of wastewater system before property changes hands.

Flooding

- ❑ Enforce floodplain construction laws and permits more thoroughly.
- ❑ Encourage local governments to undertake stream restoration rather than drainageways.
- ❑ Have city engineers and local officials engineer better retention basins.
- ❑ Mount joint efforts between local government and other agencies to study the hydrology (Corps of Engineers).
- ❑ Increase the size of riparian buffers by involving both public support and private landowners. Currently, stormwater regulations require 25' of non-disturbance zone on either side of a stream and other buffers and easements.

Town Branch

- ❑ Main issues: urban stormwater, solid waste/garbage, sewage treatment plant, stockyard.
- ❑ Main resources or programs: TMDL and stormwater permitting. Both are short of staff and lack political support at times.
- ❑ Short term strategy: Lexington will work with state government to come up with targeted areas to work on. They will target problems that are solvable and can garner the needed resources and political will.
- ❑ TMDLs will calculate limits on phosphorus, but can they fix the problem?
- ❑ Lexington will send letters soon to holders of stormwater permits, to remind them of responsibilities.

- ❑ Work with agencies implementing the landfill closure plan to ensure compatibility with a Town Branch greenway.
- ❑ Organize cleanups to remove solid waste in streambeds and along banks.
- ❑ Need proactive ways to act rather than reacting to problems.

Data Collection

- ❑ Define which concerns are actually problems and which are most pressing.
- ❑ Develop a mechanism to more specifically define sources of impairments.
- ❑ Gather sources of data for the watershed, and identify further data needs.
- ❑ Distribute information already available; share data.

Watershed concerns, by area

Town Branch and Wolf Run

The Town Branch and Wolf Run subwatersheds, in central Lexington and western Fayette County, are affected by many impacts and have diverse needs.

Impacts on Town Branch and Wolf Run

- ❑ Urban runoff, via storm sewers that run to streams, includes nonpoint source pollution of many types, among them lawn chemicals and fertilizer.
- ❑ Stormwater also carries frequent spills and discharges.
- ❑ Other concerns include solid waste, landfill leachate (the city plans to cap and close the landfill), and stockyard runoff. Fecal coliform bacteria contaminate Town Branch above the sewage treatment plant.
- ❑ The treatment plant discharges phosphorus and organic matter, as well as transferring large quantities of water from the Kentucky River (source of the city's water supply) to Town Branch.
- ❑ Riparian/streamside buffers have been lost during the development of the watershed, and there has been a dramatic increases in impervious cover in the headwaters. For example, the watershed of Wolf Run is more than 60% impervious.
- ❑ The increase in impermeable surface affects water quality, water quantity, and geomorphology. Productive agricultural bottom lands downstream often flood as a result of rapid runoff from impervious surfaces.

Needed action for Town Branch and Wolf Run

- ❑ Mount a stormwater education campaign so that people know that storm sewers drain to Town Branch and know how to prevent damage. Creeks are “invisible” to most of Lexington: we need to attract attention to them and make them a focal point.
- ❑ Identify facilities that should be routing effluent to sanitary sewers or that should have a KPDES permit.

Kentucky River Basin Management Plan

- Promote revegetation of riparian areas and urban forestry opportunities to improve the watershed.
- Ensure that a greenway is incorporated into the landfill closure plan and the design for the Newtown Pike extension.
- Obtain needed assistance for the McConnell Springs contamination site.
- Clean up accumulated solid waste in and near streams.

South Elkhorn above Town Branch

- Need assistance from DOW to ensure that industrial discharge/stormwater permits are enforced (Fayette County will be asking to see permits).
- LFUCG Ordinance 16, section 73, says anything that is added to stormwater that makes a chemical or physical change to stormwater is illegal. Encourage LFUCG to enforce that law.
- The airport abuts the creek and its tributaries. Cave Hill Creek or South Elkhorn Creek will be moved for airport expansion. Also, de-icing glycol materials affect water quality.
- Filling or rerouting stream systems produces loss of aquatic habitat and hydrologic modifications that decrease baseflow. Such practices are particularly common in developing areas of northern Jessamine County and southern Fayette County.
- In the Hometown Road area near Shannon Run, septic systems are built low and close to the bedrock and not adequately installed.
- Muck piles, composting operations, and stockyards are present in the South Elkhorn watershed.

South Elkhorn below Town Branch

- This section of the creek is affected by Town Branch nutrient loads.
- High fecal bacterial levels are common after rainfalls in most agricultural zones.
- Runoff from cattle operations.
- Runoff from pastures turned into horse farms, with increased spraying for pasture maintenance.
- Inadequate leach fields at mobile home parks.
- Plans and potential for new development, which include a stockyard and commercial/industrial development, Woodford EDA.
- Other development sites: Lees Branch; I-64 interchange at Midway/KY 341; Rte. 421; Fishers Mill (Woodford/Scott line).
- New bridge construction concerns: cleaning woody debris and how they are going to construct the bridge and reroute traffic, controlling sediment.
- Head of South Fork to the Forks of Elkhorn: development causing flooding.

- ❑ At the Forks of Elkhorn, the severity of floods is increasing. Bacteria and nutrients from livestock and fertilizer runoff are a concern there too.

Watershed-wide issues

- ❑ Onsite wastewater issues: get people to maintain septic tanks and to keep records. Information is available via homeowner plan, groundwater protection plan, and Farm-A-SYST; must find ways to reach homeowners with this material.
- ❑ Dispel the misconception that properly installed and maintained septic systems will protect groundwater in karst. Encourage better design of septic systems.
- ❑ Riparian/streamside buffers and development: promote protection and expansion of streamside vegetation. Narrow line of trees is not adequate for wildlife or to protect water quality.
- ❑ Urban/rural runoff and contaminants and impervious surfaces.
- ❑ Urban construction: sedimentation from poor practices. Also, removal of topsoil increases impervious surface for all practical purposes.
- ❑ Low-level dams impacting fish habitat, siltation, eutrophication.
- ❑ Nutrient load: what are the sources?
- ❑ Improve Elkhorn for smallmouth bass.
- ❑ Livestock access to the creek leads to animal waste in water and bank degradation.
- ❑ Nonpoint source pollution from lawn chemicals and agriculture.
- ❑ Need for coordinated decision making on watershed issues (such as the impervious cover) across jurisdictional boundaries.
- ❑ Sanitary sewer overflows: inflow and infiltration into collection systems during wet-weather events, also illegal roof drains and sump pumps. These overload the treatment plant and cause bypasses that result in raw sewage being discharged.
- ❑ Pressure for development in northwest Fayette County, Leestown Pike, etc.
- ❑ Loss of streams, riparian areas, and habitat is widespread: not much effort to mitigate for stream loss.
- ❑ Homeowners, street flushing into storm sewers and creeks.
- ❑ Retention and detention basins: choose options for better design.
- ❑ Are there treatment options for stormwater runoff?
- ❑ Ignorance of geology and soils in making decisions about development.
- ❑ Solid waste in creeks: where does it come from and why?
- ❑ Enforcement and intergovernmental coordination/cooperation.

Participants in the South Elkhorn Workshop Phase

Workshop was held September 5, 2001, at Midway

Local Representatives

Lynn Brammer, DOW Frankfort Regional Office
Arthur Craig, County Engineer, Woodford County
Amanda Curry, NRCS Ag Water Quality program, Woodford County
Don Dampier, Kentucky River Watershed Watch
Stan Dyer, property owner and canoeist, Elkhorn Creek
Charles Farmer, NRCS, Fayette County
Fred Goins, Vice Judge Executive, Franklin County
Joe Gormley, County Judge Executive, Woodford County
Don Hassall, Blue Grass Area Development District
Yvette Hurt, Town Branch Trail, Inc.
David Gabbard, Lexington-Fayette water quality engineer
Steve Jackson, Lexington Division of Environmental and Emergency Management
Bev Juett, Kentucky River Watershed Watch
Phillip Kring, Magistrate, Franklin County
Bill McGowan, Kentucky River Watershed Watch
Kerry Prather, Department of Fish and Wildlife Resources, central Ky. fisheries
Whitney Probst, Scott County Conservation District
Jim Rebmann, Lexington-Fayette Planning
Randal Rock, NRCS, Woodford County
Clay Smitson, Department of Fish and Wildlife Resources, private lands wildlife
Patrick Thompson, UK policy intern
J.R. Williamson, Scott County Fiscal Court

State Program Representatives

Benjy Kinman, Department of Fish and Wildlife Resources, Fisheries
Gary Levy, DOW Enforcement Branch
Bennie McWain, DOW Facilities Construction Branch
Ed Neal, DOW Water Resources Branch
Beverly Oliver, DOW Groundwater Branch
Shanda Pace, DOW Nonpoint Source Section, grants administration
Ron Price, DOW Program Planning, grants administration
Bruce Scott, DOW KPDES Branch
Bob Ware, DOW Assistant Director and Kentucky River Authority
Corrine Wells, DOW Nonpoint Source Section

Staff

Jennifer Thompson, facilitator (Kentucky Natural Resources Leadership Institute)

Pamla Wood, workshop recorder (Licking River Basin Coordinator, DOW)

Greg Epp, Kentucky River Basin Coordinator (KWRRRI for KRA)

Lee Colten, Watershed Framework Manager (DOW)

Point of Contact

David Gabbard, LFUCG Division of Engineering
200 East Main Street, 8th Floor, Lexington, KY 40507
(859) 258-3410

Watershed Plan for the Eagle Creek Mouth Watershed (051002-05-410)

The Eagle Creek mouth watershed is largely agricultural, but it is likely to experience development in the near future. The terrain is steep, so the potential for erosion is high. The watershed contains a number of small streams with problems, and Eagle Creek itself carries high concentrations of bacteria. There is general concern about the nutrient and sediment runoff from agricultural land and of sediment runoff from construction activities. One priority is to promote practices for construction and land management that can prevent soil loss and degradation of the streams. A principal strategy is to fund implementation of the existing 1992 watershed plan for the Lick Creek subwatershed. Another priority is to eliminate the pathogen contamination of local streams. A new regional sewer system and a study of the total maximum daily load for pathogens will help with this. Other priorities are to foster a regional discussion of development, design, hydrology, and flooding and to determine what is needed to restore degraded creek sections and minimize losses from flooding. Landowners, local government, citizens and other stakeholders have a leading role to play in developing specific plans.

The following watershed plan emerged through the combined input of local task force members and agency personnel who participated in a series of meetings on this watershed, culminating in a planning workshop (see list of participants on page 50). Task force members and agency personnel examined monitoring data, agency programmatic information, and local knowledge assembled through the framework process as a factual background for the meetings. During the workshop, an independent facilitator asked planning participants to identify the issues they felt were most important. Next, the group went through a priority-setting process to highlight the issues and actions of greatest concern to the group. Finally, they discussed what steps should be taken next to address issues in the watershed.

Goals and strategies for action are listed on page 47. A color map of the Eagle Creek mouth watershed appears on page 151. The watershed summary for this watershed appears on page 370.

Assessment and Ranking (2000)

Ranking metrics

Eagle Creek mouth watershed was the only watershed in the north end of the basin that rated a high ranking of overall need for action under the framework prioritization formula. A cluster of stream impairments among tributaries to Eagle Creek was one reason. The level of bacteria in Eagle Creek itself, and its conse-

quent failure to support use for swimming was another. The potential for agricultural erosion was calculated to be 5.35 tons/acre, substantially higher than the 3.2 tons/acre mean for all watersheds in the basin (values for watersheds ranged from 0.57 to 9.79, with a median of 2.96 tons/acre).

Agency data assessment

Of 89.4 miles of streams in the watershed, 40.8 miles were assessed for the 2000 305(b) report, and 25.9 miles fail to fully support all designated uses. Three of the nine assessed creek segments in this watershed do not support their designated uses. Segments of two other streams only partially support theirs. The upper end of Eagle Creek (the only place in watershed that was assessed for bacteria) had levels of bacteria too high to support primary contact recreation. A short stretch of Buck Run (siltation) and part of Moseby Branch (flow alteration and habitat alteration) fail to support aquatic life. Lick Creek (siltation and habitat alterations) and Twomile Creek (flow alteration) only partially support aquatic life.

Eagle Creek proper (creek miles 0 to 38.8) was listed for TMDL development (nutrients and pathogens) in 1998, at that time as a second priority. UK's Tracy Farmer Center for the Environment is conducting the TMDL under an EPA grant. The tributaries of Eagle Creek in this watershed were not on the 303(d) list before the watershed management assessment, so there are as yet no TMDLs. The tributaries will be listed on the 2002 303(d) list in October 2002, and TMDLs will be scheduled then.

Most of the identified impairments within the watershed are in lower-order tributaries rather than on the main stem of the creek. Achieving and documenting improvements should not, therefore, be complicated by inflow of contaminated water from upstream watersheds, and focused restoration projects would be quite feasible on tributaries such as these.

Volunteer data

Kentucky River Watershed Watch took one sample from Eagle Creek in July 1999, near the bottom of the watershed, and the fecal coliform count was very low. No samples were collected there in 2000. In July 2001, samples from two sites on Eagle Creek, at the head of the watershed, yielded fecal coliform counts of 610 and 810 col/100 mls. Dissolved oxygen values from all three sites were in the 5-6 mg/l range.

Identification of Issues and Opportunities (2001)

Eagle Creek emerged as the regional priority at the meeting held for the northern counties of the Kentucky River basin in Owenton (January 2001). Participants in the regional meeting and in subsequent discussions provide a nucleus of

service personnel who can provide technical expertise. The Eagle RC&D Council is prepared to take a guiding role in this effort and offers a multi-county organization and experience with grant writing and program development. Members of the council include county and city officials and members of conservation boards. Theoda Franklin, the Regional Coordinator for the Council, has supported the Framework process from its beginning. The local NRCS district conservationists have also participated in our meetings.

Local concerns are a microcosm of the basin: major issues include water supplies for homes and livestock, sewage disposal, and agricultural effects on sediment, stream banks, and pathogens. Flooding concerns many residents of the watershed because of recent severe and frequent flood events. Streamside vegetation is lacking in many places. Woodland management, overgrazing, and loss of habitat for small game and songbirds are also a problem.

Owen County is reorganizing its water utilities, and the county government is keenly interested in water supply and source water protection issues. Some of these issues will be beyond the scope of a watershed task force, but they can be addressed at a basin or regional level. Others are watershed-level issues. Several of the counties, for instance, have been pursuing ways to increase the compliance of septic systems and reduce their impacts on water quality.

Watershed meetings organized by the Kentucky Waterways Alliance in 2001 drew mainly people from Sanders, where the mayor, Jack Ogden, and members of the town council took an active interest. Flooding and siltation in Eagle Creek and Lick Creek were among their leading concerns. The group expressed interest in development strategies that would minimize impacts on the watershed and creek.

NRCS developed a watershed plan for the Lick Creek subwatershed in 1992. Funding the implementation of this plan is an important goal.

A new sewage collection line for a regional wastewater treatment plant in Carrollton will be operational this spring, serving Glencoe, Sparta, and Sanders. The project will eliminate all package treatment plants except those at Eagle Valley Camping Resort and Eagle Creek Resort. It can also be expected to divert some of the sewage that now reaches the creek from failing septic systems or straight pipes. The Speedway's temporary package plant will be eliminated once the sewer line is complete. People along the line will be required to connect to the sewer system: KRS 037 requires hookup. There is no regional sewer authority. The TMDL (total maximum daily load) research now underway will evaluate whether bacterial contamination of the creek remains a problem once the sewer is in use, and the TMDL analysis will provide a strategy for solving remaining contamination. Implementation of solutions can be facilitated by the watershed management framework process.

Planning Workshop (September 2001)

Goals and strategies for action

Development, hydrologic change, and flooding

Residential and commercial development on highly erodible land (e.g., the Sparta and Sanders area) is likely to become rapid. Future development around the Kentucky Speedway could have substantial impact on runoff volume. Already, severe streambank erosion is evident in places (e.g., Folsom/Glencoe area), and sedimentation elsewhere (e.g., Sanders area) has filled channels and degraded fishing.

These effects may be related to watershed changes well upstream (such as the increased percentage of impervious cover associated with new development). Hydrologic modification and streambank erosion will occur as permeable surface is lost to development, and present stormwater retention requirements are not adequate (especially at 35 & I-71) to prevent destabilization of streams. Flooding is also an issue: development in the floodplain of Eagle Creek and its tributaries should be discouraged. New ways to protect the creeks and the water quality while creating growth opportunities are desirable.

Sediment and nutrient runoff

There is general concern about nutrient and sediment runoff from agricultural land and siltation from construction activities. Better design and management practices should be encouraged. Construction BMPs could reduce water quality impacts caused by projects near the interstates. Promoting BMPs in agriculture can protect natural resources in the watershed, without causing hardship to farmers. The NRCS has developed a master plan for the Lick Creek subwatershed, but needs funding to put the plan into action. The restoration of streams—for example, Moseby Branch and Lick Creek—whose condition has been degraded should be a priority.

Pathogens

Residents want to protect public health and maintain and enhance recreational opportunities related to the creeks, i.e., fishing, swimming, canoeing, etc. The new sewer line will help eliminate use impairments caused by pathogens. However, malfunctioning septic systems and unmanaged livestock waste may continue to contaminate groundwater and streams. It is imperative that all who can should continue to tap on to the new sewer lines. The risks of sewer bypass due to either mechanical failure or flooding should not be forgotten. The increased demand on wastewater systems from future development is also an important issue. Flooding impacts on septic systems north of Sparta and animal waste and septic systems in unincorporated areas of Lick Creek watershed are a concern.

Priorities

- Promote county-wide ordinances requiring connection to sanitary sewers and a focus on regional wastewater treatment.
- Health departments need to disapprove new septic systems in sewerred areas. DOW can work with local health departments on enforcing sewer hookup requirements.
- Promote proper land management, especially for agriculture and forestry (overgrazing) through existing cost-share programs. Implement BMPs for erosion in Lick Creek, according to the existing plan.
- Foster regional discussion of development, design, hydrology, and flooding.
- Educate the public about damages caused by instream activities (such as dredging, channel modification, all-terrain vehicles, etc.) to counter lack of knowledge about restrictions on disturbing creek banks and creek bottoms.
- Involve the agricultural community, particularly landowners, and other stakeholders.
- Coordinate with universities for monitoring and analysis.
- Find resources to support research for grant applications.

Data Collection

- Institute additional biological monitoring to help identify origins of impairments in tributary streams and more widely assess stream health.
- Ascertain the sources of pathogens with a broader sampling coverage and develop implementation strategies to reduce fecal loading (the TMDL will provide some of this).
- Evaluate the impact of development upstream of this HUC on flooding, sedimentation, etc.
- Investigate the need for more accurate floodplain maps and how to get them.
- Obtain complete land use and riparian zone analysis, including ground-truthing, to identify opportunities for increasing streamside vegetation and erosion controls.

Critical Partnerships

- UK Tracy Farmer Center for the Environment (TMDL results, in 2 years).
- RC&D Council network.
- NRCS Lick Creek Plan and landowners.
- Local Conservation Districts.
- UK Cooperative Extension network.
- 109 Solid Waste Boards (could be activated?).
- Local leadership: mayors, county judges, magistrates, health departments.

Agency Support

- County or local ordinances may be needed to enforce continued hookup to sewer lines. The county health departments and DOW can cooperate in enforcement.
- State and federal authorities could re-map floodplains.
- DOW will help coordinate local implementation of TMDL plan.
- DOW may conduct sampling and monitoring, help coordinate volunteer samplers, and help train citizen monitors.
- DOW has 604(b) funds for planning regionalized wastewater management.
- In Lieu Fee program (KDFWR) is a potential funder of stream restoration.
- Division of Conservation has state cost-share funds for agricultural BMPs.

Watershed concerns, by area

- Upstream of this watershed, the major issues are the effects of development on hydrology and water quality. At the extreme end of the drainage, Scott County will be constructing a dam and creating an impoundment for water supply.
- In Tenmile Creek, which joins Eagle Creek at the head of the Eagle Creek mouth watershed, bacteria endanger contact recreation, especially for children but also for fishing and canoeing, and the low quality water affects fishing, as well.
- Information and implementation strategies are needed throughout the Eagle Creek mouth watershed to address bacterial contamination.
- Streambank erosion is cutting into a highway between Glencoe and Folsom.
- Near Sparta there is significant potential for development. Planning/zoning is new in Gallatin County. Septic systems north of town lie outside the sewage area.
- In the Sanders area, flooding patterns appear to be changing, and people would like to assess the impact of upstream development and possible responses. Updated floodplain mapping would help to better manage the floodplain program and prevent losses.
- In the Lick Creek subwatershed, erosion could be reduced through grazing practices and other land management approaches. Animal waste is largely uncontrolled, and septic systems outside the sewer area are sometimes affected by flooding.
- At Buck Run, the segment impaired was reevaluated and subsequently reduced to less than one stream mile; degradation appears to be limited to one property.

Participants in the Eagle Creek Workshop Phase

Workshop was held September 25, 2001, at Carrollton

Local Representatives

Gretchen Bartley, Division of Water (DOW) Florence Field Office

Larry Brown, Eagle RC&D Council

David Crawford, City of Sanders

Jeff Crosby, Department of Fish and Wildlife Resources

Theoda Franklin, Eagle RC&D Coordinator (NRCS)

Linda Hunter, Eagle RC&D Council and Division of Conservation regional office

Gene McMurry, County Judge Executive, Carroll County

Ron Meyer, Division of Forestry local field office

Jack Ogden, Mayor of Sanders

Kim Strohmeier, UK Cooperative Extension, Owen County

Glenn Yost, Director of Creasey Mahan Nature Preserve

State Program Representatives

Julia Clark, DOW Water Quantity Management

Clark Dorman, Kentucky Waterways Alliance

Gary Levy, DOW Enforcement Branch

Joel Murphy, DOW Nonpoint Source Section, grants administration

Danny Peake, DOW Nonpoint Source Section

Kevin Ruhl, DOW Total Maximum Daily Load program

Bill Sampson, Department of Fish and Wildlife Resources, Watersheds

John Shuttleworth, DOW Groundwater Branch

Mike Tipton, DOW Facilities Construction Branch

Bob Ware, DOW Assistant Director and Kentucky River Authority member

Staff

Jennifer Thompson, facilitator (Kentucky Natural Resources Leadership Institute)

Pamla Wood, workshop recorder (Licking River Basin Coordinator, DOW)

Greg Epp, Kentucky River Basin Coordinator (KWRI for KRA)

Lee Colten, Watershed Framework Manager (DOW)

Reference

United States Department of Agriculture, Soil Conservation Service. "Hydrologic Unit Management Plan: Lick Creek Watershed." 1992.

Point of Contact

Theoda Franklin, Coordinator, Eagle RC&D
1804 Highland Avenue, Carrollton, KY 41008
(502) 732-0070