

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE OBEY RIVER WATERSHED

- 5.1 Background**
- 5.2 Federal Partnerships**
 - 5.2.A. Natural Resources Conservation Service**
 - 5.2.B. United States Geological Survey**
 - 5.2.C. United States Fish and Wildlife Service**
 - 5.2.D. United States Army Corps of Engineers**
- 5.3 State Partnerships**
 - 5.3.A. TDEC Division of Water Supply**
 - 5.3.B. State Revolving Fund**
 - 5.3.C. Tennessee Department of Agriculture**
 - 5.3.D. Kentucky Division of Water**
- 5.4 Local Initiatives**
 - 5.4.A. The Cumberland River Compact**
 - 5.4.B. The Nature Conservancy**
 - 5.4.C. Hull-York Lakeland RC&D Council**

5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Obey River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at <http://prms.nrcs.usda.gov/prs>. From the opening menu, select “Reports” in the top tool bar. You will select the time period that you are interested in and the conservation treatment of interest on the page that comes up. Depending on the time period of interest, you will have various report options to choose from, such as location, reporting period and program involved in the reporting. You may be required to “refresh” the page in order to get the current report to come up.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

Conservation Practice	Feet	Acres	Number
Conservation Buffers	52,439	18	
Erosion Control		3,033	
Irrigation Management		75	1
Nutrient Management		12,786	6
Pest Management		11,768	37
Grazing / Forages	68,829	9,150	
Tree and Shrub Practices		5,612	
Tillage and Cropping		2,020	
Waste Management Systems			14
Wildlife Habitat Management		6,820	
Water Supply		2,329	14

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. Data are from PRMS for October 1, 2001 through September 30, 2005 reporting period. More information is provided in Appendix V.

5.2.B. United States Geological Survey – Tennessee Water Science Center Programs.

The United States Geological Survey (USGS) provides relevant and objective scientific information and data for public use in evaluation of the quantity, quality, and use of the Nation's water resources. National USGS water resource assessments include the National Streamflow Information Program (<http://water.usgs.gov/nsip/>), National Atmospheric Deposition Network (<http://bqs.usgs.gov/acidrain/>), the National Stream Quality Accounting Network (<http://water.usgs.gov/nasqan/>), and the National Water-Quality Assessment Program (<http://water.usgs.gov/nawqa/>). For a national overview of USGS water resources programs, please visit <http://water.usgs.gov>. Specific information on the Upper and Lower Tennessee River NAWQA study units can be found at <http://tn.water.usgs.gov/iten/tenn.html> .

In addition to National assessments, the USGS also conducts hydrologic investigations and data collection in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Hydrologic investigations conducted by the USGS Tennessee Water Science Center address scientific questions pertaining to five general thematic topics:

1. Water Use and Availability,
2. Landforms and Ecology,
3. Watersheds and Land Use,
4. Occurrence, Fate, and Transport of Contaminants, and
5. Floods and Droughts.

In support of these investigations, the USGS Tennessee Water Science Center records streamflow continuously at more than 100 gaging stations, makes instantaneous measurements of streamflow at numerous other locations as needed or requested, monitors ground-water levels Statewide, and analyzes the physical, chemical, and biologic characteristics of surface and ground waters. In addition, the Water Science Center compiles annual water-use records for the State of Tennessee and collects a variety of data in support of National USGS baseline and other networks. More information pertaining to USGS activities in Tennessee can be accessed at <http://tn.water.usgs.gov> .

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water-level, and water-quality data at sites operated by the USGS Tennessee Water Science Center can be accessed on-line at <http://waterdata.usgs.gov/tn/nwis/nwis> . Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus on the web page. For specific information or questions about USGS streamflow data, contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov . Recent USGS Tennessee Water Science Center publications can be accessed by visiting <http://tn.water.usgs.gov/pubpg.html> . A searchable bibliographic database is also provided for locating other USGS reports and products addressing specific scientific topics.

5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. The federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), and the federally threatened bald eagle (*Haliaeetus leucocephalus*) occur in the Obey River Watershed. There were likely numerous federally listed mussel species present in the Obey River Watershed. The impoundment of the river has seriously degraded water quality and habitat for these species. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at <http://cookeville.fws.gov>.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Chapter of The Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types which benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

HOW TO PARTICIPATE ...

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Cookeville Ecological Services Field Office at 931/528-6481 or visit their website at <http://cookeville.fws.gov>.

5.2.D. United States Army Corps of Engineers-Nashville District. The Nashville District, U.S. Army Corps of Engineers is one of seven districts in the Lakes and Rivers Division. The district's area is determined by the Cumberland River and the Tennessee River's watersheds and encompasses 59,000 square miles in portions of seven states. This geographic area is represented by 14 senators and 20 Congressional representatives. The Nashville District's missions include providing flood protection, recreation, hydropower, and navigation. The District also provides environmental stewardship through our Regulatory and Civil Works programs, conducts emergency response to disasters, and to performs other authorized Civil Works projects.

Within the 18,000 square mile Cumberland River Basin, overall responsibilities for the Nashville District include operation and maintenance of 10 reservoir projects. Each of these is operated for some or all of the following purposes: hydropower production, flood control, navigation, water supply, water quality, fish and wildlife, and recreation.

Within the much larger, 41,000 square mile Tennessee River Basin the Nashville District operates a series of navigation locks and has regulatory permit authority over dredge and fill activities under the Clean Water Act and the Rivers and Harbors Act.

As of 2005, the District's flood control projects have prevented more than \$1.96 billion in flood damages. The District also provides flood prevention planning assistance to the states and local governments.

Lakes in the Nashville District are the most popular in the nation. More than 36 million people visited our 10 lakes last year. These recreation users had an economic impact on the region of nearly \$877 million dollars. Five Nashville District lakes rank among the top 25 in Corps-wide visitation. In 2000, the District's 70 commercial concessionaires produced \$1.3 million in profit, and returned more than \$300,000 to the U.S. Treasury in rent payments for leases.

The Nashville District has the capacity to produce more than 914 megawatts of clean electricity, enough to power the needs of a city the size of Nashville, at nine different hydropower generations plants in the Cumberland River Basin. The District generates about \$44 million in revenue from the sale of this power annually. This revenue is returned to the U.S. Treasury.

The Nashville District operates and maintains 1,175 commercially navigable river miles; almost 10% of the total within the U.S. Army Corps of Engineers. The district operates and maintains 14 navigation lock projects; nine on the Tennessee River, four on the Cumberland River, and one on the Clinch River. There are more than 40,000 commercial and recreational lockages annually. More than 74 million tons of commodities passed through these 14 locks during 2005. Wilson Lock in Alabama has the highest single lift east of the Rocky Mountains, between 93 and 100 feet, depending on the current river water level.

Regulatory Program

The U.S. Army Corps of Engineers has been involved in regulating certain activities in the nation's water since 1890. Prior to 1968, the primary thrust for the regulatory program was the protection of navigation. As a result of new laws and judicial decisions, the program has evolved to one that considers the full public interest by balancing the favorable impacts against detrimental impacts. The Nashville District annually handles more than 3,000 regulatory actions, 97% of which were evaluated in less than 60 days.

Section 10 of the Rivers and Harbors Act of 1899 - requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition or capacity of such waters. Typical activities requiring Section 10 permits are:

- Construction of piers, wharves, bulkheads, dolphins, marinas, ramps, and cable/pipeline crossings.
- Dredging and excavation

Section 404 of the Clean Water Act - requires approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:

- Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
- Site development fill for residential, commercial, or recreational developments.
- Construction of revetments, groins, breakwaters, levees, dams, dikes, and weirs.
- Placement of riprap and road fills.

Civil Works Program

The Corps' ongoing Civil Works responsibilities date back to the early 1800's when Congress authorized the removal of navigation hazards and obstacles. Over the years, succeeding Administrations and Congresses have expanded the Corps' missions to include most all water-related planning, development, and construction areas where a Federal interest is involved. Funds for Congressionally Authorized Projects are provided through Energy and Water Appropriations Acts and through contributions from non-Federal entities for specific projects.

Civil Works projects may also be funded under the Continuing Authorities Program (CAP). Congress has provided the Corps with standing authorities to study and build specific water resources projects for specific purposes and with specified spending limits. CAP projects are usually implemented in a faster time frame, are limited in complexity, have Federal cost limits, are approved by the Division Commander, and do not need Congressional authorization.

Nashville District Corps of Engineers Water Quality Program

The Nashville District Corps of Engineers collects a significant volume of physical, chemical, and biological water quality data every year. These data are collected at representative points both within all ten Nashville District lakes, on various major and/or representative inflow streams, and in the tailwaters. Where there are known water quality problems, such as seasonal low DO in certain turbine releases, monitoring is significantly intensified to track and quantify a particular problem. This information is used to make informed decisions about how a project's powerplant should operate. Baseline, continuous recording, multiparameter water quality monitors keep track of conditions at critical points on the main stem of the Cumberland River from the mouth of the Obey River near Celina, Tennessee to the tailwater of Lake Barkley in western Kentucky. The monitor at the Old Hickory Dam tailwater, in particular, provides key information, since water discharged from Old Hickory must be able to absorb inputs from Nashville which is just downstream.

The data collected by the Nashville District are used to help determine watershed water quality trends and to provide for better management of the comprehensive reservoir system. The data are essential for running predictive water quality models, a growing trend in Corps' water management practice.

Additional information concerning projects, programs, and activities of the Nashville District Corps of Engineers can be obtained on the World Wide Web at <http://www.orn.usace.army.mil/>

Water Quality Issues and Actions In the Obey River Watershed

Background

Dale Hollow Dam is located at Obey River Mile 7.3 in Clay County, Tennessee. The impoundment formed by Dale Hollow Dam extends upstream for the entire length of the Obey River and impounds portions of the East Fork and West Fork of the Obey River, as well as a major reach of Wolf River. The lake's surface area is 27,700 acres at elevation 651.0, which is the top of the power pool. At elevation 651.0, Dale Hollow Lake averages 49 feet in depth. The project stores potentially damaging floodwaters that can be released gradually once the danger of downstream flooding has passed. Releases from the dam are typically through the three hydroturbines. The dam and lake are an integral part of the mature system of Corps of Engineers dams that regulate water within the Cumberland River Basin.

The water quality of Dale Hollow Lake is affected by several factors. Typical for a deep, southern, storage impoundment, Dale Hollow Lake develops strong, thermal stratification during the growing season that causes gradual depletion of dissolved oxygen in waters below the surface layer. Dissolved oxygen depletion is exacerbated by oxygen demanding pollutants and materials that enter the lake from the watershed. Even though the overall watershed is lightly populated and largely forested, activities both historical and current, affect the water quality of Dale Hollow Lake.

The watershed has seen a variety of increased development and resource extraction pressures in recent years. The devastating, negative effect of historical mining for coal resources in some watershed streams, particularly the East Fork Obey River watershed, has been somewhat alleviated by active restoration efforts and natural recovery. Unfortunately and more recently, within the East Fork Obey River watershed, significant deforestation and clearing of the rugged mountainous terrain and lands have occurred. The East Fork Obey River flows through a deep, remote gorge. In recent months, several thousand acres of forested lands have been timbered and mechanically cleared in the East Obey watershed near Wilder, Tennessee. The land clearing has occurred on the steep forested slopes immediately adjacent to the river as well as on the Cumberland Plateau escarpment. This deforestation has resulted in unstable slopes and has resulted in heavy siltation in what had been a steadily recovering aquatic ecosystem. The aesthetic impacts of these activities on the land are horrendous. These lands were once owned by large timber companies but have been divested and sold to private development interests. Many of these development companies operate out-of-state and seem to pay little attention to state or local environmental guidance and regulations. Sadly, these actions create a renewed threat to the water quality of Dale Hollow Lake and have damaged a beautiful river gorge. This type of activity demonstrates the difficult and tenuous nature maintaining a watershed's integrity and achieving improvements in water quality on a watershed wide basis. Only through multi-agency involvement and enforcement of laws to protect water quality can real progress be made in advancing the cause of water quality.

Exploration and extraction of oil and natural gas is an ongoing activity on private lands in the watershed. These activities can cause localized negative water quality impacts if pollutants generated from these activities enter area streams. At one time this was a significant problem, however at present few reports of problems have arisen. When Dale Hollow Lake was impounded a number of oil wells were covered by its waters. These wells were plugged, but in some cases small seeps have developed as the plugs have deteriorated or fractures in rock strata have allowed crude oil to bubble to the surface. Plugging submerged oil wells is problematic. No major water quality related problems have been reported due to the old, submerged wells. One proactive approach to water quality protection accomplished by the lake's resource management office and the Nashville District has been to gain a waiver of mineral exploration and development on Dale Hollow Lake lands and waters. The Assistant Secretary of the Army granted that waiver on July 12, 2001.

Impacts of houseboat sanitary waste discharges are a concern at Dale Hollow Lake. The Dale Hollow Lake Resource Management office is pursuing the reclassification of Dale Hollow Lake from "Discharge" status to "No Discharge". Tennessee and Kentucky state agencies are on board as are the respective state governors concerning this proposed change. In addition the Dale Hollow Lake Marina Association is also in favor. This issue has been through a review and evaluation process with USEPA. The Federal Register comment period ended with little opposition. It appears that USEPA will agree with the reclassification request with the decision to be formally rendered soon. All existing houseboats with Coast Guard approved sanitation devices will likely be "grandfathered" and continue to operate in accordance with Coast Guard regulations. However, all new houseboats would have to be self-contained with no discharge of treated waste into the lake. There are over 1,200 houseboats on Dale Hollow

(approximately one houseboat per 25 acres of water surface), and this number is expected to increase. The management of houseboat waste will be critical to the future of Dale Hollow Lake water quality. It will take a partnering effort of all federal and state agencies involved to wisely manage this issue.

Dale Hollow Lake Resource Management office has initiated a "Clean Marina Initiative" on Dale Hollow Lake. The purpose of the program is to encourage marina operators to use environmentally friendly management practices during their daily operations. Thus far, Willow Grove Marina is the first to earn a "Clean Marina" designation. Cedar Hill and Sunset Marinas have expressed interest in gaining similar designation. This will be a continuing program.

A general and increasing trend has been construction of many new homes near the lake. Many cleared areas are now visible from the lake, where there was previously forest. Runoff from newly cleared areas contributes sediment and probably other pollutants to the lake. This trend is likely to continue as the popularity of second and vacation homes increases.

Overall, it is still possible to state that the water quality of Dale Hollow Lake is good and supportive of current uses. In order for this to continue, and allow the enjoyment of the lake, better management and enforcement of environmental regulations is essential for improvement of watershed conditions.

The relatively short reach of tailwater below Dale Hollow is heavily affected by water releases from the dam. Tailwater conditions are radically different from pre-impoundment, natural stream conditions. The tailwater normally experiences daily water level fluctuations, mainly the result of cold, hydropower releases. These fluctuations cause alternate flooding and drying of habitat and have degraded gravel, shoal habitat. The result is reduced quality of habitat for the already limited aquatic biota that can survive in such a cold, tailwater environment. The tailwater is considered a coldwater fishery and is routinely stocked with trout. No continuous minimum flow is provided by the dam. Seasonally depressed dissolved oxygen (DO) levels in the hydropower releases negatively affect the tailwater. The length and severity of seasonal DO problems vary from year to year depending upon antecedent conditions found in Dale Hollow Lake and hydropower generation patterns. DO levels in the turbine discharges from Dale Hollow characteristically drop below the state minimum standard of 6.0 mg/l during late summer and early fall. DO concentrations recover naturally as the lake destratifies and vertically mixes with the approach of winter. Restoration measures have been taken to augment DO during the critical water quality season.

Restoration Initiatives at Dale Hollow Dam.

The recognition of problems caused by stressful DO levels below Dale Hollow Dam led to studies and then implementation of various turbine-venting measures to improve water quality conditions of the turbine discharges. Turbine venting has been implemented on all three generating units at Dale Hollow within recent years.

Turbine venting involves a combination of providing supplemental air supplies and installation of hub baffles on the hydropower units. Since the units at Dale Hollow are old, turbine venting was considered experimental at first. Following implementation, testing, and evaluation, turbine venting was deemed successful, at least as an interim measure to improve oxygen levels in hydropower releases.

The long-term solution to dissolved oxygen restoration at Dale Hollow Dam is eventual replacement of the 50 plus year old units with auto-venting turbines. Auto-venting turbines have the advantage of greatly improving dissolved oxygen conditions during times when augmentation is needed, without the loss of hydropower generating efficiency caused by hub baffles.

Cooperation with the Tennessee Department of Environment and Conservation, Division of Water Pollution Control

Extensive water quality data are provided to the TDEC, Division of Water Pollution Control to assist the watershed management program cycle. The water quality data provided by the Corps helps fill in gaps in the water quality record for area water bodies. Often Corps water quality data is the only information available that is collected on a systematic basis for the Corps' Cumberland River Basin lakes and reservoirs.

Environmental Education

Environmental education opportunities are provided to area school age children by the Nashville District Corps of Engineers. Water Quality personnel have participated in environmental awareness programs for the past several years at the majority of Nashville District lakes. These programs are organized by the local lake Resource Management staff and involve various area schools. The programs provided allow students to have a "hands on" experience in water quality surveillance techniques. Typically the programs include an interactive discussion of overall water quality issues. This is supplemented with demonstrations of sophisticated water quality instrumentation, collection and analysis of biological specimens from local aquatic environments, and viewing of reference materials and preserved specimens. The value of such environmental education is enormous, because it reaches young people early in their lives and exposes them to a scientific learning experience that is impossible to duplicate in a formal classroom. This experience hopefully contributes to a greater lifelong awareness by the individual of the importance of conserving and improving water quality and wise use of water resources.

Additional Information

To obtain additional information about the District, please refer to the home page at: <http://www.lrn.usace.army.mil/>, or contact the following offices:
Public Affairs Office (General Information): (615) 736-7161
Regulatory Branch: (615) 369-7500

5.3. STATE PARTNERSHIPS

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

- 1) Delineate the drinking water source protection area
- 2) Inventory known and potential sources of contamination within these areas
- 3) Determine the susceptibility of the water supply system to these contaminants
- 4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
- 5) Implement management measures to prevent, reduce or eliminate threats
- 6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water

assessments were mandated and funded by Congress. Source water protection will be left up to the individual states and local governments without additional authority from Congress for that progression.

Tennessee's Wellhead Protection Rules were revised as of October 29, 2005 to include requirements for similar protection for public water systems using surface water sources under the heading of Drinking Water Source Protection Rule (1200-5-1-.34) in addition to the previous requirements for wellhead protection for public water systems using ground water sources. The rule addresses surface or ground water withdrawals in the vicinity of public water sources as well as potential contaminant sources threatening public water sources to reflect the amended prohibitions in the 2002 Amendments to the Tennessee Safe Drinking Water Act, TCA 68-221-771. There are additional reporting requirements of potential contaminant source inventories and emergency response for the public water systems as well. The Division of Water Supply will be able to use the Drinking Water Source Protection Rule to work in complimentary fashion with the Division of Water Pollution Control and other Departmental agencies in activities to protect public water sources.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at <http://www.state.tn.us/environment/dws> as well as other information regarding the Source Water Assessment Program and public water systems.

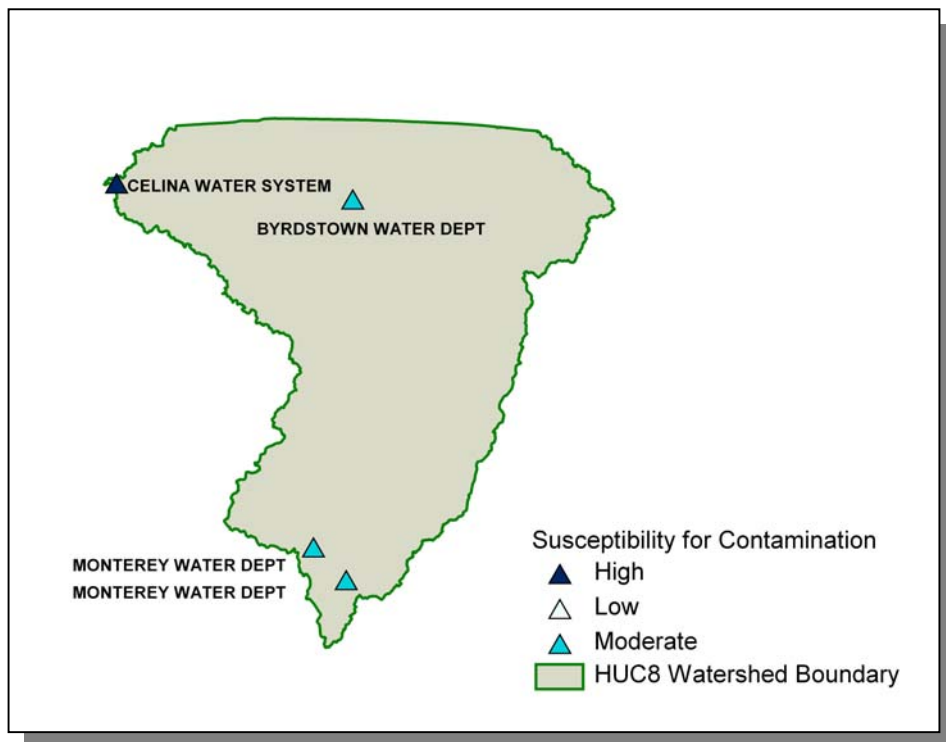


Figure 5-1. Susceptibility for Contamination in the Obey River Watershed.

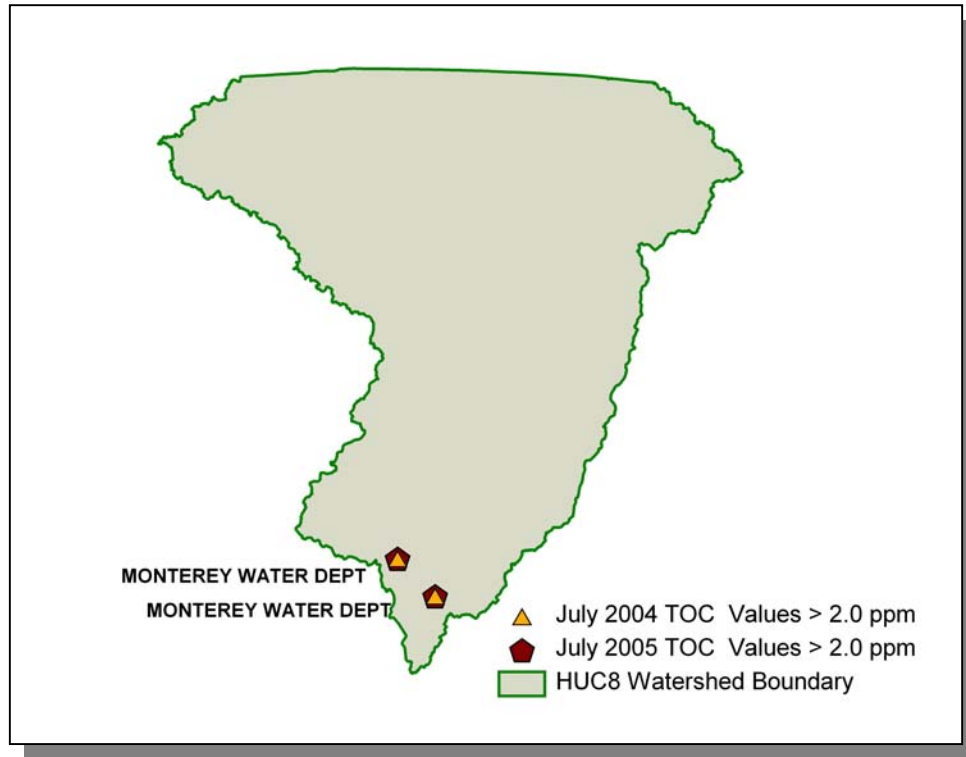


Figure 5-2. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Obey River Watershed.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at <http://www.tdec.net/water.shtml>.

5.3.B. State Revolving Fund. TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately \$550 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at <http://www.tdec.net/srf>.

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- **BMP Implementation Projects.** These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.
- **Monitoring Projects.** Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the Obey River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0).
- **Educational Projects.** The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at:

<http://www.state.tn.us/agriculture/forestry/bmpmanual.html>

The complaint form is available at:

http://www.state.tn.us/environment/wpc/forms/wqlogging_cn1274.doc

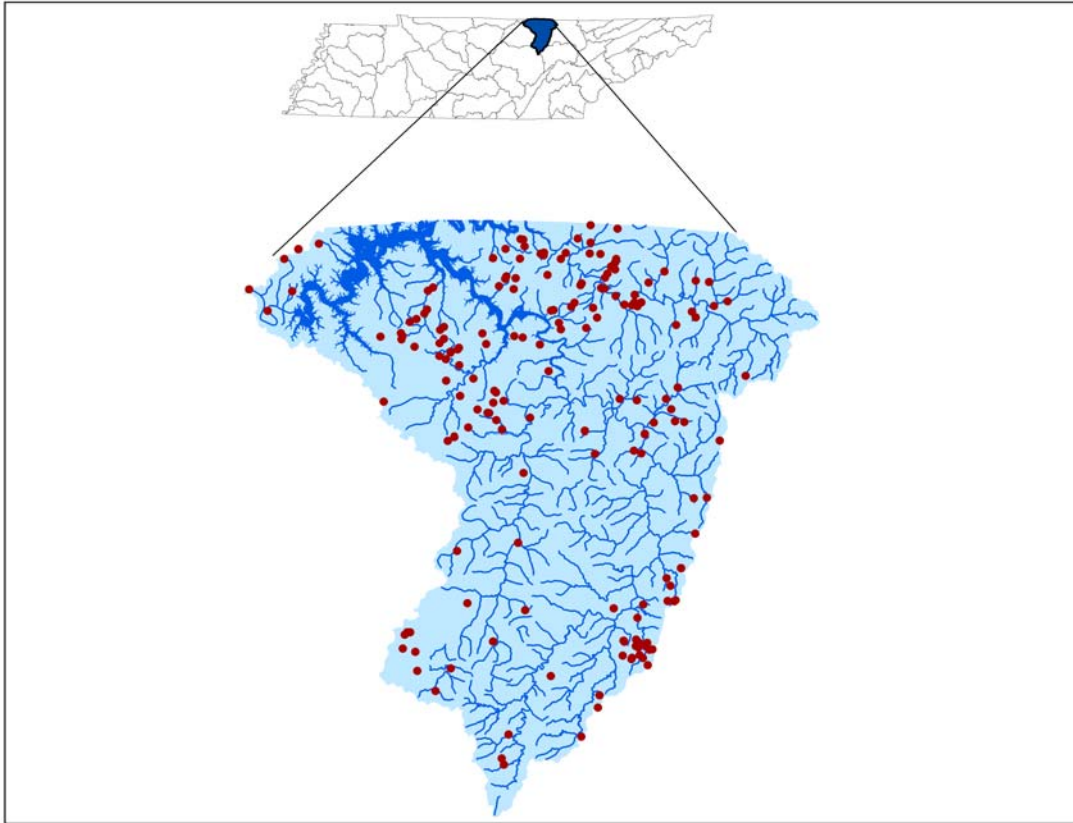


Figure 5-3. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Obey River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. More information is provided in Appendix V.

5.3.D. Kentucky Division of Water- Kentucky Watershed Management Framework. The Kentucky Watershed Management Framework is a dynamic, flexible structure for coordinating watershed management across the Commonwealth of Kentucky.

The Watershed Management Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in more effective and efficient management of the state's land and water resources. Inherent in the design of the Framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate in the process of managing the abundant natural resources that characterize Kentucky's watersheds.

Benefits to the people of Kentucky include:

- Better information for decision making
- Increased ability to resolve complex water resource problems
- Improved coordination among governmental agencies
- More opportunities for citizens to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost-effective use of public and private funds

Each major river basin in Kentucky is staffed with a Basin Coordinator. Basin Coordinators are staff assigned to serve as a liaison in a given basin management unit among the agencies, the local interests, and the resources concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns, and facilitate the watershed process to implement plans that address the problems.

For more information about the KY Watershed Management Framework visit our website at <http://www.watersheds.ky.gov/>

Watershed Framework activities in the Obey River Watershed are coordinated through the Upper Cumberland River Basin Team. The Upper Cumberland River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Upper Cumberland River Basin Team contact Rob Miller, Upper Cumberland River Basin Coordinator at (606) 878-0157 or via email at robert.l.miller@ky.gov. The web address is http://www.watersheds.ky.gov/basins/upper_cumberland/.

Obey River

Spring Creek (05130105210)

Wolf River (05130105180)

Sulphur Creek, of Dale Hollow Lake (Clinton County) (05130105200)

Illwill Creek (05130105220)

Sulphur Creek, of Dale Hollow Lake (Cumberland County) (05130105230)

Geography. The Obey River Watershed in Kentucky is comprised of about 165 square miles. It consists of several tributaries that drain to Dale Hollow Lake. These include Spring Creek, Wolf River, Sulphur Creek (Clinton County), Sulphur Creek (Cumberland County), and Illwill Creek. The headwaters drain the slopes of the Pottsville Escarpment region of the Cumberland Plateau. The general topography of the Cumberland Plateau is steep with high ridges and low hollows. The terrain is mountainous with elevations exceeding 1700 feet on the higher mountains and knobs. The terrain is well-dissected and well-drained by deeply entrenched streams. Ridges are generally narrow and winding. Natural flat land is mainly restricted to flood plains of the main stem and major tributaries. Low-order streams are generally V-shaped and have no flood plains. The

escarpment region is a transitional zone between the Cumberland Plateau and the Mississippian Plateau. Resistant sandstone and conglomerate have weathered to create sheer cliffs, steep-walled gorges, rock shelters, waterfalls, natural bridges and arches.

On the eastern side of the watershed the terrain changes quickly once it leaves the plateau region and enters the Eastern Pennyroyal region of the Mississippian Plateau. The valley is still narrow in many areas but rises only moderately to broad ridges and rolling hills. As the streams approach Dale Hollow Lake the terrain rises more sharply from the valley to the ridge tops. Karst geology is common throughout the watershed.

Waterways. There are over 220 miles of streams in the Kentucky portion of the watershed. Significant tributaries include Spring Creek, Illwill Creek, and two separate streams sharing the name Sulphur Creek. Surface water flow is limited in some areas due to extensive karst geology that drains water to underground flows. The lower portions of the larger tributaries are inundated by Dale Hollow Lake.

Land cover/land use. Much of the watershed is agricultural including dairy, poultry, swine and row crop production. A few areas in the northeastern portion of the watershed have been surface mined and stand as reclaimed land. Oil and gas wells are common in the watershed. The northern and western edges of the watershed are rugged and are mostly deciduous forest. As well are areas immediately around the lake, which are part of the Dale Hollow Lake Wildlife Management Area. Land around the city of Albany is a mix of residential, commercial, and industrial. A limestone quarry is located on Grider Mountain off of Highway 1590.

Agency Data Assessment. During the 2000 water quality assessment the following stream reaches were assessed.

- Spring Creek from Dale Hollow Lake up to Hays Creek was assessed and was judged fully supporting for aquatic life.
- A 1.0-mile segment of Clear Fork Branch was assessed using discharge monitoring report (DMR) data from the Albany sewage treatment plant. The segment was judged partially supporting for primary contact recreation.
- A 1.0-mile segment of Hays Creek was assessed and judged fully supporting for aquatic life.
- A 3.4-mile segment of Sulphur Creek upstream of Dale Hollow Lake was assessed for fish, macroinvertebrates and algae. The segment was judged fully supporting for aquatic life.
- A 2.6-mile segment of Howards Creek upstream of Dale Hollow Lake was assessed for fish, macroinvertebrates and algae. This stream was judged fully supporting for aquatic life.

Watershed Efforts in the Obey River. No sub watersheds in the Obey River Watershed were selected by the Upper Cumberland River Basin Team as a priority watershed for watershed planning.

5.4. LOCAL INITIATIVES.

5.4.A. The Cumberland River Compact. The mission of the Cumberland River Compact is to enhance the water quality of the Cumberland River and its tributaries through education and by promoting cooperation among citizens, businesses, and agencies in Kentucky and Tennessee.

We are a unique non-profit group that believes we can have both a strong economy and a healthy environment. The Compact is made up of businesses, individuals, community organizations and agencies working in the Cumberland River Watershed. Over 2 million people share this watershed. Compact members work with all interested organizations and individuals to help ensure that our rivers and streams continue to provide us with clean water, bountiful crops, healthy fisheries and abundant recreational opportunities.

Since 1997, the Compact has set out to create a Watershed Outreach Program in each of the 14 watersheds that make up the Cumberland Basin. Members and staff of the Compact work with local communities to develop watershed forums where citizens can come together to learn more about their watershed and participate in developing a shared vision for the future. We welcome your interest and participation in this challenging project.

For more information about the Cumberland River Compact and to learn more about your local watershed, contact us at info@cumberlandrivercompact.org; 615-837-1151 or join us on the web at <http://www.cumberlandrivercompact.org>.

5.4.B. The Nature Conservancy (TNC). The Tennessee State Wildlife Action Plan (SWAP), formerly known as the Comprehensive Wildlife Conservation Strategy (CWCS), was developed by the Tennessee Wildlife Resources Agency with assistance from The Nature Conservancy in 2005. Congress mandated that each state and territory in the United States develop a SWAP as a requirement for continued receipt of federal State Wildlife Grant funding. These plans require the completion of 8 key elements of wildlife planning: 1) a list of animal species of greatest conservation need, 2) information about the distribution and abundance of species targets, 3) locations and relative conditions of key habitats, 4) descriptions of problems affecting target species and their habitats, 5) descriptions of conservation actions and priorities for conserving target species and habitats, 6) details for monitoring target species, conservation actions, and adaptive management, 7) discussion of plans to review the SWAP at specific intervals, and 8) information about coordination and implementation of the SWAP with major stakeholders. In Tennessee, the SWAP was integrated into a spatial model using Geographic Information Systems (GIS) and other database technology. Priority aquatic, terrestrial, and subterranean areas for conservation were identified across the state. Priorities were determined in the GIS model based upon relative differences in species rarity, population viability, and potential mobility of species across habitat units. Priority problems affecting species and needed conservation actions are detailed across each region of the state. For complete information about the Tennessee SWAP, please visit: <http://www.state.tn.us/twra/cwcs/cwcsindex.html> to read or download the full report.

Contact:
Chris Bullington
State Conservation Planning Manager
The Nature Conservancy, TN Chapter
2021 21st Avenue South; Suite C-400
Nashville, TN 37212
phone: (615) 383-9909 x 227

5.4.C. Hull-York Lakeland Resource Conservation and Development (RC&D) Council.
The RC&D Council mission is to *“Provide leadership to local communities to improve quality of life and conserve natural resources by organizing partners and facilitating technical and financial assistance resources”*.

Hull-York Lakeland RC&D Council covers 14-counties of the Upper Cumberland area. These counties are: Macon, Clay, Pickett, Fentress, Overton, Jackson, Smith, DeKalb, Putnam, Cumberland, White, Van Buren, Warren and Cannon. Recreation in this area is dependant on a high standard of water quality. The main recreational attractions in the RC&D area are Dale Hollow Lake, Center Hill Lake, Cordell Hull Lake, and the scenic trout waters of the Caney Fork River. These resources attract large numbers of visitors to the area each year, and Hull-York Lakeland therefore has a vested interest in insuring the water quality of its watersheds.

Hull-York Lakeland RC&D Council has many local, state, federal and private partners with similar interests in the RC&D area. These partners join forces to engage in programs and projects that help individual land users and communities improve and conserve the natural resources, and engage in projects that enhance community and economic development activities. Hull-York Lakeland was the first RC&D area authorized by USDA in the state of Tennessee, and one of the first in the nation. Hull-York Lakeland was authorized in 1966.

Past projects have included Cane Creek Park and Lake in Putnam County, Camp Discovery in Jackson County, farmers markets in several counties, and emergency services consolidation projects. Current projects include a 319(h) grant for development of a watershed management plan in the Post Oak Creek Watershed. This watershed is 16,000+ acres and has been identified on the Tennessee 303(d) list of impaired waters as not meeting intended uses due to agriculture. The RC&D Council’s goal is to develop a plan that identifies needs and problems in the watershed in order to have it removed from the 303(d) list, and then submit a project for funding practices that address those needs and problems.

Hull-York Lakeland RC&D Council has received a grant from the Tennessee Department of Agriculture – Agriculture Resources Conservation Fund (TDA – ARCF) with which they have purchased a tree planter in order to promote tree planting in riparian corridors to improve and enhance water quality. The Council has also received grants from TDA-ARCF, TWRA, and Quail Unlimited in order to purchase a Native Warm Season Grass No-Till Drill. This drill was purchased in May 2006 to promote the planting of Native Warm Season Grasses in the Upper Cumberland Area to create and enhance wildlife habitat, as well as establish buffers and field borders to improve water quality.

In 2006 Hull-York Lakeland has so far received \$108,442 in direct grants, and has assisted communities in the receipt of \$445,692. These funds are being used to address water quality and community development issues. For more information about Hull-York Lakeland RC&D Council contact Jeff Sanders at (931) 528-6472, ext. 110, or jeff.sanders@tn.usda.gov. You can also go to the council's website at: <http://www.hylrcd.org>.