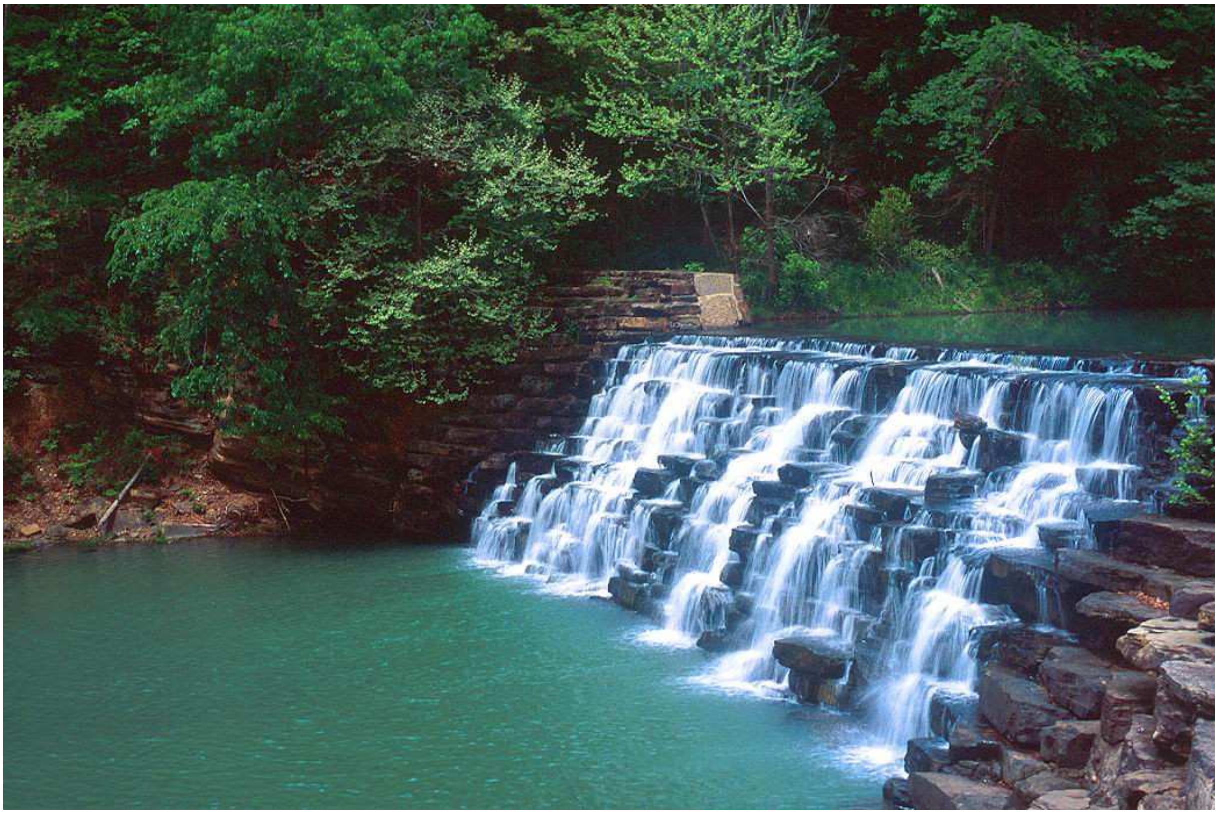
State of Arkansas

2006 Integrated Water Quality Monitoring and Assessment Report

Prepared pursuant to Section 305(b) and 303(d)
of the Federal Water Pollution Control Act

Arkansas Department of Environmental Quality
Water Division

ADEQ
ARKANSAS
Department of Environmental Quality



Lee Creek flowing through Devil's Den State Park, spilling over a native stone dam to form Lake Devil.
Photo courtesy of Arkansas Department of Parks and Tourism.

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Cover Photo: Lee Creek, western AR

STATE OF ARKANSAS

DEPARTMENT
OF
ENVIRONMENTAL QUALITY

INTEGRATED WATER QUALITY MONITORING
AND ASSESSMENT REPORT
2006

Prepared pursuant to Section 305(b) and 303(d)
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Federal Water Pollution Control Act

WQ06-04-01

430 Pages

Water Division Planning Branch

Mr. Steve Drown is currently the Chief and Mr. Mo Shafii is the Assistant Chief of the Water Division. Both are actively involved with many of the activities of the Water Quality Planning Branch. The Water Quality Planning Branch consists of ten biologists/ecologists and two geologists. This branch deals with a variety of issues related to surface and ground water. Among the numerous activities is the management of the State Water Quality Monitoring Network for both surface and subsurface waters. Included in the network is routine monitoring as well as intensive, special investigations of watersheds and/or aquifers. The data generated from these activities are used to prepare the biennial "Integrated Water Quality Monitoring and Assessment Report (305B)" and the "List of Impaired Waterbodies, (303(d) list)", and to develop Total Maximum Daily Loads (TMDLs) for impaired water bodies. The data are also used to develop water quality standards and criteria for designated use assessment.

The staff continues to develop and/or enhance ecoregion-based, biological assessment criteria for both fish and macroinvertebrates. The staff additionally is active in the development and updating of water quality standards and technical review and administration of the National Pollutant Discharge Elimination System Permits Whole effluent toxicity testing Program. Ground water issues of concern in recent years have included the investigation of pesticides in ground water, potential impacts from confined animal operations, saltwater intrusion in southeastern Arkansas, and most recently the development of ground water standards. Various staff members represent the Department on numerous federal, state, local, and watershed-based advisory boards and technical support groups.

Current staff includes:

Steve Drown, Chief, Water Division
Mo Shafii, Assistant Chief, Water Division

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To learn more about the Water Division and other divisions of the Arkansas Department of Environmental Quality, and to view a list of publications by the Planning Branch of the Water Division, visit http://www.adeq.state.ar.us/water or call at (501) 682-0660.

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Acknowledgements

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Appreciation is also given to all of those individuals in the Computer Services Division, Mining Division, Environmental Preservation & Technical Services Division, Hazardous Waste Division, Regulated Storage Tanks Division, and the Water Division of Arkansas Department of Environmental Quality.

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PART I EXECUTIVE SUMMARY/OVERVIEW

Section 305(b) of the Clean Water Act requires the states to perform a comprehensive assessment of the quality of waters of the State; this is to be reported to Congress every two years. In addition, Section 303(d) of the Act requires the states to prepare a list of of waterbodies with impaired designated uses on which TMDLs (total maximum daily loads) or other corrective actions must be determined. Current USEPA guidance recommends the states produce an integrated report combining the requirements of the Act for Sections 305(b) reporting and 303(d) submissions. The combined report is referred to as the *Integrated Water Quality Monitoring and Assessment Report.* The 2006 version of this report was prepared using the "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act; TMDL-01-03." The reporting period for Arkansas's 2006 report is from October 2000 to September 2005.

The use of River Reach File 3 (RF3) by the USEPA to tabulate and classify waterbodies significantly increases the tabulation of the total waters within the State. All waters or water courses that are apparent on the USGS 7.5 minute quadrangle maps were digitized by digital line graph traces and tabulated by different types of waterbodies (e.g., perennial streams, intermittent streams, ditches, etc.). The number of stream miles tabulated for Arkansas increased from approximately 11,900 miles (RF1) to almost 88,000 miles (RF3). However, since the RF3 database includes many waters with only ephemeral flows and very short-term uses, the RF1 data was retained as the base delineation and tabulation of Arkansas's waters.

Specific guidance was developed by USEPA for all states to aid in making use determinations. This guidance is intended to provide national consistency in the assessment process rather than allowing a state to establish its own assessment criteria. However, it was necessary to modify this criteria based on the type and amount of data available. A major additional request by USEPA was to report aquatic life use support based on biological communities within a waterbody.

The water quality databases from which to draw have improved in area coverage as well as parameters sampled. Additionally, the length of time which these databases have existed is now allowing valuable trend determinations, although these are not a required part of the report. The primary database used for this assessment is the Arkansas Department of Environmental Quality's ambient water quality monitoring network, which currently includes 149 stations monitored monthly for several key water quality parameters. In addition, almost 200 stations were added to assess previously unassessed waters or waters that have not been monitored in several years. These stations were sampled quarterly or bimonthly. Special projects within the last three years include the continued monitoring of 32 sites on the Buffalo River and its tributaries and an intensive watershed survey consisting of 11 sites in the Middle Fork Little Red River and 8 sites in the Middle Fork Saline River. In addition, data collected from previous special survey projects was also used in this assessment.

Numerous toxicity tests have been completed and reviewed during this reporting period, including self monitoring tests by the dischargers and compliance testing by the Department.

The bacteria monitoring program was continued at selected regular monitoring stations that were sampled seasonally for *Escherichia coli* (*E. coli)* bacteria as per USEPA guidance.

The assessments in this report have been based on the rather extensive database as described above and by the assessment methodology as described in Part III, Chapter 3.

Generally, the monitoring data has been used to assess only the specific river reach on which it was generated. Other reaches within the segment, with no monitoring data available, were either evaluated by general knowledge of waterbody conditions or placed in a category labeled "unassessed."

The following is a summary of the assessment of Arkansas's waters:

Total miles of streams in RF1	11,900.0
Total miles of streams in RF3	87,617.4
Miles assessed for use attainment	9,857.1
miles monitored	6,944.9
miles evaluated	2,912.2
Miles meeting all assessed uses	6,422.2
Assessed miles not meeting fishable goal	466.4
Assessed miles not meeting swimmable goal	114.2

This data indicates that 65.2 percent of the assessed waters are meeting all of the assessed designated uses. This is a conservative estimate and this percentage cannot be extrapolated to all waters of the State for the following reasons: (a) if any of the designated uses of a waterbody are not met, the waterbody is listed as "not meeting uses" even though all of its other uses are adequately met; (b) a large number of the water quality monitoring stations are purposely located in areas known or suspected of having water quality contamination. Thus, this results in a higher percentage of problem areas being monitored, thereby skewing the results toward the use impaired category; (c) much of the data from the Delta Region of the State was listed as unassessed due to the difficulty of determining water quality impacts where severe physical alteration of the habitat has occurred; and (d) although fish consumption is not a statutory or a water quality standard designated use, USEPA guidelines require this be evaluated. Waters with restricted fish consumption advisories are assessed as impaired and therefore, do not meet all designated uses. Previously, overall use support was based on the full support of all designated uses; if one of those uses was not assessed, it was not counted as supporting all uses. New guidance requires tabulation of waters supporting all assessed uses; therefore, if one or more uses were not assessed, but all assessed uses were fully supported, the water is counted as "supporting all assessed uses."

Among the Department's numerous water quality management programs, the Section 401 (water quality certification) is utilized to review all federal licenses or permits, including but not limited to Section 404, which may result in any discharge of dredged or fill materials into the navigable waters. Such certification is determined on the basis of protection of designated uses and the antidegradation requirement of the State's water quality standards.

Ground water assessment activities by the Department have expanded significantly in the last ten years. The Arkansas Ambient Ground Water Quality Monitoring Program currently maintains almost 300 monitoring sites which had been sampled every three years since inception of the program. In 2004, the sampling frequency increased to every two years, and the monitoring network expanded from nine to eleven distinct areas. The Department added an ambient ground water monitoring area along the boundary of the Athens Piedmont Plateau and the Gulf Coastal Plain in Pike and Howard counties to determine the possible deleterious impact on ground water quality from the extensive swine, broiler, and cattle operations of this region, and to expand the knowledge of baseline ground water chemistry of the numerous aquifers within this area. Wells in this area are completed in the Mississippian and Devonian Arkansas Novaculite, the Pennsylvanian Jackfork Sandstone, the Cretaceous Tokio Formation, and Quaternary deposits of the alluvial aquifer. Additionally, the Department has developed a ground water monitoring area in Pulaski and Saline Counties in the northeastern Ouachita Mountains region of central Arkansas to characterize ground water quality in the numerous Paleozoic formations of this region, and to identify possible anthropogenic impacts on ground water quality from ensuing commercial and residential development of this area. In addition to the established ambient monitoring sites, the Department has initiated several investigations in order to evaluate areas of the State with special concerns, including: the impact of pesticide use in the Delta, the impact of confined animal operations in northwest Arkansas, areas of saltwater intrusion in southeast Arkansas, occurrence of arsenic exceeding federal MCLs in eastern Arkansas, and the interaction of surface and ground water in the Arkansas River alluvium near Dardanelle, Arkansas.

The increasing focus on ground water quality directly reflects the increased attention on nonpoint sources of contamination. As such, other state and federal agencies are involved in ground water case studies on an unprecedented level, including agencies which in past years had little involvement in ground water quality concerns such as the University of Arkansas Cooperative Extension Service and the Natural Resources Conservation Service, among others. In addition to water quality concerns, declining ground water levels prompted the Arkansas Natural Resources Commission to enact legislation in 1991 to address the overuse of ground water. The present report on ground water assessment activities generally follows the 1996 USEPA guidance, which enacted many changes primarily related to consistency among states.

As part of ADEQ’s 10-year Strategic Plan, the Department has committed to the development of state-promulgated ground water standards for protection of the State’s ground water aquifers. Ground water accounts for approximately 60 percent of the total water use in Arkansas, and provides high-quality water for industrial, agricultural, municipal, and domestic uses, among other important facets associated with contribution to baseflow in streams, recreational use through hot springs, and numerous other benefits. Both nonpoint and point sources of contamination have been documented throughout Arkansas, and monitoring and remediation of these sources, in addition to contamination prevention activities; continue to task the resources of the Department’s various ground water protection programs. Although language is included in several of ADEQ’s regulations, which include contamination prevention activities, investigation, and remediation of known contamination, the regulations are fragmented, fraught with loopholes, specific to certain contaminants, and, as a whole, do not address the full spectrum of potential contaminant sources with the State. The Department is currently working through an internal task force, composed of members from various Divisions within the Department, to address important components of ground water standards development.

Arkansas's point source discharge controls are managed through the NPDES program, which USEPA delegated to the State in 1986. This program is guided by the State's Water Quality Management Plan, the State's Surface Water Quality Standards, and the Continuing Planning Process. Enforcement activities are based on non-compliance as reported through the NPDES permitting system, with monitoring data compiled through monthly discharge monitoring reports and complicance inspections of NPDES facilities.

The initial Nonpoint Source Pollution Assessment for Arkansas was prepared using pre-1988 data. Assessment updates were completed in 1990 and 1997 which indicated agricultural activities as the major source of waterbody impairment. Data from the current water quality assessment indicates a similar trend, except that instream turbidity is now associated with overall surface erosion. The major efforts of nonpoint source management are oriented toward the waste management activities of the confined animal production areas, and in controlling surface erosion. In February 2003 new federal regulations were implemented to help minimize impacts from dry litter operations. Increased intensity of ground water and surface water monitoring and applied research on the fate of animal waste applied to pastures are attempting to address the nonpoint source impacts from confined animal activities. Expansion of the nonpoint source management program began in 1998 and now includes management plans for resource extraction, silviculture, agriculture, surfact erosion, household, and small business. Storm water pollution prevention plans have been developed to reduce the impacts of construction activities in rapid growth areas in the larger metropolitan areas of the State. Because of recent assessments of impaired waters in the row-crop dominated Delta area of the State and the completion of TMDLs, implementation of watershed management plans are expanding into row-crop agriculture. Through the formations of watershed groups and education outreach programs, the implementation of watershed restoration activities has begun to address many of these issues.

The classification of the State's waters by ecoregion not only categorized them by physical, chemical, and biological features, but also separated the major pollution problems, most of which are land use related. A general summary of the water quality by ecoregion follows.

Water quality in the Delta Region is significantly influenced by nonpoint source runoff from its highly agricultural areas. The vast majority of the waterways within this region form a network of extensively channelized drainage ditches. Government programs have been used to develop this highly productive agricultural land. In contrast, many of the practices utilized in making this land more productive actually impact the designated water quality uses. Most Department work within this region indicates that, in the majority of these waters, the best that can be expected in terms of a fishery is an altered fishery. Once a natural stream has been channelized, only those organisms which do not require in stream cover and can exist in highly turbid waters will survive. Within these systems the fishable goal of the CWA is being met, even though the aquatic life communities have been substantially altered.

The Gulf Coastal Region of southern Arkansas exhibits site specific impacts because of historical resource extraction activities; including the extraction of petroleum products, brine, bromine, barite, gypsum, bauxite, gravel, and others. Impacts occur from the extraction site, storage, transmission of the product, and the processing facilities. Although timber is the major resource harvested in this area, no large-scale impairments from these activities have been identified in this area.

The Ouachita Mountains Region has characteristically been described as a recreational region that possesses exceptionally high quality water. The predominant land use is silviculture, both in private timber companies and National Forest holdings. Some of the Ouachita Mountains have been plotted on a national scale map as areas potentially sensitive to acidification (acid rain). Data is currently inconclusive concerning any impact on the region due to acid precipitation. Additional concerns have been voiced by various groups and organizations dealing with potential erosion and siltation as a result of management practices used in timber harvest. Periodic water quality monitoring data has not indicated significant impacts to the streams within this region. Occasional above normal turbidity values have been observed during periods of significant rainfall events. Potential impacts to waters in this region include land clearing for pasture without protective riparian zones, in stream gravel removal, post resource extraction, and existing areas of confined animal production.

The Arkansas River Valley Region exhibits distinct seasonal characteristics of its surface waters with zero flows common during summer critical conditions. Peak runoff events tend to introduce contaminants from the predominantly agricultural land use, which are primarily pasturelands with increasing poultry production. Fecal coliform bacteria has been a parameter of concern due to its preclusion of the swimmable use. Measurements during storm events routinely exceeded the water quality standard, although the source usually was not fecal contamination. The use of *E. coli* as the indicator organism provided a more accurate measurement of contamination from warm-blooded animals and has indicated no significant problems. The current exploitation of natural gas deposits has resulted in some site specific water quality degradation. This area experienced a rapid expansion of confined animal activities throughout the 1990s. Soil types in much of this area are highly erosive and tend to go into colloidal suspension causing long-lasting, high turbidity values.

The Boston Mountains Region, located in north central Arkansas, is sparsely populated. The land use is silviculture and much of the region is located within the Ozark National Forest. It is a high recreational use region with exceptional water quality. A large percentage of the streams from this region are designated as extraordinary resource waters. Major concerns about potential water quality degradation include: 1) conversion of hardwoods to improved pastures; 2) confined animal operations; 3) even-aged timber management; and 4) localized natural gas production. Current monitoring data from within this region continues to reflect high quality water. Periodic, elevated levels of turbidity are noted in some waters in this region. This is most likely caused by clearing of timberland adjacent to major streams for conversion to pastures, which accelerates stream channel and bank erosion. In addition, secondary and tertiary road construction and maintenance and in stream gravel removal are exacerbating the turbidity problems.

The Ozark Highlands Region, located in extreme north Arkansas, is noted for its mountainous terrain with steep gradients and fast-flowing, spring-fed streams. A large percentage of the streams are designated as extraordinary resource waters. The fractured limestone and dolomite lithology allows a direct linkage between surface and ground waters. The water quality problems are directly related to land use. The large human population increase also results in increased water contamination from infrastructure development as well as surface erosion from construction activities. Within this region are some of the highest animal production rates in the State. Removal of gravel from the banks and beds of streams is a frequent activity. This causes direct habitat destruction and greatly accelerates siltation problems within the streams.

PART II BACKGROUND

CHAPTER ONE ATLAS OF ARKANSAS

There are approximately 34 million acres of land and water inside Arkansas's boundaries. Of this total, 15.1 million acres are in agriculture production, approximately 8.2 million acres in crop production, and 6.9 million acres in pastureland and other agricultural uses. There are approximately 17 million acres of forests in the State; however, not all of these acres are managed for timber production. The remaining 1.9 million acres are in State parks and wildlife areas, waterways, highways, roads, urban areas, and other non-agricultural lands. There are approximately one-half million acres of impounded surface waters in the State.

River Basins/Total River Miles

The State is divided by six major river basins: the Red River Basin, Ouachita River Basin, Arkansas River Basin, White River Basin, St. Francis River Basin, and the Mississippi River Basin. Arkansas has 12,071.7 miles of rivers and streams digitized in the USEPA River Reach File (RF1) with some additions by the Department. The RF1 files were digitized from 1:500,000 scale maps and include only the major water bodies. Recently the USEPA has re-digitized the State's water bodies from the 7.5-minute topographic maps, thus significantly increasing the detail and the number of water bodies. This includes the intermittent streams and ephemeral drainages that flow only during a rainfall event.

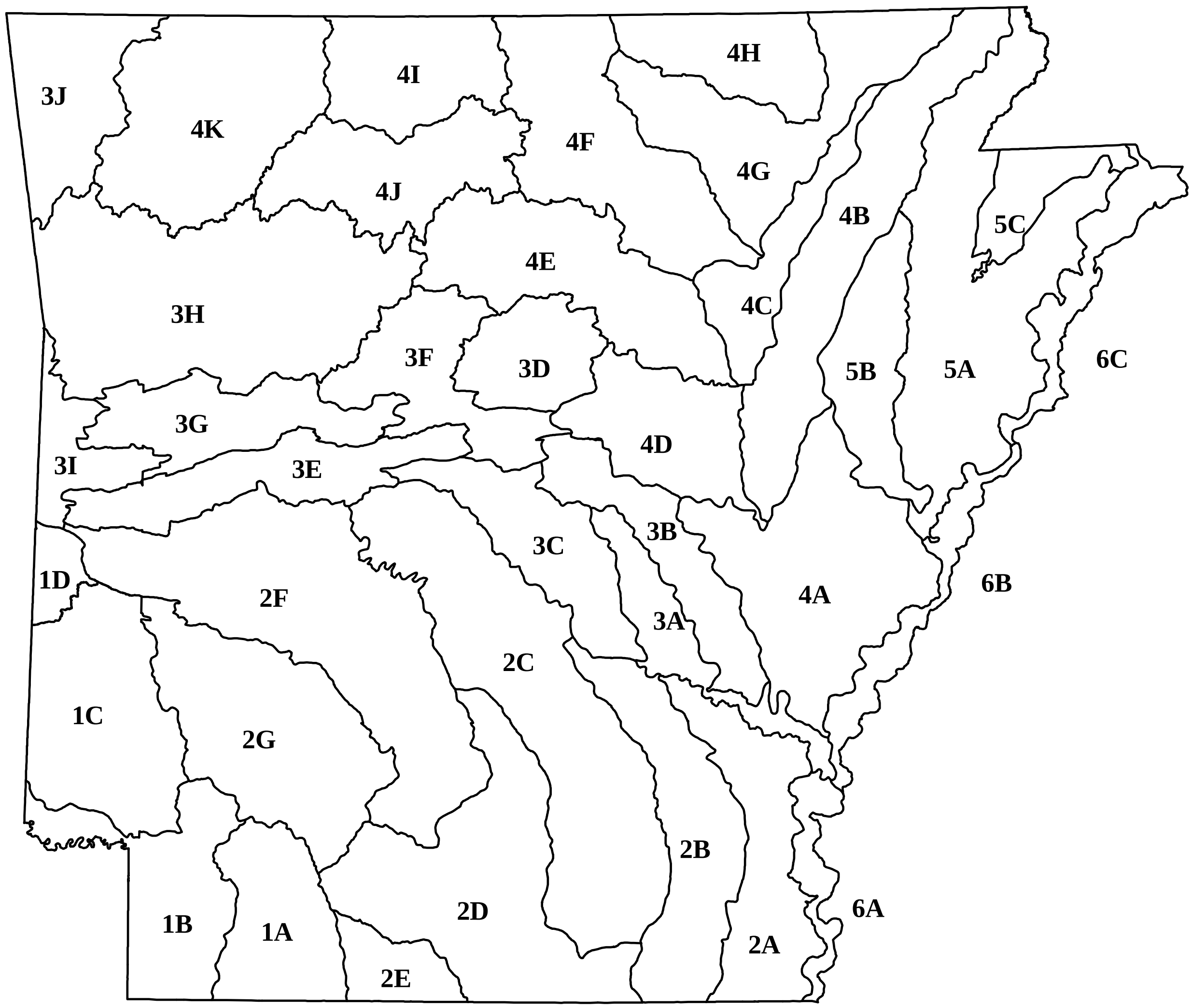
For comparison, the following data was developed from the USEPA RF3/DLG database for the State of Arkansas:

Total river and stream miles		87,617.4
	Perennial stream miles	28,408.2
	Intermittent stream miles	53,465.2
	Ditches and canal miles	5,250.6
	Border stream miles	493.5
Total acres of lakes, reservoirs, ponds		514,245.0

Since most of the water bodies identified in the RF3 File are not assessed, the State has chosen to retain the RF1 database in its assessment process.

The 6 major river basins are subdivided into 38 water quality planning segments (Figure II-1) based on hydrological characteristics, human activities, geographic characteristics, etc. The planning segments are further broken down into 492 smaller watersheds, based on discrete hydrological boundaries as defined by the U.S. Natural Resources Conservation Service.

Figure *I1-1: Water Quality Planning Segments*



1 Red River Basin

2 Ouachita River Basin

3 Arkansas River Basin

4 White River Basin

5 St. Francis River Basin

6 Mississippi River Basin

Publicly Owned Lakes/Reservoirs

A discussion of lakes and reservoirs is included in Part III, Chapter Five and includes a list of Arkansas's publicly owned lakes and reservoirs and their trophic status. The State has a total of 356,254 acres of significant publicly-owned lakes. The USEPA RF3/DLG calculation identifies a total of 514,245 acres of lakes, ponds, and other impounded waters in the State, some of which are private fish production facilities and water treatment facilities.

Wetlands

The draft National Wetlands Priority Conservation Plan (NWPCP) identified Arkansas as one of nineteen states that experienced significant decreases in wetlands from 1954 to 1974. Most of the State's wetlands are located in the Delta, which is dominated by row-crop agriculture, where the primary threat to wetlands is conversion to cropland. Although the conversion rate appears to have peaked in the 1960s and is now decreasing, the total wetland base has declined substantially making smaller losses more critical. Without significant changes in wetlands protection strategies, it was predicted that Arkansas's Delta Region would continue to lose wetlands at a rate of over 15,000 acres per year. Additional discussion about the State's wetlands is located in Part III, Chapter Six.

Summary of Classified Uses

Essentially, all waters of the State are classified for specific designated uses. Approximately 1,833 miles (about 16%) of Arkansas's streams are classified as high quality, outstanding state or national resources. The designated uses assigned to various water bodies include:

- Extraordinary Resource Waters (ERW)(Figure II-2)
- Ecologically Sensitive Water bodies
- Natural and Scenic Waterways
- Primary Contact Recreation ("swimmable")
- Secondary Contact Recreation
- Fisheries ("fishable")
  - Trout
  - Lake and Reservoir
  - Stream
    - Ozark Highlands
    - Boston Mountains
    - Arkansas River Valley
    - Ouachita Mountains
    - Typical Gulf Coastal
    - Spring water-influenced Gulf Coastal
    - Least-altered Delta
    - Channel-altered Delta
- Domestic Water Supply
- Industrial Water Supply
- Agricultural Water Supply

Ozark Highlands
Current River
Eleven Point River
Strawberry River
Spring River
- **Field Creek**
- **Big Creek**
- **English Creek**
- **Gut Creek**
- **Myatt Creek**

South Fork Spring River
North Sylamore Creek
Buffalo River
Kings River
Bull Shoals Reservoir

Boston Mountains
Devils Fork Little Red River
- **Beech Creek**
- **Tomahawk Creek**
- **Turkey Creek**
- **Lick Creek**
- **Racoon Creek**

Middle Fork Little Red River
Archey Creek
Illinois Bayou
- **North Fork**
- **Middle Fork**
- **East Fork**

Piney Creek
Hurricane Creek
Mulberry River
Lee Creek
Salado Creek
Kings River
Buffalo River
- **Richland Creek**
    - **Falling Water Creek**

Arkansas River Valley
Cadron Creek
- **North Fork**
- **East Fork**

Mulberry River
Big Creek

Ouachita Mountains
Lake Ouachita
DeGray Reservoir
Saline River
- **North Fork**
- **Alum Fork**
- **Middle Fork**
- **South Fork**

Caddo River
- **South Fork Caddo River**

Cossatot River
- **Caney Creek**

Little Missouri River
Mountain Fork River
Big Fork Creek

Gulf Coastal
Saline River
Moro Creek

Delta
Second Creek
Cache River
Arkansas River
Strawberry River
Two Prairie Bayou

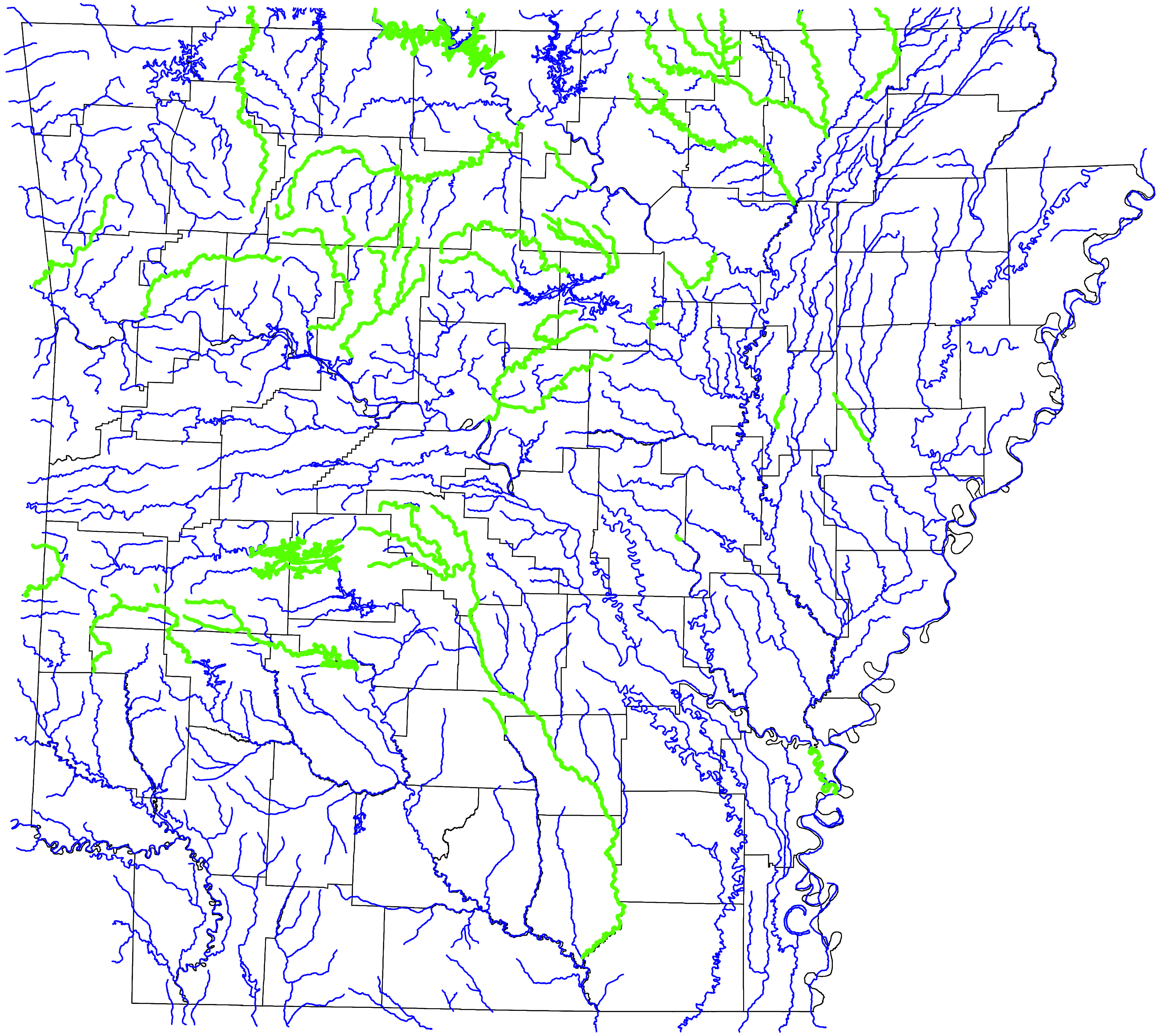


Figure II-2: Arkansas's Extraordinary Resource Waters

CHAPTER TWO WATER POLLUTION CONTROL PROGRAMS

Watershed Approach

The watershed approach for water quality management in Arkansas was initiated in the early to mid 1970s with the development of Water Quality Planning Segments. In accordance with Section 303(e) of the Clean Water Act, wasteload allocation studies to establish TMDLs (total maximum daily loads) for waters in each segment were performed. The water quality management plan has been continuously updated with new or expanded facilities, or in compliance with modifications of the water quality standards. Similarly, assessment of the State's water quality is based on individual stream reaches grouped by planning segments and based on watersheds. The statewide monitoring program, as well as the NPDES permitting program, is organized by these same planning segments. The planning segments are congruent with the hydrologic unit code (HUC) boundaries in USEPA's River Reach File. This allows GIS capabilities to assist with designation, characterization, assessment and management.

Water Quality Standards

Arkansas's water quality standards are based on data collection of the physical, chemical, and biological characteristics of least-disturbed streams within ecoregions that were established by land surface forms, potential natural vegetation, soil types and land uses. All waters of the State have been designated to support multiple uses based on the potential attainability of the use in each waterbody.

Specific criteria to protect the designated uses of each waterbody were developed from the intensive ecoregion studies, an abundance of historical data, numerous additional scientific data and considerable public and other governmental agency input. These criteria include numeric values, narrative limitations, and prohibitions on physical alterations of certain waters. The aquatic life uses are specifically defined to provide a measure for aquatic life use support that includes community structure as well as toxicity limitations.

Provisions are established in the water quality standards to allow modifications of the criteria and the designated uses of specific water bodies based on existing uses, the level of classification of the waterbody, and the social and economic needs of the area of concern.

Act 472 of 1949 designates ADEQ as the lead authority for development and implementation of ground water quality standards. Chapter 3 of Act 472 addresses water and air pollution. Section 8-4-102 (Definitions) include definitions for "pollution", "waters of the state", and "discharge into the waters of the state." Section 8-4-201 (Powers and duties of commission generally) gives the Pollution Control and Ecology Commission (Commission) the powers "To make such classification of the waters of this state as it may deem advisable" and also "to administer and enforce all laws and regulation relating to the pollution of any waters of the state." As such, the Commission is the sole enforcer of water quality violations. Section 8-4-202 (Rules and regulations) specifically assigns to the powers of the Commission the authority to prescribe "water quality standards, performance standards, and pretreatment standards." Because "Waters of the state" include "…all bodies or accumulations of water, surface and *underground*…", then the Commission is assigned authority to develop standards for the protection of ground water.

As part of ADEQ's 10-year Strategic Plan, the Department has committed to the development of state-promulgated ground water standards for protection of the State's ground water aquifers. A ground water task force was assembled with members from all the divisions of ADEQ charged with protection of ground water, and the task force conducted approximately 20 meetings from December 1994 through September 1995. The team studied the current status of ground water protection within ADEQ, and additionally discussed the need for ground water standards in addition to establishing a general format for those standards. A rough draft set of ground water standards were developed as one product from the task force. Several changes in federal policies concerning both ground water protection and contamination remediation put initiation of standards on hold, in order to evaluate the impact of the policy changes on existing legislation by the various ADEQ divisions. These changes included adoption of Region VI Human Health Media-Specific Screening Levels by ADEQ Brownfields Program, methodologies and established standards for evaluation of risk assessments at contaminated sites (ASTM and others), amendments to existing ADEQ regulations by many of the divisions, and other programmatic changes within the divisions charged with ground water protection. Emphasis on risk assessments demonstrated the difficulty of simply establishing numerical standards at all contaminated sites within the State. Establishment of standards must be done in a manner that will compliment existing departmental regulations, provide a uniform, statewide set of criteria for defining and addressing ground water contamination, and fill existing gaps in ground water protection.

Water Division staff have currently updated a library of standards from other states within the United States that were first gathered in 1990 and 1991. Together with a thorough review of changes in regulations by other states, in conjunction with a review of ADEQ regulations pertaining to the various divisions, the Water Division has drafted a set of discussion items to be used by a new task force, which is charged with standards development. Each division member serving on the task force will review this list and be prepared to address in writing and in future discussions the impacts, deficiencies, and needs within each of these criteria as related to ground water contamination remediation and prevention. The basic input from division representatives will include the problems faced by ground water personnel over the years in interpreting and applying existing regulatory language, in addressing loopholes and grey areas that have plagued efficient case management, and in defining what constitutes pollution and/or the type of ground water warranting protection. Together with a review of standards from other states and discussions with ground water personnel from other states, ADEQ should be able to draft a set of standards that will fully protect Arkansas ground water.

Point Source Control Program

In accordance with the federal Clean Water Act, Section 303(e), Arkansas maintains a "continuous planning process" in order to integrate the National Pollutant Discharge Elimination System (NPDES) permit program, State Permit Program and the State water quality standards with the Water Quality Management Plan (WQMP). The WQMP is the controlling document for determining all point source discharge limits statewide. As new information is developed, revisions to the WQMP are made in accordance with the public participation requirements of the Clean Water Act.

The State of Arkansas presently administers the State Permit Program, which has been in operation since 1949. As of November 1, 1986, the State also has been authorized by USEPA to administer the NPDES program under the Clean Water Act.

The State Permits Branch of Water Division is responsible for issuing all permits relating to "No-Discharge" waste disposal systems (those that do not discharge directly to the Waters of the State). Most common facilities permitted by the State Permits Branch for waste storage, treatment, and disposal are confined animal facilities, commercial facilities with septic tanks and leach fields, and centralized or decentralized wastewater treatment systems for residential developments. The State Permits Branch also permits land application of waste generated by different types of treatment facilities such as wastewater treatment plants, water treatment plants, poultry processing plants, and food-processing plants, and drilling fluids from oil and gas field exploration activities. In addition, the State Permits Branch manages the Underground Injection Control (UIC) Program, in conjunction with the Arkansas Oil and Gas Commission, issues permits for salt-water disposal systems and is responsible for Section 401 Water Quality Certifications for any water project requiring a federal permit or license.

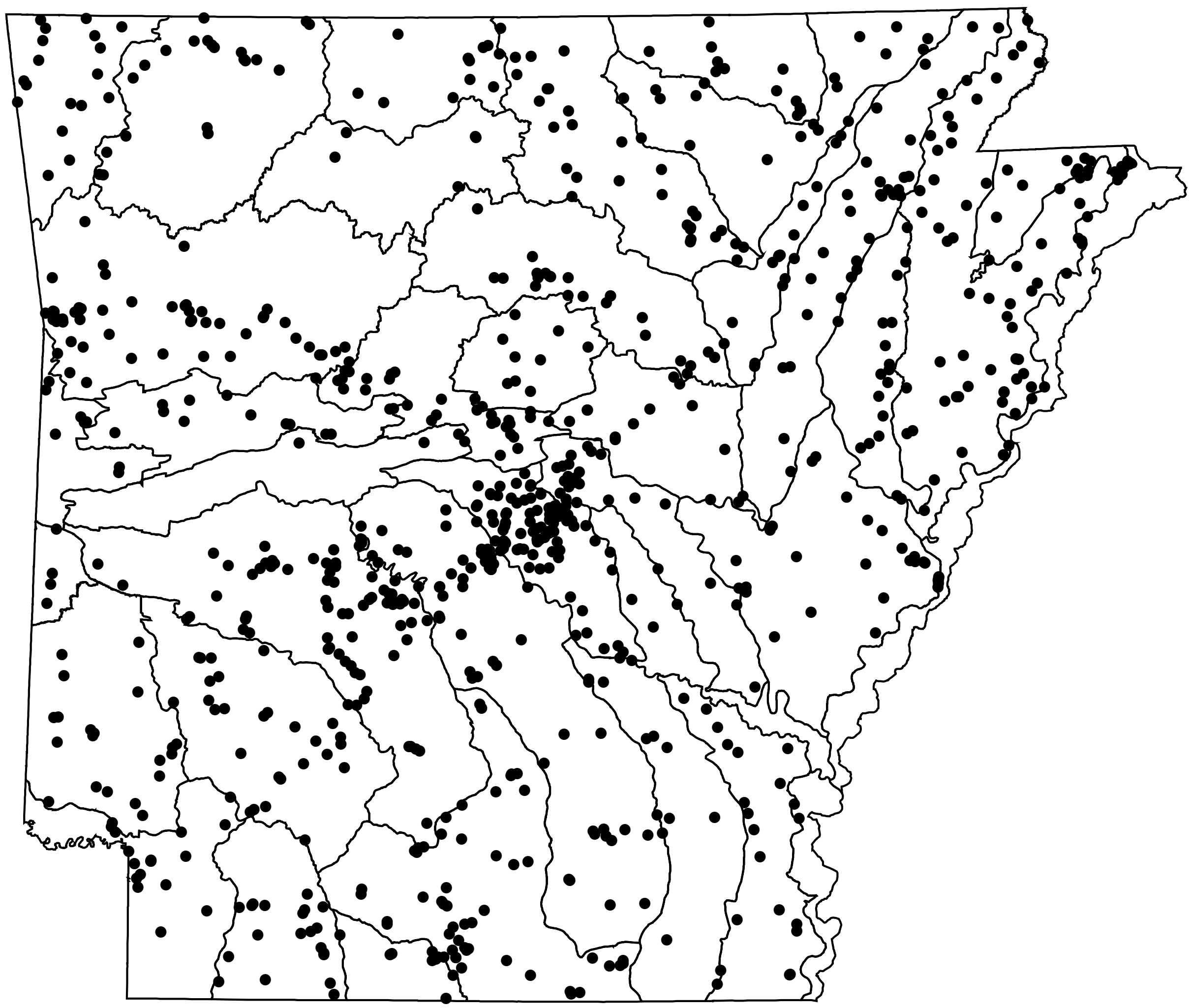
Arkansas currently operates a NPDES program patterned very closely after the USEPA program, using the federally approved forms for permit application, as well as monitoring reports. In the administration of the program, the Department has adopted by reference, in Regulation No. 6, most of the federal regulations applicable to a wastewater discharge permitting program. The distribution of Arkansas's major and selected minor NPDES permits is illustrated in Figure II-3.

Storm Water Requirements

The Storm Water Section (SWS) of the NPDES Branch manages three general permits and one individual permit covering various storm water discharges. The Construction Storm Water General Permit (ARR150000) is written to cover any type of construction activity that is subject to permitting requirements. This general permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP) using Best Management Practices (BMPs) to control storm water contamination from erosion and other waste generated on a construction site. The SWPPP must include a detailed description of the construction project; a detailed site map showing drainage, erosion controls, discharge locations, etc.; a description of the erosion controls used on the site; inspection and maintenance procedures for the erosion controls, documentation for Total Maximum Daily Load (TMDL) and Water Quality Standard compliance; and certifications.

Industrial Strom Water General Permits (ARR000000) cover the 11 categories of industry types that are required by the federal regulation to obtain storm water permit coverage. In addition, 12 industry types covered under the permit are required to monitor their storm water discharges on an annual basis for various pollutants. This general permit requires the development of a SWPPP using BMPs to address the reduction in pollutants exposed to the storm water runoff and/or removal of the pollutants after the storm water has been contaminated. The SWPPP must include a list of personnel that will inspect the facility, a non-storm water certification, good housekeeping, spill prevention and response, and inventory of exposed material.

Figure II-3: NPDES Permitted Facilities



The Small Municipal Separate Storm Sewer System (MS4) General Permit (ARR040000) covers all of the regulated Small MS4s in the State. This general permit requires the development of a Storm Water Management Plan (SWMP) to address the Six Minimum Control Measures as required by federal regulation. These Six Minimum Control Measures cover public education, public participation, illicit discharge detection, construction site control, post-construction control, and good housekeeping.

Additionally, the Individual MS4 Permit (ARS000002) covers the storm sewer discharges from the City of Little Rock. This permit has been issued as a co-permit to the City of Little Rock and the Arkansas State Highway and Transportation Department. This permit requires the development of a program to address the same basic measures as the ARR040000 general permit. This permit also requires the co-permittees to sample the storm water discharges form the permitted outfalls on a quarterly basis.

Point Source Impacts Monitoring

The impacts from major point source discharges of concern are monitored primarily through strategically located monitoring stations within the statewide Ambient Water Quality Monitoring Network. These stations not only document areas of concern needing enforcement or some other type of abatement activity, but they also demonstrate improved conditions resulting from pollution control activities. In addition, self-monitoring through monthly discharge monitoring reports is required in the NPDES permits of most dischargers (see enforcement).

Toxics Strategy

Since FY87, the Department has utilized toxicity testing as a monitoring tool to measure compliance with its narrative toxicity standard, which states: “Toxic materials shall not be present in receiving waters, after mixing, in such quantities as to be toxic to human, animal, plant or aquatic life, or to interfere with the normal propagation, growth and survival of the indigenous aquatic biota.” The actual intent of the toxics strategy is that there shall be no discharge of any wastewater from any source that:

1. Results in the endangerment of any drinking water supply,
2. Results in aquatic bioaccumulation, which endangers human health,
3. Results in any in stream acute or chronic aquatic toxicity, or
4. Violates any other applicable general or numerical State water quality standard.

The toxicity testing program consists of both self-monitoring conducted by the permittees and compliance monitoring conducted by the State. The State has been and will continue to implement the post-third round permit policy endorsed by USEPA Region 6, with minor revisions. Whole effluent toxicity testing requirements are included in all major and selected minor permits. Whole effluent toxicity testing requirements are placed in permits at renewal or, in some instances, prior to renewal if information indicates a significant probability of toxicity.

In 1991, the Arkansas Pollution Control and Ecology Commission adopted specific numeric criteria for 12 pollutants in terms of their acute and chronic toxicity (Section 2.508 of Regulation No. 2). On December 22, 1992, USEPA promulgated numeric criteria for 10 heavy metals and cyanide into Arkansas water quality standards. These criteria were initially expressed as total recoverable metals. Later USEPA modified these values by applying a conversion factor to the total recoverable values and expressed them as dissolved values. The promulgated standards for chromium (VI), mercury, and cyanide are expressed as a function of the pollutant's water-effect ratio (WER), while standards for cadmium, chromium (III), copper, lead, nickel, silver, and zinc are expressed as a function of the pollutant's WER and as a function of hardness. In January 1998, the Commission adopted the National Toxics Rule numbers previously promulgated by USEPA as a part of the State's water quality standards.

When NPDES permit applications are submitted, in stream waste concentrations (IWC) for all potential pollutants for which there is no adopted state standard are calculated and compared to values listed in the Quality Criteria For Water 1986 (Gold Book). If toxicity values published in the Gold Book are exceeded by the calculated IWC, whole effluent toxicity testing is required.

Self Monitoring for Toxicity

Whole effluent toxicity (WET) testing is required in 88 major and significant minor industrial NPDES permits. Lethal and sublethal effects were observed in 13 percent and 18 percent, respectively, in 2,873 of WET tests submitted by these permittees. Eight industrial facilities are performing, or have completed, Toxicity Reduction Evaluations (TRE's) from October 2000 through September 2005. Depending on the results of the TRE's, these facilities have discontinued or relocated discharges or improved treatment capabilities.

Seventy-three municipal permittees performed 2,526 WET tests in the above time period. In approximately 4 percent of these tests lethal effects were observed, and sub-lethal effects were observed in 11 percent of these tests.

When the general storm water runoff permit for industrial activity (ARR00A000) was first issued on October 1, 1992, acute toxicity testing was required for approximately 220 facilities. These facilities fell under the first three monitoring categories found in Part V.B of the general permit. After the first three years of the permit, these requirements were removed for those facilities that successfully passed the requirement (approximately 60 percent).

Testing was required on a quarterly basis from 1996 until the general permit was renewed on October 1, 1998. During this time, 60 of the 90 facilities were able to pass the quarterly acute toxicity testing. When the general storm water runoff permit for industrial activity (ARR00A000) was renewed, the whole effluent toxicity testing requirements were not continued. The facilities that were still having trouble passing the whole effluent toxicity testing requirements (approximately 30) were placed back on annual testing until they passed two consecutive tests. As of October 1, 1998, 16 industrial facilities were required to conduct annual acute whole effluent toxicity testing. From October 1, 1998 to December 31, 2001, permits expired or whole effluent toxicity testing was no longer required for several facilities leaving five facilities still sampling. Currently, those same five facilities are required to biomonitor yearly, using acute toxicity tests.

Certification of Monitoring Data

Pursuant to the provisions of Act 322 of the 79th General Assembly of 1993, the Arkansas Pollution Control and Ecology Commission established mandatory certification for certain environmental testing laboratories. This Act clarifies the Department's existing power to refuse to accept invalid test results and expands the enforcement powers over environmental testing. Regulation No. 13 establishes the fee system for laboratory certification. As of December 2005, 90 environmental testing laboratories have received certification from the State of Arkansas.

Enforcement

Enforcement responsibilities fall under the NPDES enforcement section. Those facilities subject to ongoing enforcement actions by USEPA at the time of program authorization remain the responsibility of USEPA until the facility is in compliance. The State has enforcement responsibility for the remainder. The primary basis for enforcement is the self monitoring data submitted by permittees on monthly discharge monitoring reports (DMRs) and routine compliance inspection performed by the Department. All DMR data is entered into the Permit Compliance System (PCS) national database. The State addresses all permit violations reported by permittees through an informal enforcement action, initially; an escalation of enforcement actions occur if the violation is not resolved. Other violations are judged on their severity and actions are taken as necessary.

Wastewater Licensing/Training

Wastewater treatment plant operator licensing and training continues to be a necessary and integral part of the overall scope of the point source pollution control program. The licensing and training verification program administered by the Wastewater Licensing Section, Water Division of the Department, operates within the authority of Arkansas Act 211 of 1971, as amended, and Act 1103 of 1991. These Acts set the requirements by law that requires a licensed operator at most wastewater treatment facilities in Arkansas. Act 211 has required licensed operators at Publicly-Operated Treatment Works (POTW) since 1971. Act 1103 of 1991 added the requirement for the licensing of industrial operators. There are approximately 3000 licensed operators in Arkansas, which includes both municipal and industrial operators. Classification of wastewater treatment plants by the unit processes determine the level of operator staffing and the licensing level of the plant operators.

Most training of wastewater treatment plant operators is accomplished by the Arkansas Environmental Academy, a branch of Southern Arkansas University located at Camden, Arkansas, and the Arkansas Rural Water Association, Lonoke, Arkansas. Over 100 training sessions are accomplished annually with offerings in all phases of wastewater training at various state locations by the faculty and staff. Other sources of training are provided by private contractors, formal organizations, and other institutions of higher learning.

Construction Assistance

As of July 1, 2001 the Construction Assistance Division is no longer a division of ADEQ. The Division, which manages the State Revolving Loan Fund, was transferred to the Arkansas Natural Resources Commission (ANRC). The program is now part of the Water Development Division, Water Resources Cost Share Revolving Fund at ANRC. However, prior to July 1, 2001, the Revolving Loan Fund, as enacted under Title VI of the Clean Water Act, as amended in 1987, provided loans to communities for the same purpose as grants. The Department offered communities an interest rate well below the market rate. The loans should have been repaid within 20 years of project completion, and the debt could be serviced from a variety of repayment sources.

Nonpoint Source Control Program

In 1988, ADEQ conducted a nonpoint source assessment and prepared a management plan pursuant to Section 319 of the Clean Water Act, as amended by the 1987 Water Quality Act. This assessment and portions of the original management program were approved by USEPA Region 6 nonpoint source program personnel.

In 1996, the former Arkansas Soil and Water Conservation Commission, now the Arkansas Natural Resources Commission (ANRC), was designated as the Nonpoint Source Program Management Agency and the lead agency for the Agriculture nonpoint source category; the Arkansas Forestry Commission assumed the responsibilities for the silviculture category; and ADEQ has retained the responsibility of assessing and reporting on nonpoint source pollution, watershed prioritization, and the responsibilities associated with the Resource Extraction (mining) category. ADEQ and ANRC share the responsibilities of the Surface Erosion, and Household and Business Activities categories. In addition, both of these agencies and numerous other cooperators lend assistance to each of the priority watersheds.

Assessment

The initial Arkansas Nonpoint Source Pollution Assessment, 1988, assessed approximately 36 percent of the 11,900 stream miles in the State. Based on assessment criteria established in 1988, 58 percent of the assessed streams were not meeting all designated uses. Limited data for the 79 significant publicly owned lakes indicated no use impairment. There was also inadequate data to identify specific areas of ground water impairment. The 1988 assessment identified agriculture and mining as the primary categories of nonpoint source (NPS) pollution in the state.

The 1988 assessment was updated in June 1997, using updated assessment criteria. The 1997 report assessed 8700 stream miles and indicated that NPS pollution was impacting (but not necessarily impairing) over 4100 stream miles. Agricultural impacts were identified as the major cause of impacts on 3197 stream miles. Other major impacts were related to silviculture activities, road construction/maintenance activities and unknown sources. The unknown source was mercury contamination of fish tissue.

To reduce the confusion between the Nonpoint Source Assessment Report, and this document, ADEQ will no longer publish a separate nonpoint source assessment report. This document, updated every two years, will serve as the nonpoint source assessment report.

Management Program

The Arkansas Nonpoint Source Pollution Management Plan was updated and fully approved in 2005. It provides for continued monitoring of water quality, research into the effectiveness of Best Management Practices (BMPs), and implementation strategies of BMPs.

Current Activities

A Total Maximum Daily Load (TMDL) was completed for the L’Anguille River in October 2001. The TMDL indicated that a reduction of total suspended solids by 38 percent to 40 percent was needed in order for the waterbody to meet in stream turbidity water quality standards.

In addition, a physical, chemical, and biological water quality assessment of the Bayou Bartholomew watershed was completed in 2001. Findings from this survey indicated possible impairments to the biological community due to excessive turbidity and inadequate in stream habitat. In addition, fecal coliform concentrations in isolated sections of the watershed occasionally exceeded the primary contact recreation standard. A Total Maximum Daily Load (TMDL) was completed for Bayou Bartholomew in October 2002. The TMDL indicated that a reduction of total suspended solids by 29 percent to 37 percent was needed in order for the waterbody to meet in stream turbidity water quality standards.

ADEQ completed a physical, chemical, and biological water quality assessment of the Strawberry River watershed in December 2003. Results from the survey indicated that seven stream segments were not fully supporting the aquatic life designated because of excessive in-stream turbidity, and that eight stream segments were not fully supporting the primary contact recreation use because of excessive fecal coliform bacteria concentrations (see Appendix A, Planning Segment 4G). The main source of the turbidity is thought to be from unpaved county roads, streambank erosion, and adjacent pasture land. The main source of the fecal coliform bacteria is thought to be from adjacent agriculture land use activities. A total maximum daily load for each of the impairments was completed in January 2006.

ADEQ initiated a physical, chemical, and biological water quality assessment of the Middle Fork of the Little Red River in central Arkansas in October 2004. Water quality data from ADEQ monitoring sites indicated low dissolved oxygen concentrations and elevated turbidity and bacteria concentrations at several sites. The objective of the survey is to better and more accurately assess the water quality in the Middle Fork, and to develop the data necessary to prepare a TMDL, if needed.

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CHAPTER THREE COST /BENEFIT ANALYSIS

The CWA requires states to provide an "*estimate of the environmental, economic and social costs and benefits needed to achieve the objectives of the CWA and an estimate of the date of such achievement.*" A comparable procedure is needed to conduct a statewide economic analysis of environmental, economic, and social costs. However, that procedure does not currently exist.

A true costs/benefits assessment (CBA) will require assessment of the value of incremental improvements in water quality from a variety of programs, some of which were implemented within the previous reporting cycle (Phase 2 Storm water Regulations, for example). Water quality assessment methodologies presently are inadequate to truly capture the benefits of CWA implementation on water quality. While ADEQ has monitored water quality as directed by CWA Section 305(b) guidance, these protocols are biased towards reporting failures, with little provision for reporting successes.

USEPA implemented the Wadeable Streams Assessment Protocol (WSAP) for statistically assessing water quality of wadeable streams across the central and eastern US during FY 2004 to address this concern. ADEQ participated in this process through the University of Arkansas, sampling 30 randomly selected sites in Arkansas across four ecoregions, in collaboration with USEPA Region 6. Those data are not yet available for reporting, but will be available by the next reporting cycle, and will be included in that analysis at that time.

Recent advances in valuing benefits such as ecological services may provide insight into the true benefits of CWA regulations that have not been represented economically in previous assessments. However, protocols for including those benefits are not yet established. Therefore, pertinent accessible information has been utilized for this water quality CBA in order to provide the required information. Future water quality reports will provide a more comprehensive CBA that will address questions critical for the effective management of water quality in Arkansas.

Cost Information

It is difficult to separate out the costs attributable to water quality pollution control efforts across state, regional, and local governments. The environmental benefits from the environmental resources protected by ADEQ are more important than ever, as evidenced by implementation of programs by agency personnel across Arkansas.

The costs for implementing CWA regulations are summarized in this report as agency programmatic implementation expenses, pollution abatement capital expenditures and operating costs for Arkansas. Much of the water quality related budget is self-generated through permit fees; however, a portion is derived through federal grants (Table II-1). These include the Section 104 grant for research investigations, training and informational demonstrations; Section 106 grant for water pollution control activities; the Section 319 grant for nonpoint source management issues, and the Section 604 grant for state water quality management planning activities. Money from each of these grants is divided throughout the appropriate water-quality related state program as directed by each grant, and provides funding for personnel, equipment, survey and research work, and ambient monitoring. Total costs for FY2005 were estimated at over $13.8 million (Table II-1).

Table II-1. Summary of Costs Associated With Implementing CWA Programs in Arkansas for FY 2005.

Funding Source	Principal Activities	Program Cost (FY 2005)
State Budget - ADEQ	Permitting and enforcing CWA provisions in Arkansas	$3,699,586
State Budget - ANRC	Nonpoint source pollution prevention, control, and remediation	$3,260,900
Federal CWA §104 Budget	Assess overall quality and ecological characteristics of Arkansas's water bodies	$315,000
Federal CWA §106 Budget	General water pollution control/water quality management program	$2,683,019
Federal CWA §319 Budget	Prevent, control, and remediate nonpoint source pollution throughout Arkansas	$3,800,000
Federal CWA §604 Budget	Survey work on streams not meeting designated uses	$100,000
	TOTAL	**$13,858,505**

State of Arkansas Budget for Water Quality Control Activities

ADEQ has the primary responsibility for permitting and enforcement of CWA provisions in Arkansas, but the implementation of water quality control activities are distributed across several state agencies, including ADEQ, ANRC, Arkansas Department of Health (ADH), Arkansas Rural Water (ARWA), and the Arkansas Agriculture Department (AAD), among others. ADEQ's 2005 state budget for water quality control activities included $896,525 in general program funds, $73,283 in waste water licensing, $2,624,443 in permit fees, and $105,335 in environmental education fees, for a total of $3,699,586 (Table II-1). Funds received through penalties, fines, and other actions are returned to State funds for redistribution. In FY 2005, ANRC and its partners spent $3,260,900 in non-federal funds for nonpoint source pollution prevention, control, and remediation.

Federal CWA Section 104 Budget

Research monies provided by Section 104 grants support the activities within ADEQ to assess overall quality and ecological characteristics of Arkansas's water bodies. In 2005, ADEQ received $315,000 in Federal funding for these activities.

Federal CWA Section 106 Budget

The Section 106 grant program provides funding for ADEQ's general water pollution control/water quality management program. Activities funded under the Section 106 grant include; ambient water quality monitoring and assessment, development of the Integrated Water Quality Monitoring and Assessment Report, revision of Arkansas's Water Quality Management Plan, development and revision of surface water quality standards, development and issuance of waste water discharge permits, compliance inspections, complaint investigations, and development of enforcement actions. In 2005, ADEQ received $2,683,019 in Federal funding for these activities.

Federal CWA Section 319 Budget

The CWA Section 319 grant for nonpoint source management in Arkansas is implemented by the Arkansas Natural Resources Commission (ANRC). ANRC works with other state agencies, universities, city and regional officials, private industry, and the federal government to prevent, control, and remediate nonpoint source pollution. In 2005 ANRC completed 39 multi-year projects, managed 26 on-going projects, and initiated 19 projects that target NPS pollutants from urban runoff, forestry, agriculture, sand and gravel operations, and on-site waste treatment systems. ANRC also worked with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service to implement 26 best management practices (BMPs) designed to improve environmental quality on more than 1,100 farms. This resulted in load reductions of more than 50,000 lbs phosphorus, 176,000 lbs nitrogen, and 24,000 lbs of sediment. ANRC continues to work closely with USDA to make progress in reducing nonpoint source pollutants and improving water quality. Part II, Chapter 2, Nonpoint Source Control Program has more information. In 2005 ANRC received $3,800,000 in Federal funding for these activities.

Federal CWA Section 604 Budget

Section 604 grant monies are used to fund work on streams not meeting designated uses. These surveys provide data for total maximum daily load (TMDL) and waste load allocation (WLA) development. This data assists permit writers in establishing water quality protective effluent limits for dischargers. In 2005 ADEQ received $100,000 in Federal funding for these activities.

Benefits Information

Arkansas has over 283,000 hectares (699,293 acres) of surface water with some 11,900 miles of streams and rivers and more than 500,000 acres of lakes. Over 800 billion liters of high quality ground water are contained in aquifers capable of yielding over 2,000 liters per minute.[1] Agriculture, Forestry & Fishing Industry accounted for $3.154 billion or 3.9 percent of Arkansas's Gross State Product (GSP) in 2004 (Arkansas GSP: $80.902 billion).[2]

Fishing and Aquaculture Benefits

Arkansas is renowned for fishing, as well as a myriad of water related recreational activities including sailing and scuba diving. Many of the streams in Arkansas are utilized for recreational floating. The quality of recreational fishing is directly related to the quality of surface water in Arkansas. Three current world-record fish (brown trout, walleye, and hybrid bass) were hooked in Arkansas waters. There are 18 high-profile waterways for canoeing/rafting/kayaking in Arkansas: Big Piney Creek, Buffalo River, Caddo River, Cadron Creek, Cossatot River, Crooked Creek, Eleven Point River, Illinois Bayou, Kings River, Little Missouri River, Little Red River, Mulberry River, Ouachita River, Saline River, Spring River, Strawberry River, and White River.[3]

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1 Information concerning water surface and the Agriculture as a % of GSP is available at the Arkansas Department of Economic Development website: http://www.1800arkansas.com/data_demographics/files/Arkansas%20Profile2005.pdf

2 Information concerning the dollar values of Agriculture industry and GSP is available at the Bureau of Economic Analysis website: http://www.bea.gov/bea/regional/gsp.htm

3 Information is available at the Arkansas Department of Parks and Tourism website: http://www.arkansas.com/outdoors/default.asp, http://www.arkansas.com/outdoors/fishing. http://www.arkansas.com/outdoors/Canoeing-Rafting-Kayaking/

Arkansas is an important state nationally for aquaculture. Specifically, Arkansas ranks second in the U.S. in catfish production, and leads the nation in baitfish, goldfish, sport-fish, largemouth bass, hybrid striped bass, and Chinese carp production. Aquaculture has a total economic impact of over $1.1 billion in Arkansas, primarily in the impoverished Delta region. In Chicot County alone, the catfish industry accounted for 2,665 jobs and $22 million in tax revenue.[4]

Recreational fishing is a major tourist attraction for Arkansas contributing $446 million to the State's economy annually through direct expenditures. In 2001, 782,000 people (residents and non-residents) over the age of 16 fished a total of more than 13,000 days. They spent almost $184 million on trip-related expenses, and almost $208 million on equipment. Thus, aquaculture and fishing, which benefit directly from water quality, provide $1,456 million in direct and indirect benefits to the State of Arkansas.[5]

Hunting Benefits

The most recent year for which data exists regarding the economic impact of hunting is 2001. In that year, Arkansas had 430,694 registered hunters with an economic impact for all hunting-related activities of $905,815,861 based on direct, indirect, and induced effects. The impact of deer hunting during that period was over 42 percent of the total value, or $383,007,221. The economic impact of migratory waterfowl and upland bird hunting was almost 30 percent of the total, or $270,286,245. Clearly, not all of this nearly billion-dollar industry is dependent on or resulting from water quality, but a significant portion of the deer and migratory waterfowl industry benefits from and is dependent upon well-managed water resources. A conservative estimate of the benefit derived from high quality water for those two hunting components would be 50 percent, resulting in a direct benefit of approximately $327 million dollars.[6]

Eco-Tourism Benefits

Ecotourism in Arkansas is calculated as the combination of watchable wildlife recreation (particularly bird watching) and general tourism less special attractions, hunting, fishing, and historic tourism. For 2001, the most recent year for which data is available, 841,000 people participated in watchable wildlife activities. Anecdotal evidence suggests the number of eco-tourists visiting Arkansas has escalated significantly with the possible discovery of the ivory-billed woodpecker in the Cache River area, but hard data are not yet available. The total economic benefit of wildlife watching in Arkansas in 2001 was almost $456 million, most of which was for equipment (Table II-2).

The Arkansas tourism industry experienced a year of record growth in 2004, with travel expenditures increasing from $3,942,501,328 to $4,253,958,933 (7.9%). Visitors increased from 19,668,336 to 20,691,089 (5.2%). These estimates are calculated using the *Travel Industry Association of America (TIA) 2001 Impact of Travel on Arkansas Counties* as a reference.

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4 The Aquaculture/Fisheries Center of Excellence at the University of Arkansas at Pine Bluff. http://www.uaex.edu/aqfi/research/

5 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, Arkansas, U.S. Department of the Interior, Fish and Wildlife Service, U.S. Department of Commerce, U.S. Census Bureau

6 2001 Economic Importance of Hunting in America, The Animal Use Issues Committee of the International Association of Fish and Wildlife Agencies, Washington, DC

During 2004, visitors to Arkansas totaled 20,691,000 person-trips. Visitors spent an average of $205.60 per trip, resulting in $4.3 billion in total travel expenditures, $238 million in state taxes

Table II-2: 2001 Economic Impacts of Watchable Wildlife Recreation in Arkansas

	Resident	**Non-Resident**	**Total**
Retail sales	$232.0 million	$11.9 million	$244.0 million
Salaries & wages	$101.2 million	$ 4.8 million	$106.0 million
Full & part-time jobs	4,532	238	4,770
Tax revenues:			
State sales tax	$12.0 million	$957,000	$12.9 million
State income tax	$5.0 million	$260,000	$5.2 million
Federal income tax	$14.9 million	$783,000	$15.7 million
Total economic effect	$454.1 million	$21.7 million	$475.7 million

Data source: The 2001 Economic Benefits of Watchable Wildlife Recreation in Arkansas (Report prepared for the Arkansas Game and Fish Commission)

and $89 million in local taxes. The Arkansas travel industry employed 59,287 persons and paid $940 million in wages and salaries. When asked the main purpose of their trip during Welcome Center Surveys, visitors surveyed responded in order of preference: visiting friends or relatives (39%), sightseeing (18%), entertainment (15%), business (9%), recreation (9%), family affairs (7%) and other (3%). According to the Internet Conversion Study (2004), tourists participated in the following activities: sightseeing (36.8%), attractions (7.0%), historic sites (3.9%), camping (16.0%), hiking (5.1%), fishing/hunting (6.7%), water sports (4.4%), bird watching (0.3%), other (7.8 %).[7] Separating bird watching from the total, the remaining eco-tourism benefit statewide during 2004 was estimated at 25.5 percent of total tourism. A conservative estimate of the economic benefit derived from well-managed water resources to ecotourism would be half of all ecotourism, or 13 percent of the total, for an economic benefit of more than $553 million plus half of bird-watching ($237 million) for a total impact of $790 million. The perception of clean water is central to the advertising campaign of Arkansas as the "Natural State."

Water-Critical Industry Benefits

The principal industries in Arkansas are manufacturing, agriculture, forestry, business services, and tourism (Table II-3). These industries are dependent upon, and thus benefit from, high quality water resources. Determining the direct benefits from CWA implementation to these industries is difficult due to a wide variety of intermingled variables. However, a conservative estimate of the benefit of implementing the CWA, and thus achieving high quality water, can be made by subtracting fishing from the Agriculture, Forest, and Fishing category, and considering

7 Arkansas Tourism Report 2004, Arkansas Department of Parks and Tourism, Littlerock, AR

a marginal value of 10 percent for high quality water. The benefit to industries in Arkansas from implementing the CWA was estimated to be $1,049 million.

Table II-3: Economic Benefits from Industries in Arkansas by Category, 2004

Industry Category	2004 Revenues (million)	Percent GSP ($80.902 billion)
Agriculture, Forestry & Fishing	$3,154	3.9
Nondurable Goods Manufacturing industry	$7,095	8.8
Accommodation and Food Services industry	$1,784	2.2
TOTAL	$12,033	14.9

Source: Arkansas Department of Economic Development, Bureau of Economic Analysis

Summary of Benefits

The cumulative benefits of implementing CWA programs in Arkansas for FY 2005 were estimated to be more than $3.7 billion (Table II-4). These benefits are rough estimates made with a variety of assumptions, many arbitrary in their magnitude. However, these assumptions were conservative (that is, likely underestimated) and based upon the most recent data available. In addition, these estimates do not consider other critical benefits that were not available for this CBA, including the cost of water treatment for drinking water, the health effects of untreated poor quality water, etc.

Table II-4: Summary of Benefits Associated With Implementing CWA Programs in Arkansas for FY 2005.

Economic Source	Principal Activities	Economic Benefits (Million)
Fishing	Aquaculture and recreational fishing	$1,546
Hunting	Migratory waterfowl and riparian game (deer, upland game birds)	$327
Ecotourism	Bird watching, recreational water sports, etc.	$790
Water-Critical Industries	Ag, forestry, manufacturing, accommodations, etc.	$1,049
	TOTAL	**$3,712**

Cost/Benefit Assessment

In conclusion, based upon the data collected, analyzed, and reported in this CBA, the costs for implementing the CWA in Arkansas in FY 2005 were approximately $13.86 million, and benefits were $3,712 million. Thus, the State of Arkansas received more than 267 times return on each dollar invested in implementing the CWA in FY2005.

CHAPTER FOUR SPECIAL STATE CONCERNS

Areas of special concern within the State's water quality management program include many of the national concerns and priorities as well as state or area specific problems. These concerns extend from wide range, philosophical concerns impacting long range goals and objectives to area- or issue-specific concerns which can be addressed within a short term program cycle. Many of these concerns are listed below simply as an exercise of compiling thoughts which are likely to shape future activities.

1. Ground water standards should be developed to reflect existing water quality in different aquifers and different regions of the State; similar to the ecoregion approach to the protection of surface waters.

2. A statewide ground water quality database and/or more effective data management process should be developed to improve access across programs by other agencies and the private sector.

3. More effective methods are needed to identify NPS (nonpoint source) impacts and their causes. This will require the use of in stream biotic indicators, rather than conventional water quality parameters. A Biological Stream Condition Assessment will be developed to address these concerns.

4. The formation of local watershed groups for water bodies listed as impaired will be critical in getting local "buy-in" to address the sources of impairment.

5. The expansion of an active program to control excessive turbidity and silt loading to water bodies is needed. This should include procedures to control major sources such as stream bank erosion, road construction and maintenance, streambed gravel removal, shale gas drilling operations, and runoff from urban construction sites. Current programs include the USEPA Storm water Phase I and II programs implemented through the NPDES program; Arkansas Stream Teams stream bank restoration activities; and the Arkansas Nonpoint Source Program implemented by the Arkansas Natural Resources Commission.

6. The Department is currently developing a strategy to address nutrient impacts to the State's waterbodies. The strategy will first focus on the State's water supply reservoirs and those waterbodies of outstanding ecological or economical value.

7. The Department has recently conceptualized, as part of the watershed management approach, the incorporation of a multi-discipline approach to pollution control to include the interrelationships of air, water, solid waste, and impacts of the ground water.

8. The Department needs to protect the existing, naturally occurring wetlands through a mechanism other than discharge permits for dredge and fill materials which are being extended into farmed fields and address only limited activities.

9. The Department needs a comprehensive, multi-discipline approach to ground water protection through total interagency cooperation in both investigating and preventing ground water contamination.

10. The Department needs to develop lake management water quality control programs including water quality monitoring, watershed management, and water quality standards specific to individual or similar lake types.

11. The Department needs to develop information to expand knowledge of quality vs. quantity in protecting designated uses. As increasing demands are exerted on water quantity, flow and/or volume of water must be considered in protecting specific designated uses.

12. Encourage the establishment of land use zoning and watershed management plans at local levels to facilitate the development/protection of the State's ground and surface water resources.

13. The Department needs continued and increased implementation and management (educating contractors) of the Phase II water regulations that went into effect in November, 2003; Phase II storm water regulation affects the smaller municipalities and all construction activities larger than one acre.

PART III SURFACE WATER ASSESSMENT

CHAPTER ONE SURFACE WATER MONITORING PROGRAM

The ambient river and stream monitoring program, which began in 1974, was an expansion and modification of an earlier interstate network. Some of the basic purposes of that monitoring network were to establish background levels and baseline water quality, including physical, chemical, and biological data, as well as seasonal and chronological variations. The monitoring program helps to establish cause and effect relationships between known point and nonpoint sources of pollution and the quality of the State's waters. The ambient monitoring program will always be vital in evaluating the effectiveness of the Department's pollution control programs by assessing overall water quality before and after the implementation of pollution controls. This ultimately helps to update or redirect pollution control efforts.

In 1982, the Department evaluated the monitoring network and four goals were established for the new network to accomplish. The first was to better assess the effects of point source dischargers upon water quality; the second was to observe the impact of known nonpoint source problems over the long term. The third goal was to continue monitoring our major rivers due to their basic importance to the State. Finally, carefully selected, high quality (least impaired) streams would be monitored to provide long term chemical data by physiographic region for use in future water quality standards revisions. The work necessary to revise the previous network has been accomplished. This network is the "Ambient Water Quality Monitoring Network" (AWQMN).

In 1994, the waters of the State that had never been monitored or had not been monitored within the last 10 years were identified. An extensive network of approximately 100 stations was established to monitor the water quality of these "unassessed" waters. Quarterly sampling began at these sites in May of 1994 and continued through October 1996. In October 1998, these stations were divided into four groups. Each group would be sampled for two years on a bimonthly basis. These stations, approximately 200, are known as the "Roving Water Quality Monitoring Network" (RWQMN). Currently, the northwest portion of the state is being sampled under this program.

A third monitoring program by ADEQ is the special or intensive surveys. These surveys are usually short term and objective specific. Most are conducted to more accurately determine designated use attainment or to develop the data necessary to develop TMDLs. Table III-1 is a list of the recent special monitoring projects. Table III-2 lists the common parameters analyzed from the samples collected from the AWQMN and RWQMN water quality monitoring sites and the special survey sites. Figure II1-1 depicts the distribution of the Ambient and Roving stations and Figure II1-2 depicts the special project monitoring waters.

Table III-1: Historical Special Projects

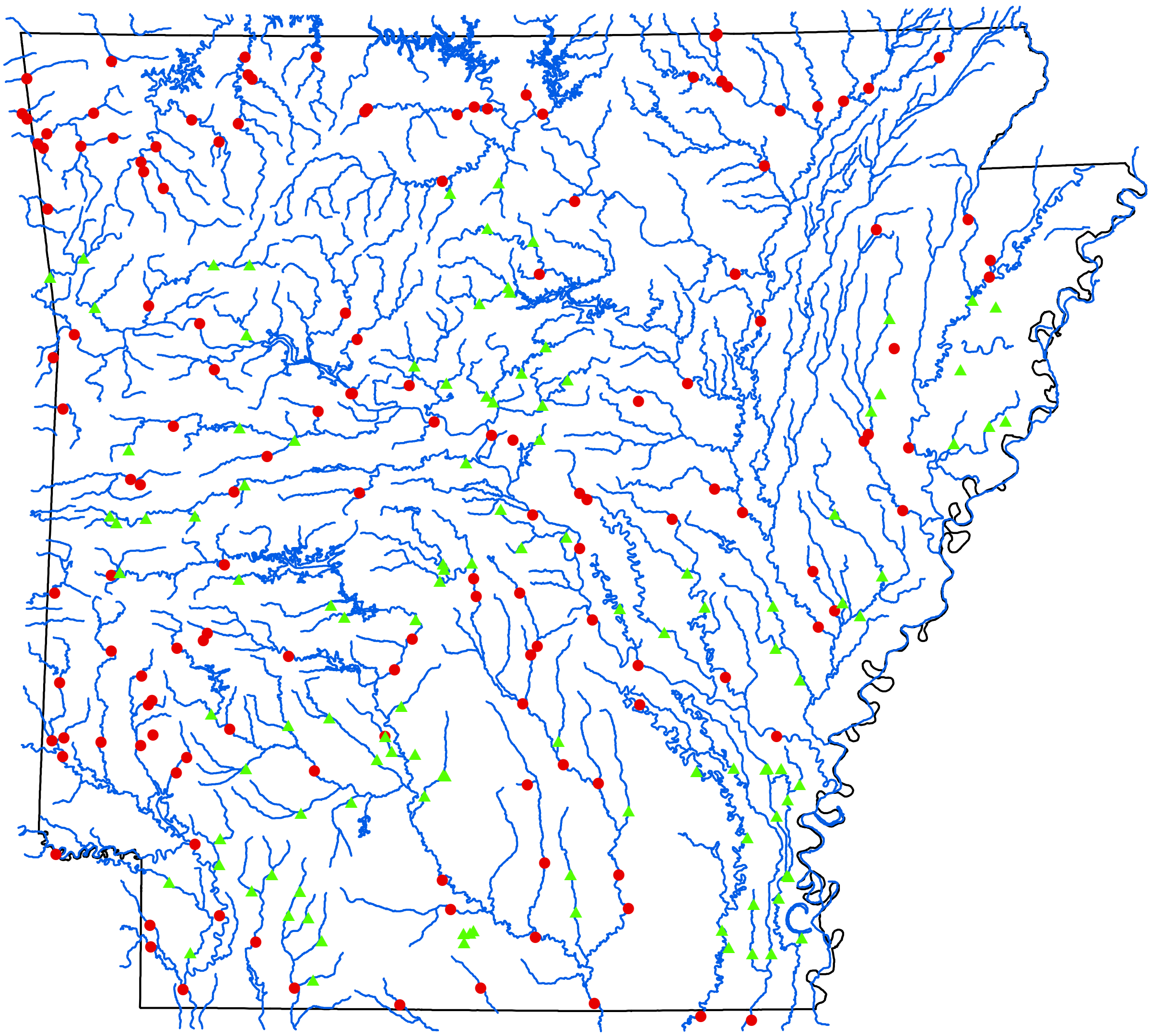
Name	Project Year(s)
Middle Fork Saline River	2003 - 2005
Middle Fork Little Red River	2004 - Present
Strawberry River	2001 - 2003
Lake Millwood Tributaries Survey	1992-1993, & 2000-2001
Bayou Bartholomew	1997-2000
Piney Creek Watershed	1997-1998
Illinois River	1995-1996
Upper Saline River	1994-1995 & 2003-2006
Poteau River	1994
Sager Creek	1993-1994
Upper White River	1992-1994
South Fork Fourche La Fave	1991-1992

Copies of the final reports for these surveys and other documents produced by the Water Quality Planning Branch of the Water Division can be downloaded from the Department's website at www.adeq.state.ar.us/water/reports_data.htm.

Table III-2: Parameters Sampled at Water Quality Monitoring Stations

Air Temperature	Boron
Water Temperature	Beryllium
pH	Barium
Turbidity	Cadmium
Dissolved Oxygen	Chromium
5-Day Biochemical Oxygen Demand	Copper
Filterable Residue (TDS)	Calcium
Nonfilterable Residue (TSS)	Lead
Chlorides	Zinc
Sulfates	Iron
Ammonia Nitrogen	Potassium
Nitrite + Nitrate Nitrogen	Magnesium
Total Phosphorus	Manganese
Ortho-Phosphate	Sodium
Total Hardness	Nickel
	Cobalt
	Vanadium

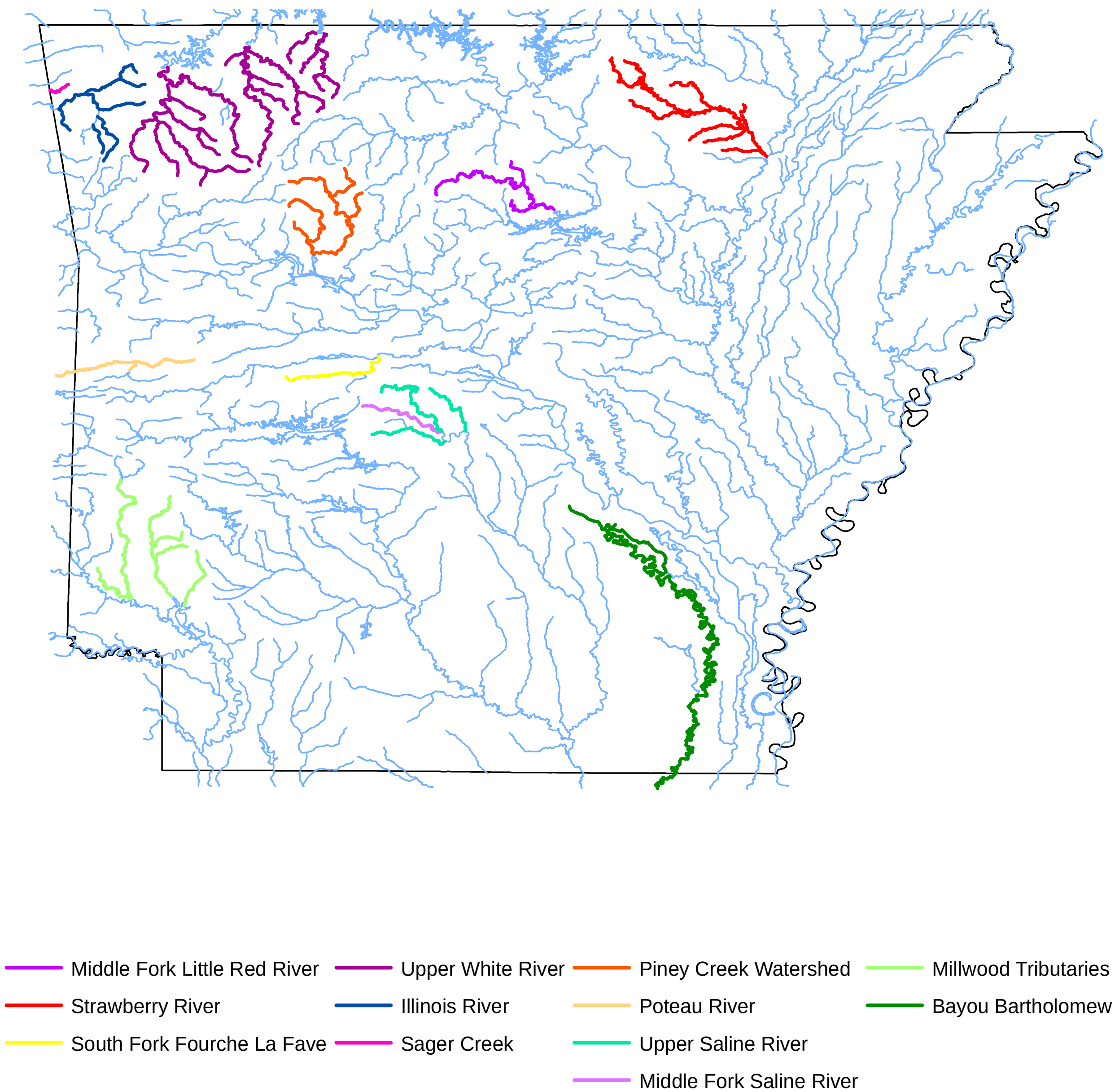
Figure II1-1: Water Quality Monitoring Stations



● Monthly Monitoring

▲ Roving Monitoring

Figure II1-2: Special Projects Monitoring Waters



Whole effluent toxicity testing

The Arkansas Department of Environmental Quality (Department) maintains a monitoring system to evaluate the environmental impacts of pollutants on aquatic life and on human health. Monitoring programs include benthological assessments; fish community assessments; fish tissue analyses for contaminants, which may be harmful for human consumption; and sediment testing for pesticides, toxic chemicals and heavy metals; in-lab toxicity testing; USEPA toxicity testing (results available at www.epa.gov/earth1r6/6wq) and bacteriological analyses. These techniques are used either as stand-alone methods or in conjunction with other biological or chemical analyses to monitor the biological health of waters throughout the State.

Benthological and Fish Community Assessment

One of the best ways to monitor the health of a stream or other waterbody is to examine its biological inhabitants. This is the primary reasoning behind surveys of the aquatic macroinvertebrate and fish communities. The Department has conducted biological community monitoring throughout the State since the 1970s. Current macroinvertebrate collection methods are based on USEPA's Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers (EPA 8-11-B-99-002).

Bacteriological Program

The bacteriological monitoring network has been substantially modified during the past several years. Because of the incompatibility of current network monitoring strategies and bacteriological sample holding times, a separate sampling scheme was developed. Technicians performed the sampling and analyses in the field in order to comply with the holding time of the methodology. Bacteriological analyses are performed at the Roving Water Quality Monitoring Network sites and those Ambient Water Quality Monitoring Network sites located in the same region as the current roving sites scheduled for sampling. The sites were sampled for bacteria on a bimonthly schedule, as well as collecting enough samples during the primary contact recreation season to meet assessment criteria.

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CHAPTER TWO PLAN FOR ACHIEVING COMPREHENSIVE ASSESSMENTS

A major emphasis is being placed on providing a comprehensive assessment of waters on a nationwide scale. Each state is to provide a plan for assessment of the state's waters as part of the Integrated Water Quality Monitoring and Assessment Report.

In Arkansas, the water quality monitoring network has been very progressive and is one of the more intensive programs in the Nation (see Part III Chapter l). It is, however, primarily limited to chemical monitoring of the water quality using long term, fixed, and specifically targeted stations. Objectives of the programs have shifted with changes in types of water quality impacts, but the program has maintained its long-term, historical integrity. The benefits of the program include features other than assessment of the impaired status of the waters. These data are used to monitor long-term trends in least-disturbed areas as well as in rapidly developing areas of the State. The data establishes background (historical) data for parameters that may not be used for assessments, but are necessary in other programmatic functions, e.g., background levels of heavy metals, ecoregion hardness values and suspended solids values for permit implementation procedures.

The current basic water quality network in Arkansas is statewide in scope with 149 fixed stations which are sampled monthly for over 30 parameters. This network is facilitated by the use of regionally located field personnel who collect water samples monthly. To convert the program to an intensive rotating basin plan would not only destroy the integrity of the program, but would severely disrupt personnel schedules and work activities. For the reasons discussed above the basic design of the Arkansas monitoring network should not be changed.

Within the past few years, additions to the network have included the addition of almost 200 stations on previously unassessed waters which were sampled quarterly by a central-office crew. This process has been modified to a bimonthly sampling schedule for a two year period and is rotated to different parts of the State each two years. Additionally, several synoptic, watershed-intensive surveys have been performed on waters with identified or suspected problem areas; these may be one or multi-year projects. They are normally base flow and storm flow oriented, and also include biological and physical assessments.

The weakest part of Arkansas assessment program is the reliance on chemical water quality data to assess the status of in stream aquatic life. While some chemical parameters may be more conclusive than others in determining the aquatic life use support, the direct measure of aquatic life communities is the most precise. The subtle impact of parameters such as minerals, turbidity, and nutrients is difficult to assess from only the chemical concentrations. In contrast, other designated uses, e.g., drinking water supply, primary contact recreation, etc. must rely on analyses of water samples directly.

At a minimum, a biological community sampling program is needed as a verification tool for assessment of aquatic life use support in waters where causes, sources, and support/nonsupport cannot be definitely determined with chemical data.

Recent modifications of the Arkansas monitoring and assessment program have included: (1) re-initiation of the unassessed waters project on a rotating basin, covering about one-fourth of the State each year and increasing the sampling frequency to bimonthly, and (2) designing the TMDL process to utilize biological assessments to verify aquatic life impairments listed on the 303(d) list of impaired waters.

CHAPTER THREE ASSESSMENT METHODOLOGY

The assessment methodology for the Integrated Report considers the most current requirements and USEPA guidance for both the 305(b) reporting and 303(d) listing, and essentially utilizes the same methodology for both activities.

The criteria within this assessment methodology are utilized to make attainment decisions of the "designated uses" of a given water body or water body segment. Monitoring data will be used to establish frequency, duration, and/or magnitude of water quality standard exceedances which may result in an impairment of a designated use. Certain parameters utilize frequency, magnitude, and duration as a part of the standard; others establish water quality goals based on values listed in Regulation No.2, "Regulation Establishing Water Quality Standards For Surface Waters Of The State Of Arkansas", which are expected to be exceeded occasionally, but which are stated as "never to exceed" to prevent a high frequency of exceedances and a resulting chronic impairment. A one-time exceedance of water quality standards due to anthropogenic disruptions may or may not cause a water quality impact, but still allows the pursuit of enforcement actions if necessary.

The following "assessment criteria", therefore, will be used to determine designated use impairment from long-term and/or frequently occurring exceedances of the water quality standards which may be linked to discernible and correctable sources. In addition, short term, acute impacts can be identified by certain parameters.

Database

The primary data base for the 2006 Integrated Water Quality Monitoring and Assessment Report is from the Arkansas Department of Environmental Quality (ADEQ) Ambient and Roving Water Quality Monitoring Networks. The networks include 149 Ambient Network stations that are sampled monthly and 147 Roving Network stations that are sampled bi-monthly. The Roving Network Stations are geographically divided into five groups and are sampled for two years on a rotating schedule. Additional data developed by ADEQ will be evaluated if the sampling frequency and duration represent actual annual ambient conditions. Data developed as part of short term, objective-specific studies will not be used for designated use attainment determinations. The period of record from which this data was assimilated is October 1, 2000, through September 30, 2005.

Agencies that routinely collect water quality data, e.g. USGS, USCOE, USFS, ANRC, AWRC, and other agencies and institutions, are solicited for valid data to aid ADEQ in its evaluation of the waters of the State. ADEQ will consider this data if the sampling frequency and duration represent actual annual ambient conditions. Data developed as part of short term, objective-specific studies will not be used for designated use attainment determinations. The period of record for which data was accepted was October 1, 2000, to September 30, 2005. All data used must have been collected and analyzed under a quality-assurance/quality-control protocol equivalent to, or more stringent than that of ADEQ or the USGS. The data must also have been analyzed pursuant to the rules outlined in the State Environmental Laboratory Certification Program Act (Act 876 of 1985 as amended).

Assessment

ADEQ must take into consideration the possibility of one-time anthropogenic or naturally occurring disruptions that may cause exceedances of a standard, but which should not result in the listing of a stream as impaired. Exceedances resulting from *Naturally Occurring Excursions* (NOE), or determined to be *Natural Background* conditions, as defined in Reg. 2.106, will not be assessed as impaired, provided supporting rationale is included.

In order to make a monitored assessment of a stream segment, data collection generally follows a monthly or bimonthly sampling regime. An attainment decision will be based on percent exceedance of at least 12 samples from ADEQ's Ambient Monitoring Network or ADEQ's Roving Monitoring Network. However, where other data exist that meets QA/QC requirements, that data will be evaluated on a case by case basis considering such things as period of record, number of samples, and seasonality in relationship to designated use. In cases where less than 12 samples occur, if the data indicates a potential for impairment, this stream location will be added to the Ambient Monitoring Network.

The percent exceedance criteria as shown in the Assessment Criteria tables are calculated using the total number of samples collected. The number of data points exceeding the criteria that are necessary for an assessment decision will be calculated and rounded up to the nearest whole number; e.g. 25% of 38 data points = 9.5, therefore ten (10) exceedances equal 25%. Therefore, ADEQ will use the 'round up to the next whole number' process to determine exceedances.

An evaluated assessment can be made for adjacent stream segments or in similar watersheds to monitored waters if there is reason to believe that the segments are similar with respect to the potential cause and magnitude of impairment. Unless documentation suggests otherwise, an evaluated assessment in the absence of data, but with general knowledge of the waterbody and watershed conditions, may be made as attainment of a use.

For lakes and reservoirs, assessments will be made from long-term trend data, collected initially in 1989 and continued on a five-year cycle, or seasonally distributed data. Lake assessments will require a minimum of four samples. Seasonally distributed data is defined as data that has been collected to analyze water quality variations during different annual lake stages, including fully mixed, and partial and complete stratification.

Turbidity will be evaluated for both primary values and storm-flows conditions. If a waterbody is not meeting either of these conditions, it will be listed as not supporting turbidity water quality standards. Primary values represent the critical season when rainfall is infrequent and is applied to June 1 through October 31. The turbidity criterion in Reg. 2.503, "Primary Values", is applicable for base flow turbidity evaluations. If four or more samples or greater than 25 percent of the total samples for the period of record from June 1 through October 31 exceed the primary values criterion, the waterbody will be listed as impaired for turbidity. The storm-flows assessment takes into account all ambient monitoring network sites sampled throughout the year. If greater than 20 percent of the total samples from the period of record, not to be less than 24, exceed the "Storm-Flows" values, the waterbody will be listed on the 303(d) list as being impaired for turbidity.

For the assessment of ambient waters, acute total ammonia nitrogen will be evaluated using Table A of Reg. 2.512, based on instream pH of the water at the time of sample collection. Chronic total ammonia nitrogen will be evaluated based on Table B of Reg. 2.512 using instream temperature and pH at the time of sample. If more than 25 percent of the total samples exceed the criteria in Table B, the segment will be assessed as not supporting aquatic life.

For assessment of ambient waters, metals toxicity will be evaluated using hardness values of the water at the time of sample collection. If the ambient hardness value is less than 25 mg/L, then a hardness value of 25 mg/L will be used to calculate metals toxicity, as outlined in Reg. 2.508. Acute toxicity will be verified using data collected between October 1, 2002, and September 30, 2005. Acute toxicity will be assessed if more than one violation of the acute toxicity numeric criteria occurs within a three year period. Chronic toxicity will be verified if more than 10 percent of the samples for a period of record exceed the calculated numeric criteria.

Mineral quality will be evaluated as follows: Assessments for waterbodies with site specific criteria are made according to the specific values listed in Reg. 2.511. For those waterbodies without site specific criteria, the criteria of 250 mg/l of chlorides, 250 mg/l of sulfates and 500 mg/l of total dissolved solids in Reg. 2.511 will apply. In either case, if greater than 10 percent of the total samples for the period of record for a mineral exceed the applicable criteria, the waterbody will be included on the 303(d) list as being impaired for the mineral assessed. The ecoregion values described in Reg. 2.511 are used to determine whether there is a 'significant modification of the water quality.' These values are not intended to be used to indicate an impairment of a waterbody. The Commission would have used the term 'impairment' if the ecoregion values were intended to be used for 303(d) list purposes. In accordance with Reg. 2.511, waters exceeding the ecoregion values greater than 50 percent of the time should be considered as candidates for a modification in accordance with Reg. 2.306.

For assessment of ambient waters, primary and secondary contact recreation will be evaluated using *Escherichia coli* bacteria criteria as outlined in Reg. 2.507. Fecal coliform data will only be used to determine point source discharge permit compliance. For bacteria sampling conducted during the primary contact period where it is impractical to conduct 12 sampling events, a minimum of eight (8) samples will be required to make an assessment determination. However, a minimum of six (6) samples, all of which must meet the standard, can be used to assess a "support" determination.

<u>Narrative Criteria</u> – Waters will be assessed as "non-support" when violation of any narrative water quality standard has been verified by ADEQ. Waters will be assessed as "non-support" if any associated numeric standard is violated pursuant to ADEQ's assessment methodology.

<u>Numeric Criteria</u> - ADEQ will assess all waters with qualifying data as either "support" or "non-support" based on the assessment criteria in the attached ecoregion/waterbody specific criteria.

Listing of Waterbodies

The State's waterbodies are assessed based mainly on the RF3 stream reach classification. However, some stream reaches from the National Hydrological database are used to supplement the RF3 database coverage. Individual stream reaches that are assessed as not attaining their respective designated use(s) will be included on the 303(d) list. These reaches will be categorized based on the confidence level, quality assurance, quantity of the data used to make the assessment, and the following USEPA derived guidance.

Arkansas's 2006 List of Water Quality Limited Waterbodies, commonly referred to as the 303(d) list, has been formatted to reflect the most current guidance issued by the Environmental Protection Agency. As part of that guidance, USEPA suggests placing waterbody segments into the following five categories:

1 = Attaining all designated uses;
2 = Attaining some designated uses, but there is insufficient data to determine if other uses are being attained;
3 = Insufficient data to determine if any designated use is attained;
4 = Impaired for one or more designated uses, but does not require the development of a TMDL because:
  a. A TMDL has been completed for the listed parameter(s);
  b. Other pollution control requirements are expected to result in attainment of water quality standards; and/or
  c. Impairment is not caused by a pollutant.
5 = The waterbody may be impaired, or one or more designated uses may not be attained. Waterbodies in Category 5 are placed in one of the following subcategories:
  a. Truly impaired; develop a TMDL (or other corrective action(s)) for the listed parameter.
  b. Waters currently not attaining standards, but may be de-listed with future Regulation No. 2 revisions.
  c. Waters in which the data is questionable because of QA/QC procedures and which require confirmation before a TMDL is scheduled.
  d. Waters which need data verification to confirm use impairment (additional sampling, biological assessment) before a TMDL (or other corrective action(s)) is scheduled.
  e. Waters which are not attaining current water quality standards and/or assessment criteria but do not require the development of a TMDL because the impairment is not caused by a pollutant.

Designated Uses - The following parameters are most often associated with impacts on these designated uses:

Designated Uses	**Parameters**
Aquatic Life Use	D.O., pH, temp., turbidity/TSS, toxics, or any non-toxic compound that alters the aquatic life community structure beyond that explained in Reg. 2.405.
Domestic Water Supply	Compounds that are not easily removed by drinking water treatment facilities; compounds with established secondary MCL's, e.g., Cl, SO_4, TDS, NO_3

Primary and Secondary Contact	*Escherichia coli*
Agriculture or IndustrialWater Supply	Compounds that interfere with industrial uses such as cooling water or the water used in certain manufacturing processes; or waters unsuitable for livestock watering or crop irrigation; most often includes Cl, SO_4, TDS

<u>Fish Consumption</u> - Waters will be listed as "non-support" for fish consumption if a primary segment of the fish community (e.g., all predators or all Largemouth bass) is recommended for non-consumption by any user group (e.g., general population or high risk groups). However, if a consumption restriction is recommended, e.g., no more than two meals per month or no consumption of fish over 15-inches, these waters will <u>not</u> be listed as "non-support."

<u>Antidegradation</u> - In compliance with the antidegradation policy, a Tier 3 waterbody will be listed as "non- support" if the water quality that existed at the time of designation has declined. For all other waters (Tier 1 and Tier 2) the listing requirements discussed above will apply.

Assessment Criteria

The following are ecoregion or stream segment specific assessment criteria that were used to list all assessed waterbodies as either supporting or not supporting the designated uses. These criteria are developed from Arkansas's Water Quality Standards and, in part, from USEPA guidance for determining support or non-support of a waterbody.

Key to the remarked entries in the assessment criteria are as follows:

1 - Except for site specific standards approved in Water Quality Standards

2 - Based on ecoregion or stream specific hardness values

3 - Refers to number of data points instead of percentage (i.e. greater than one value exceeding criteria = not support).

4 - Criteria based on 90^{th} percentile of ecoregion values

A waterbody will be assessed as "non-support" if any of its designated uses are determined to be impaired by a water quality parameter which exceeds the frequency as outlined in the following assessment criteria tables:

Table III-3: Assessment Criteria Tables

<u>Assessment Criteria for Ozark Highlands Ecoregion Streams</u>

PARAMETER	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	29 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]	Primary	Critical	< =10%		>10%	
<10 MI	6	2				
10-100 MI	6	5				
> 100 MI	6	6				
Trout Waters	6	6				
pH	6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N	As per Reg. No. 2					
ACUTE[3]	Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC	Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]	250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	5.7	1.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)	16	11	< =1	< =10%	>1	>10%
COPPER (Cu)	24.6	15.9	< =1	< =10%	>1	>10%
LEAD (Pb)	98.7	3.9	< =1	< =10%	>1	>10%
ZINC (Zn)	159.5	145.7	< =1	< =10%	>1	>10%
Escherichia coli	STANDARD		SUPPORT		NON-SUPPORT	
PRIM. – ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT – All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
SEC. CONTACT – All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values	10 NTU		< = 25%		>25%	
Storm Flow[4]	17 NTU		< = 20%		>20%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Boston Mountains Ecoregion Streams

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		31 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
<10 MI		6	2				
> 10 MI		6	6				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		0.8	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		4.6	3.5	< =1	< =10%	>1	>10%
LEAD (Pb)		13.9	0.5	< =1	< =10%	>1	>10%
ZINC (Zn)		35	32.3	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC. CONTACT	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		10 NTU		< = 25%		>25%	
Storm Flow[4]		19 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Arkansas River Valley Ecoregion Streams

PARAMETER	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	31 C		< =10%		>10%	
DISSOLVED OXYGEN[1]	Primary	Critical	< =10%		>10%	
<10 MI	5	2				
10-150 MI	5	3				
151-400 MI	5	4				
>400 MI	5	5				
pH	6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N	As per Reg. No. 2					
ACUTE[3]	Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC	Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]	250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	0.8	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)	16	11	< =1	< =10%	>1	>10%
COPPER (Cu)	4.6	3.5	< =1	< =10%	>1	>10%
LEAD (Pb)	13.9	0.5	< =1	< =10%	>1	>10%
ZINC (Zn)	35	32.3	< =1	< =10%	>1	>10%
Escherichia coli	STANDARD		SUPPORT		NON-SUPPORT	
PRIM. — ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT — All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC. — ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT — All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values	21 NTU		< = 25%		>25%	
Storm Flow[4]	40 NTU		< = 20%		>20%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Ouachita Mountains Ecoregion Streams

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
<10 MI		6	2				
>10 MI		6	6				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		1	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		5.6	4.2	< =1	< =10%	>1	>10%
LEAD (Pb)		17.7	0.7	< =1	< =10%	>1	>10%
ZINC (Zn)		42.4	38.7	< =1	< =10%	>1	>10%
Escherichia coli		**Escherichia coli**		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		10 NTU		< = 25%		>25%	
Storm Flow[4]		18 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Gulf Coastal Ecoregion (Typical Streams)

PARAMETER	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]	Primary	Critical	< =10%		>10%	
<10 MI	5	2				
10-500 MI	5	3				
>500 MI	5	5				
pH	6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N	As per Reg. No. 2					
ACUTE[3]	Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC	Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]	250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	1	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)	16	11	< =1	< =10%	>1	>10%
COPPER (Cu)	5.6	4.2	< =1	< =10%	>1	>10%
LEAD (Pb)	17.7	0.7	< =1	< =10%	>1	>10%
ZINC (Zn)	42.4	38.7	< =1	< =10%	>1	>10%
Escherichia coli	STANDARD		SUPPORT		NON-SUPPORT	
PRIM. — ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT — All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC. — ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT — All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values	21 NTU		< = 25%		>25%	
Storm Flow[4]	32 NTU		< = 20%		>20%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Delta Ecoregion (Least Altered)

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
<10 MI		5	2				
10-500 MI		5	3				
>500 MI		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
$CL/SO_4/TDS$[1]		250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		2.9	0.9	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		14	9.5	< =1	< =10%	>1	>10%
LEAD (Pb)		51.3	2	< =1	< =10%	>1	>10%
ZINC (Zn)		95.7	87.4	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		45 NTU		< = 25%		>25%	
Storm Flow[4]		84 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Gulf Coastal Ecoregion (Springwater Influenced)

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
ALL WATERSHEDS		6	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		1	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		5.6	4.2	< =1	< =10%	>1	>10%
LEAD (Pb)		17.7	0.7	< =1	< =10%	>1	>10%
ZINC (Zn)		42.4	38.7	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		21 NTU		< = 25%		>25%	
Storm Flow[4]		32 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Delta Ecoregion (Channel-Altered)

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		32 C		< =10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
<10 MI		5	2				
10-100 MI		5	3				
>100 MI		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
$CL/SO_4/TDS$[1]		250/250/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		2.9	0.9	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		14	9.5	< =1	< =10%	>1	>10%
LEAD (Pb)		51.3	2	< =1	< =10%	>1	>10%
ZINC (Zn)		95.7	87.4	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		75 NTU		< = 25%		>25%	
Storm Flow[4]		250 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for White River (Main Stem)

PARAMETER	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]			< = 10%		>10%	
DAM #1 TO MOUTH	32 C					
OZARK HIGHLANDS	29 C					
TROUT WATERS	20 C					
DISSOLVED OXYGEN[1]	Primary	Critical	< =10%		>10%	
DELTA	5	5				
OZARK HIGHLANDS	6	6				
TROUT WATERS	6	6				
pH	6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N	As per Reg. No. 2					
ACUTE[3]	Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC	Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]	250/250/500		< =10%		>10%	
DAM #3 TO MO. LINE[1]	20/20/180		< =10%		>10%	
MO. LINE TO HEADWATERS[1]	20/20/160		< =10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	4.3	1.2	< =1	< =10%	>1	>10%
CHROMIUM (Cr)	16	11	< =1	< =10%	>1	>10%
COPPER (Cu)	19.6	12.9	< =1	< =10%	>1	>10%
LEAD (Pb)	75.9	3	< =1	< =10%	>1	>10%
ZINC (Zn)	129.8	118.5	< =1	< =10%	>1	>10%
Escherichia coli	STANDARD		SUPPORT		NON-SUPPORT	
PRIM. — ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT — All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC. — ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT — All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values Delta	45 NTU		< = 25%		>25%	
Storm Flow Delta[4]	84 NTU		< = 20%		>20%	
Primary Ozark Highlands	10 NTU		< = 25%		>25%	
Storm Flow Ozark Highlands[4]	17 NTU		< = 20%		>20%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for St. Francis River

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
ALL WATERS		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< = 1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< = 25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
MOUTH TO 36^0 N. LAT.[1]		10/30/330		< =10%		>10%	
36^0 N. LAT. TO 36^0 30'N LAT.[1]		10/20/180		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		3.8	1.1	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		17.5	11.6	< =1	< =10%	>1	>10%
LEAD (Pb)		66.7	2.6	< =1	< =10%	>1	>10%
ZINC (Zn)		117.3	107.2	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		75 NTU		< = 25%		>25%	
Storm Flow[4]		100 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Arkansas River

PARAMETER	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]	Primary	Critical	< =10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N	As per Reg. No. 2					
ACUTE[3]	Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC	Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]	250/250/500		< =10%		>10%	
MOUTH TO L&D #7[1]	250/100/500		< =10%		>10%	
L&D #7 TO L&D #10[1]	250/100/500		< =10%		>10%	
L&D #10 TO OK LINE[1]	250/120/500		< =10%		>10%	
DISS.METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	4.7	1.2	< =1	< =10%	>1	>10%
CHROMIUM (Cr)	16	11	< =1	< =10%	>1	>10%
COPPER (Cu)	21	13.7	< =1	< =10%	>1	>10%
LEAD (Pb)	82.3	3.2	< =1	< =10%	>1	>10%
ZINC (Zn)	138.3	126.3	< =1	< =10%	>1	>10%
Escherichia coli	STANDARD		SUPPORT		NON-SUPPORT	
PRIM. — ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT — All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC. — ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT — All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY	ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values	50 NTU		< = 25%		>25%	
Storm Flow[4]	52 NTU		< = 20%		>20%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

<u>**Assessment Criteria for Ouachita River Below Lake Catherine**</u>

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]							
L. MISSOURI TO S.LINE		32 C		< = 10%		>10%	
ABOVE L. MISSOURI		30 C		< =10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
ALL WATERS		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< = 25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
LA LINE TO CAMDEN[1]		160/40/350		< =10%		>10%	
CAMDEN TO CARPENTER DAM[1]		50/40/150		< =10%		>10%	
CARPENTER DAM TO HEADWATERS[1]		10/10/100		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		0.9	0.4	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		5.1	3.8	< =1	< =10%	>1	>10%
LEAD (Pb)		15.8	0.6	< =1	< =10%	>1	>10%
ZINC (Zn)		38.9	35.5	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		21 NTU		< = 25%		>25%	
Storm Flow[4]		32 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Red River

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
ALL WATERS		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< =25%		>25%	
NO_3-N (D.W.)		10 mg/L		< =10%		>10%	
CL/SO_4/TDS[1]		250/250/500		< =10%		>10%	
OK LINE TO CONFLUENCE WITH LITTLE RIVER[1]		250/200/850		< =10%		>10%	
LITTLE RIVER TO LA LINE[1]		250/200/500		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		8.3	1.8	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		34.4	21.5	< =1	< =10%	>1	>10%
LEAD (Pb)		144.1	5.6	< =1	< =10%	>1	>10%
ZINC (Zn)		215.5	196.7	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		50 NTU		< = 25%		>25%	
Storm Flow[4]		150 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Mississippi River

PARAMETER		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
				DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]		32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1]		Primary	Critical	< =10%		>10%	
ALL WATERS		5	5				
pH		6 to 9 standard pH units		< =10%		>10%	
T. AMMONIA-N		As per Reg. No. 2					
ACUTE[3]		Reg. 2.512 Table A		< =1 in 3 years		>1 in 3 years	
CHRONIC		Reg. 2.512 Table B		< = 25%		>25%	
NO_3-N (D.W.)		10 mg/L (drinking water)		< =10%		>10%	
$CL/SO_4/TDS$[1]		250/250/500		< =10%		>10%	
LA LINE TO AR RIVER[1]		60/150/425		< =10%		>10%	
AR RIVER TO MO LINE[1]		60/175/450		< =10%		>10%	
DISS. METALS[2] (ug/L)		Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)		3.7	1	< =1	< =10%	>1	>10%
CHROMIUM (Cr)		16	11	< =1	< =10%	>1	>10%
COPPER (Cu)		17	11.4	< =1	< =10%	>1	>10%
LEAD (Pb)		64.6	2.5	< =1	< =10%	>1	>10%
ZINC (Zn)		114.4	104.5	< =1	< =10%	>1	>10%
Escherichia coli		STANDARD		SUPPORT		NON-SUPPORT	
PRIM.	ERW Waters Lakes	298 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
CONTACT	All other waters	410 col/100 ml (Apr-Sept)		< = 25%		>25%[1]	
SEC.	ERW Waters Lakes	1490 col/100 ml(anytime)		< = 25%		>25%[1]	
CONTACT	All other waters	2050 col/100 ml(anytime)		< = 25%		>25%[1]	
TURBIDITY		ECOREGION STANDARD		SUPPORT		NON-SUPPORT	
Primary Values		50 NTU		< = 25%		>25%	
Storm Flow[4]		75 NTU		< = 20%		>20%	
FISH CONSUMPTION				No restriction or limited consumption		No consumption for any user group	

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Chemical Parameters

The following tables summarize the use support of the Category 5, Category 4a, and Category 4b 303(d) listings of the State's river and stream water bodies. A detailed listing of each segment specific water body, water quality data summary, use assessment and other segment specific data is located Appendix A.

Table III-4: Designated Use Support in Arkansas

Degree of Use Support	Assessment Basis (miles)		Assessed Total (miles)
	Evaluated	Monitored	
Supporting all assessed uses	2386.3	4035.9	6472.2
Not supporting a use	525.9	2909.0	3434.9
Total Waters Assessed	2912.2	6944.9	9857.1

Table III-5: Designated Use Support of Assessed Waters by Use Type

Use Type	Support (miles)	Non-Support (miles)
Fish consumption	9387.7	466.4
Aquatic life	7149.3	2707.8
Primary contact	9724.3	114.2
Secondary contact	9852.5	4.6
Domestic Water Supply	9136.8	446.5
Agri & industrial Water Supply	8998.0	605.6

Table III-6: Total Sizes of Waters Listed Not Supporting Uses by Various Source Categories

Source Categories	Stream Segments	Stream Miles
Agriculture	60	1326.8
Surface erosion	25	321.6
Resource extraction	18	210.8
Silviculture	0	0.0
Urban run-off	4	27.6
Industrial point sources	16	236.7
Municipal point sources	15	183.2
Hydropower	4	24.10
Unknown	104	185.0

Table III-7: Total Sizes of Waters Listed Not Supporting Uses by Various Cause Categories

Cause Categories	Stream Segments	Stream Miles
Ammonia	2	11.5
Nitrogen	7	70.6
Phosphorus	3	29.4
Chlorides	25	561.9
Sulfates	24	379.8
Total Dissolved Solids	49	769.3
Siltation/Turbidity	55	1022.5
Pathogen Indicators	12	182.8
Aluminum	1	11.7
Beryllium	26	444.1
Copper	1	2.5
Lead	41	738.3
Zinc	46	758.9
Mercury	21	409.3
Priority Organics	2	57.1
Organic Enrichment/DO	63	1252.8
pH	11	119.7
Temperature	12	119.5

Biological Parameters

Aquatic life use support assessment is a tool used to better characterize the attainment of designated uses of water bodies based on macroinvertebrate and fish community structures. Short-term water quality impairments from point and/or nonpoint source inputs or from short-term seasonal and/or storm events may not always be detected by water quality data from grab samples. Individual short-term events most likely do not have a significant effect on the biological communities within a stream; however, these communities may be affected by frequent short-term events that limit full recovery between episodes.

More than 150 aquatic life samples were collected for use support determination between October 2001 and September 2005, Table III-6. The samples were collected as either a part of a watershed assessment survey or to establish ecoregion based indices of biotic integrity. Some of these samples were part of the special project surveys listed in Part III, Chapter 1. The data is accessible on line: www.adeq.state.ar.us/compsvs/webmaster/databases.htm.

Table III-8: Recent Aquatic Life Data Collections

Ten Square Mile Ecoregion Reference Stream Survey							
Stream Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
Rose Creek	2001	11110204	001t	3G	Arkansas River Valley	X	X
Big Shoal Creek	2001	11110202	008	3H	Arkansas River Valley	X	X
Bayou Des Arc	2001	8020301	007	4D	Arkansas River Valley	X	X
Bull Creek	2001	8020301	009	4D	Arkansas River Valley	X	X
Little Creek	2001	11010014	043	4E	Arkansas River Valley	X	X
Stevens Creek	2001	11010014	009t	4E	Arkansas River Valley	X	X
Reville Creek	2001	11110202	011t	3H	Arkansas River Valley	X	X

Ecoregion Macroinvertebrate Metrics Development Resampling of Original Ecoregion Reference Streams							
Stream Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
Hurricane Creek	2001	11110202	-022	3H	Boston Mountains	X	
Indian Creek	2001	11110202	-020	3H	Boston Mountains	X	
N. Fork Illinois Bayou	2001	11110202	-015	3H	Boston Mountains	X	
Lee Creek	2001	11110104	-002	3H	Boston Mountains	X	
Mulberry River	2001	11110201	-008	3H	Boston Mountains	X	
Turkey Creek	2001	11010014	-025t	4E	Boston Mountains	X	
Kings River	2001	11010001	-042t	4K	Boston Mountains	X	
White River	2001	11010001	029t	4K	Boston Mountains	X	
Bear Creek	2001	11010005	-026	4J	Boston Mountains	X	
Richland Creek	2001	11010005	-024	4J	Boston Mountains	X	
Little Buffalo River	2001	11010005	-015	4J	Boston Mountains	X	
East Fork Cadron Creek	2002	11110205	-005	3D	Arkansas River Valley	X	
North Fork Cadron Creek	2002	11110205	-013	3D	Arkansas River Valley	X	
West Point Remove	2002	11110203	-016	3F	Arkansas River Valley	X	
East Point Remove	2002	11110203	-014	3F	Arkansas River Valley	X	
Petit Jean River	2002	11110204	-003	3G	Arkansas River Valley	X	
Petit Jean River	2002	11110204	-011	3G	Arkansas River Valley	X	
Dutch Creek	2002	11110204	-015	3G	Arkansas River Valley	X	
Short Mountain	2002	11110202	-043	3H	Arkansas River Valley	X	
Big Shoal Creek	2002	11110202	-045	3H	Arkansas River Valley	X	
Poteau River	2002	11110105	-031	3I	Arkansas River Valley	X	
Cossatot River	2002	11140109	-018	1C	Ouachita Mountains	X	
Rolling Fork	2002	11140109	-024	1C	Ouachita Mountains	X	
Rolling Fork	2002	11140109	-024	1C	Ouachita Mountains	X	
Mountain Fork	2002	11140108	-016	1D	Ouachita Mountains	X	

Ecoregion Macroinvertebrate Metrics Development Resampling of Original Ecoregion Reference Streams							
Stream Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
South Fork Saline	2002	08040102	-028	2C	Ouachita Mountains	X	
Prairie Creek	2002	08040101	-048	2F	Ouachita Mountains	X	
Caddo River	2002	08040102	-019	2F	Ouachita Mountains	X	
South Fork Ouachita	2002	08040101	-043	2F	Ouachita Mountains	X	
Little Missouri R.	2002	08040103	-022	2G	Ouachita Mountains	X	
Black Fork Fourche La Fave R.	2002	11110206	-009	3E	Ouachita Mountains	X	
Bois D' Arc Creek	2003	11140201	-008	1B	Gulf Coastal Plains	X	X
Derrieusseaux Cr.	2003	08040203	-002	2C	Gulf Coastal Plains	X	X
Big Creek	2003	08040204	-005	2C	Gulf Coastal Plains	X	X
Hudgins Creek	2003	08040204	-003	2C	Gulf Coastal Plains	X	X
L'Aigle Creek	2003	08040204	-007	2C	Gulf Coastal Plains	X	X
Moro Creek	2003	08040201	-001	2D	Gulf Coastal Plains	X	X
Whitewater Creek	2003	08040201	-xxx	2D	Gulf Coastal Plains	X	
Flat Creek	2003	08040201	-706	2D	Gulf Coastal Plains	X	
Jug Creek	2003	08040201	-901	2D	Gulf Coastal Plains	X	
Bayou Freeo	2003	08040102	-028	2F	Gulf Coastal Plains	X	X
East Fork Tulip	2003	08040102	-901	2F	Gulf Coastal Plains	X	X
Terre Rouge Creek	2003	08040103	-031	2G	Gulf Coastal Plains	X	
Bayou Macon	2003	08050002	-003	2A	Delta	X	
Boat Gunwale Slash	2003	08020303	-914	4A	Delta	X	
Big Creek	2003	08020304	-009	4A	Delta	X	
Bayou DeView	2003	08020302	-002	4B	Delta	X	
Village Creek	2003	11010013	-006	4C	Delta	X	
Whiteman Creek	2003	08020203	-xxx	5A	Delta	X	
L'Anguille River	2003	08020205	-004	5B	Delta	X	
Second Creek	2003	08020205	-008	5B	Delta	X	
Cockle Burr Slough	2003	08020204	-xxx	5C	Delta	X	
Board Camp Creek	2004	08040101	-036t	2F	Ouachita Mountains		X
Little Missouri R.	2004	08040103	-022	2G	Ouachita Mountains		X
S. Fork Ouachita R.	2004	08040101	-043	2F	Ouachita Mountains		X
Cossatot River	2004	11140109	-018	1C	Ouachita Mountains		X
Caddo River	2004	08040102	-016	2F	Ouachita Mountains		X
Saline River	2004	08040203	-010	2C	Ouachita Mountains		X
Mill Creek	2005	11110205	xxx	3D	Arkansas River Valley		X
N. Cadron Creek	2005	11110205	-015	3D	Arkansas River Valley		X
Petit Jean Creek	2005	11110204	-011	3G	Arkansas River Valley		X

Middle Fork Saline River Physical, Chemical, and Biological Community Assessment (*2003, 2004, 2005)							
Site Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
MFS02	*	08040203	-019	2C	Ouachita Mountains	X	X
MFS03	*	08040203	-019	2C	Ouachita Mountains	X	X
MFS05	*	08040203	-019	2C	Ouachita Mountains	X	X
MFS04B	*	08040203	-019	2C	Ouachita Mountains	X	X
Mill Creek	*	08040203	-019	2C	Ouachita Mountains	X	X

Strawberry River Physical, Chemical, and Biological Community Assessment (2001-2003)							
Site Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
WHI0143A	‘01 &‘02	11010012	-011	4G	Ozark Highlands	X	
UWSBR01	‘01 &‘02	11010012	-011	4G	Ozark Highlands	X	X
WHI0143E	‘01 &‘02	11010012	-010	4G	Ozark Highlands	X	
WHI0143H	‘01 &‘02	11010012	-010	4G	Ozark Highlands	X	X
WHI0143B	‘01 &‘02	11010012	-009	4G	Ozark Highlands	X	X
UWSBR02	‘01 &‘02	11010012	-009	4G	Ozark Highlands	X	X
WHI0143L	‘01 &‘02	11010012	-012	4G	Ozark Highlands	X	X
WHI0143M	‘01 &‘02	11010012	-012	4G	Ozark Highlands	X	X
WHI0143IA	‘01 &‘02	11010012	-007	4G	Ozark Highlands	X	X
WHI0143I	‘01 &‘02	11010012	-007	4G	Ozark Highlands	X	X
WHI0143IB	‘01 &‘02	11010012	-007	4G	Ozark Highlands	X	X
UWNBC01	‘01 &‘02	11010012	-007	4G	Ozark Highlands	X	X
WHI0143P	‘01 &‘02	11010012	-006	4G	Ozark Highlands	X	
WHI0143N	‘01 &‘02	11010012	-016	4G	Ozark Highlands	X	X
WHI0024	‘01 &‘02	11010012	-006	4G	Ozark Highlands	X	X
WHI0143K	‘01 &‘02	11010012	-013	4G	Ozark Highlands	X	X
WHI0143J	‘01 &‘02	11010012	-013	4G	Ozark Highlands	X	X
WHI0143S	‘01 &‘02	11010012	-003	4G	Ozark Highlands	X	X
UWRDC01	‘01 &‘02	11010012	-014	4G	Ozark Highlands	X	X
UWSBR03	‘01 &‘02	11010012	-015	4G	Ozark Highlands		X
WHI0143Q	‘01 &‘02	11010012	-015	4G	Ozark Highlands	X	X
WHI0143R	‘01 &‘02	11010012	-015	4G	Ozark Highlands	X	X

Middle Fork Little Red River Physical, Chemical, and Biological Community Assessment							
Site Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
WHI0180	2005	11010014	-030	4E	Boston Mountains	X	
WHI0181	2005	11010014	-030	4E	Boston Mountains	X	X
UWMFK01	2005	11010014	-030	4E	Boston Mountains	X	
WHI0182	2005	11010014	-030t	4E	Boston Mountains	X	
WHI0186	2005	11010014	-030t	4E	Boston Mountains	X	
WHI0177	2005	11010014	-030	4E	Boston Mountains	X	X
WHI0178	2005	11010014	-030	4E	Boston Mountains	X	X
WHI0153	2005	11010014	-029	4E	Boston Mountains	X	
WHI0043	2005	11010014	-028	4E	Boston Mountains	X	X
WHI0179	2005	11010014	-028t	4E	Boston Mountains	X	X

White River *Didymosphenia geminata* Assessment							
Site Locations	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
White Hole	2005	11010003	-002	4IE	Ozark Highlands	X	
Cotter	2005	11010003	-002	4IE	Ozark Highlands	X	
Newland's Pool	2005	11010003	-002	4IE	Ozark Highlands	X	
Wildcat Shoals	2005	11010003	-002	4IE	Ozark Highlands	X	

The macroinvertebrate communities were collected and evaluated following the Department's Rapid Bioassessment Protocols. Habitat considerations were used in the evaluation of the macroinvertebrate communities through percent comparability evaluation techniques. An upstream-downstream comparison of the communities and a comparison of the community to a least disturbed reference stream were also used to make the assessments. Fish communities were analyzed following USEPA's "Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analysis", and direct comparisons were made with ecoregion fish community data outlined in the Department's "Physical, Chemical, and Biological Characteristics of Least-Disturbed Reference Streams in Arkansas's Ecoregions, 1987." In addition, an upstream-downstream comparison of the communities was made, and a comparison to a least-disturbed reference stream was conducted under the guidelines outlined in the Department's Quality Assurance Project Plan.

CHAPTER FIVE LAKES WATER QUALITY ASSESSMENT

Background

Water quality data from the majority of Arkansas's lakes is sparse, although selected lakes have had intensive, long term data collection. Some have only specific purpose data, e.g., fecal coliform sampling from swimming areas. A few lakes have been investigated as a short term project when a specific or potential problem was identified. Such studies were associated with the Clean Lakes Section of the Water Quality Act, or municipal water supply reservoirs with treatment problems. In contrast, the Corps' lakes of the Little Rock District have a relatively large amount of multi-parameter and multi-site water quality data. Additionally, DeGray Reservoir probably has the most extensive water quality database of any reservoir in this region of the country; data extend from pre-impoundment to the current date.

Arkansas currently has identified seventy-nine (79) significant publicly-owned lakes ranging in size from 60 to over 45,000 acres and currently totaling 356,506 acres. The lakes are categorized into five groups called "Types" (ADEQ 2004) by ecoregion, primary construction purpose, and certain morphometric features such as size and average depth. A new lake, Lake Monticello in Drew County in southeast Arkansas, was completed in 1997 and added to the list. In 2003, a construction project was initiated to combine Lakes Ft. Smith and Shepherd Springs in Crawford County in northwest Arkansas. Construction has not yet been completed on the new Lake Ft. Smith. Table III-9 is a list of Arkansas's significant publicly-owned lakes and selected characteristics of each. Figure III-3 is a map depicting the locations of each lake. The number corresponds to the lake number in Table III-9.

Lake Water Quality Assessments

Four lake water quality assessments have been completed on Arkansas significant publicly-owned lakes since 1989. Water quality samples, metals, pesticides, dissolved oxygen and temperature profiles, and fecal coliform and/or *Escherichia coli* bacteria were collected from most lakes between mid-July and the end of August in 1989, 1994, 1999, and 2004. Sediment samples were collected in 1994, and plankton samples were collected in 1999 and 2004.

Lake Water Quality Trends

A comparison of the in-lake water quality data to water quality standards must be made with some qualifications. The State's in-lake water quality standards have been modified from the State's stream standards and often do not reflect conditions in a stratified lake. The vast majority of the water quality data collected from all of the State's lakes as a whole fell within the water quality standards. However, it is not appropriate to assess the lakes based on the current assessment methodology because of the limited database. Some generalities and trends can be concluded, but must be made with caution. The State is currently undertaking activities to develop specific standards for individual lake types that are better suited to protect the assigned designated uses of each lake.

Table III-9: Significant Publicly-Owned Lakes

No	Lake	County	Acres	Avg. Depth	Water Shed[1]	W/A[2]	Eco Region[3]	Purpose[4]	Type
1	WINONA	SALINE	1240	30	44.4	22.9	OM	W	A
2	DIERKS	HOWARD	1360	22	114.0	53.6	OM	F	A
3	GILLHAM	HOWARD	1370	21	271.0	126.6	OM	F	A
4	DEQUEEN	SEVIER	1680	21	169.0	64.4	OM	F	A
5	CATHERINE	HOT SPRING	1940	18	1516.0	500.1	OM	H	A
6	GREESON	PIKE	7200	39	237.0	21.1	OM	H	A
7	HAMILTON	GARLAND	7300	26	1441.0	126.3	OM	H	A
8	MAUMELLE	PULASKI	8900	23	137.0	9.9	OM	W	A
9	DEGRAY	CLARK	13200	49	453.0	22.0	OM	H	A
10	NORFORK	BAXTER	22000	57	1806.0	52.5	OH	H	A
11	BEAVER	BENTON	28200	58	1186.0	26.9	OH	H	A
12	GREERS FERRY	CLEBURNE	31500	60	1153.0	23.4	BM	H	A
13	OUACHITA	GARLAND	40100	51	1105.0	17.6	OM	H	A
14	BULL SHOALS	MARION	45440	67	6036.0	85.0	OH	H	A
15	CRYSTAL	BENTON	60	12	4.5	48.0	OH	A	B
16	SHORES	FRANKLIN	82	10	26.0	202.9	BM	R	B
17	SPRING	YELL	82	23	10.5	82.0	AV	R	B
18	HORSEHEAD	JOHNSON	100	16	17.3	110.7	BM	R	B
19	WEDINGTON	WASHINGTON	102	16	3.0	18.8	OH	R	B
20	COVE	LOGAN	160	10	8.5	34.0	AV	R	B
21	ELMDALE	WASHINGTON	180	8	6.0	21.3	OH	A	B
22	FAYETTEVILLE	WASHINGTON	196	15	6.0	19.6	OH	R	B
23	BOBB KIDD	WASHINGTON	200	13	4.0	12.8	OH	A	B
24	WILHELMINA	POLK	200	10	13.5	43.2	OM	A	B
25	BARNETT	WHITE	245	27	37.5	98.0	AV	A	B
26	SUGARLOAF	SEBASTIAN	250	12	5.0	12.8	AV	A	B
27	NOLAN (Wright)	SEBASTIAN	350	9	3.1	5.7	AV	A	B
28	FT. SMITH	CRAWFORD					BM	W	B
29	SEQUOYAH	WASHINGTON	500	8	275.0	352.0	OH	R	B
30	SWEPCO	BENTON	531	17	14.0	16.9	OH	W	B
32	CHARLES	LAWRENCE	562	8	18.0	20.5	OH	A	B
33	LEE CREEK	CRAWFORD	634	11	465.0	469.4	BM	W	B
34	BEAVERFORK	FAULKNER	900	10	11.5	8.2	AV	R	B
35	HINKLE	SCOTT	965	15	27.5	18.2	AV	A	B
36	BREWER	CONWAY	1165	20	36.4	20.0	AV	W	B
37	JUNE	LAFAYETTE	60	5	4.0	42.7	GC	A	C
38	BAILEY	CONWAY	124	8	7.5	38.7	AV	R	C
39	TRICOUNTY	CALHOUN	280	7	11.5	26.3	GC	A	C
40	COX CREEK	GRANT	300	6	17.0	36.3	GC	A	C
41	FRIERSON	GREENE	335	8	7.3	13.9	DL	A	C
42	STORM CREEK	PHILLIPS	420	7	8.0	12.2	DL	R	C
43	CALION	UNION	510	6	6.7	8.4	GC	A	C
44	POINSETT	POINSETT	550	7	4.5	5.2	DL	A	C
45	BEAR CREEK	LEE	625	10	6.0	6.1	DL	R	C
46	UP WHITE OAK	OUACHITA	630	8	20.7	21.0	GC	A	C
47	ATKINS	POPE	750	6	10.2	8.7	AV	A	C

No	Lake	County	Acres	Avg. Depth	Water Shed[1]	W/A[2]	Eco Region[3]	Purpose[4]	Type
48	OVERCUP	CONWAY	1025	4	17.2	10.7	AV	A	C
49	LO WHITE OAK	OUACHITA	1080	8	42.5	25.2	GC	A	C
50	HARRIS BRAKE	PERRY	1300	6	11.2	5.5	AV	A	C
80	MONTICELLO	DREW	1520	12.5	6.8	2.9	GC	A	C
51	CANE CREEK	LINCOLN	1620	6	24.0	9.5	GC	A	C
52	WILSON	ASHLEY	150	5	1.0	4.3	DL	A	D
53	ENTERPIRSE	ASHLEY	200	5	2.0	6.4	DL	A	D
54	FIRST OLD RIVER	MILLER	200	4	2.0	6.4	GC	A	D
55	PICKTHORNE	LONOKE	207	5	13.2	40.8	DL	A	D
56	HOGUE	POINSETT	280	4	2.0	4.6	DL	A	D
57	GREENLEE	MONROE	300	6	0.5	1.1	DL	A	D
58	MALLARD	MISSISSIPPI	300	6	0.5	1.1	DL	A	D
59	GRAMPUS	ASHLEY	334	6	2.0	3.8	DL	A	D
60	DES ARC	PRAIRIE	350	6	1.0	1.8	DL	A	D
61	WALLACE	DREW	362	5	1.0	1.8	DL	A	D
62	PINE BLUFF	JEFFERSON	500	6	4.0	5.1	DL	A	D
63	ASHBAUGH	GREENE	500	5	1.0	1.3	DL	A	D
64	BOIS D'ARC	HEMPSTEAD	750	4	4.0	3.4	GC	A	D
65	OLD TOWN	PHILLIPS	900	4	23.0	16.4	DL	R	D
66	HORSESHOE	CRITTENDEN	1200	10	13.5	7.2	DL	R	E
67	UPPER CHICOT	CHICOT	1270	15	14.0	7.1	DL	R	E
68	GRAND	CHICOT	1400	7	5.5	2.5	DL	A	E
69	GEORGIA PACIFIC	ASHLEY	1700	4	4.0	1.5	GC	W	E
70	BLUE MOUNTAIN	LOGAN	2900	9	488.0	107.7	AV	F	E
71	COLUMBIA	COLUMBIA	2950	11	48.0	10.4	GC	W	E
72	NIMROD	YELL	3600	8	680.0	120.9	AV	F	E
73	LOWER CHICOT	CHICOT	4030	15	350.0	55.6	DL	R	E
74	CONWAY	FAULKNER	6700	5	136.0	13.0	AV	A	E
75	ERLING	LAFAYETTE	7000	7	400.0	36.6	GC	W	E
76	OZARK	FRANKLIN	10600	14	151801.0	9165.3	AV	N	E
77	FELSENTHAL	BRADLEY	14000	7	10852.0	496.1	GC	R	E
78	MILLWOOD	LITTLE RIVER	29500	5	4144.0	89.9	GC	F	E
79	DARDANELLE	POPE	34300	14	153666.0	2867.2	AV	N	E
		Total	356,506						

1 Watershed measurements indicate square miles.

2 W/A = Watershed (Acres)/Area of Lake

3 OM=Ouachita Mountains; BM=Boston Mountains; OH=Ozark Highlands; AV=Arkansas River Valley; GC=Gulf Coastal Plains; DL=Delta

4 W=Water Supply; F=Flood Control; H=Hydropower; A=Angling (Public Fishing) N=Navigation; R=Recreation

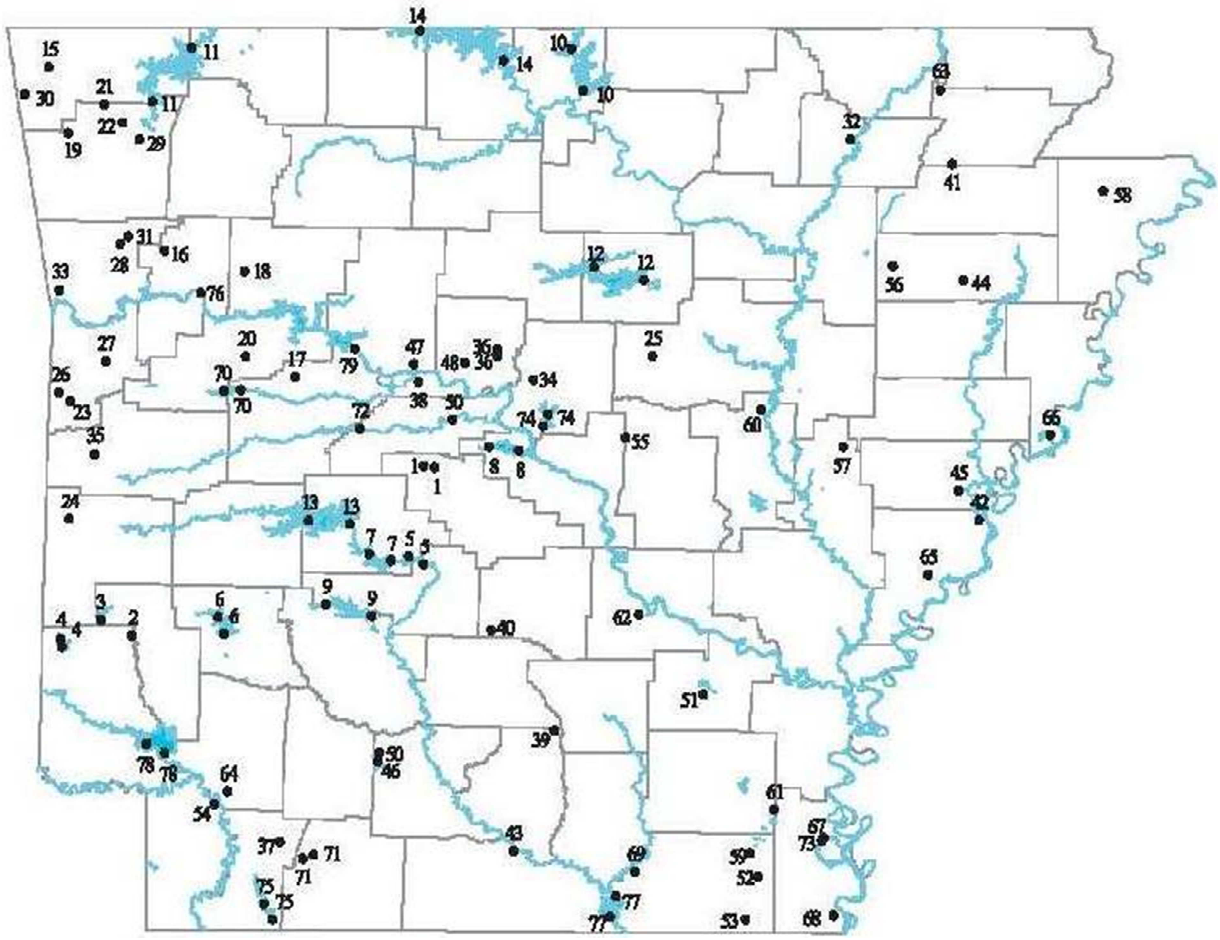
A comparison of the trophic rankings for all of the lakes, and the average trophic raking for each lake was completed in 2005. The trophic index was determined by taking the total phosphorus value of the epilimnion, multiplying it by the chlorophyll a concentration, and then dividing that product by the secchi disk transparency in inches. Lake Greenlee had the highest average trophic ranking, 107.52, of all of the lakes. The abnormally low secchi disc reading in 1989, because of suspended silt particles, caused the lake to have a trophic index of 288.74. Its average trophic index for 1999 and 2004 was 16.92, and probably much closer represents its true trophic status. Old Town Lake had the next highest average index of 32.91. It routinely has one of the highest chlorophyll a concentrations of all of the lakes. Grand Lake also routinely has one of the highest trophic indices, and one of the highest chlorophyll a concentrations. The trophic indices of Lakes Frierson and Blue Mountain are greatly influenced by very low secchi disk transparencies because of excessive turbidity from suspended silt particles. Lake Mallard had the fifth highest average trophic index and routinely has some of the higher chlorophyll a concentrations. This lake, along with numerous lakes managed by the Arkansas Game and Fish Commission, was routinely fertilized to build a sustainable plankton community for fisheries enhancement.

The larger Corps of Engineers reservoirs and the lakes of the mountainous regions of the State, Type A and B lakes, have very low trophic indices. These lakes generally have low total phosphorus and chlorophyll a concentrations, and deep secchi disk transparencies. The lower 43 percent of the average trophic rankings were all comprised of these lake types, with the exception of Lake Nimrod. The upper one-third of the average rankings was made up of mostly of the larger lakes, greater than 1000 surface acres, located in the low-land areas of the state. These lakes are managed for fisheries by the Arkansas Game and Fish Commission and are not routinely used for primary contact recreation activities. The smaller low-land lakes, those with surfaces areas less than 1000 acres, were scattered throughout the top 60 percent of the rankings list.

Over the past four surveys, the pH standard was occasionally not attained in the lakes with anoxic hypolimnions, or in the more productive lakes of the Delta ecoregion. Rarely was the pH recorded above 10 or below 5 in any lakes. Most of the pH exceedances can be attributed to abnormal weather patterns, including either periods of drought or excessive rainfall conditions. None of these pH excursions can be attributed to a point source discharge.

Several lakes exceeded temperature standards, but these violations were most likely because of the unusually hot ambient air temperatures and dry conditions that existed during the 1999 survey. Lake Swepco's elevated surface temperature, as well as the elevated sulfates, is a result of the lake's primary purpose as a cooling water supply for the power production facility. Several lakes had one-time turbidity values above the 25 NTU standard in the hypolimnion sample. These were most likely caused by heavy storm events prior to sampling and are not reflective of normal lake conditions. Blue Mountain Lake, Lake Frierson, and Lake Poinsett have a history of elevated turbidity values most likely because of in-lake processes of wind action on shallow waters, soil types susceptible to colloidal suspensions, and/or disturbances in their watersheds. Lake Pickthorne, built by the Arkansas Game and Fish Commission in the early 1990s, is located in the Arkansas River Valley ecoregion. Its turbidity values have been increasing slightly each survey. This is probably a reflection of the primary lake purpose-fisheries-, the soil types of the Arkansas River Valley, and wind action on the shallow waters. Lake Wilhelmina has had a history of not attaining the primary and secondary contact recreation standards because of excessive fecal coliform concentrations. The bacteria detected in Lake Wilhelmina were most likely not a fecal coliform bacterium since the only suspected source is from a fish production facility. The State adopted new standards in 2004, changing from fecal coliform to *Escherichia coli* for the primary and secondary contact recreation standard. *E. coli* data collected in 2004 indicated complete support of the recreational contact uses.

Figure III-3: Arkansas's Significant Publicly-Owned Lakes



Restoration Efforts

Many federal, state, and local agencies are involved in either in-lake or watershed restoration/enhancement/education activities across the State. The Arkansas Game and Fish Commission has implemented restoration and enhancement techniques on several lakes throughout the State; the U.S. Army Corps of Engineers has initiated rehabilitation techniques on a couple of its lakes in the State; the Arkansas Water Education Team (AWET) educates junior high and high school students from across the State with a hands-on, in stream learning/monitoring curriculum; and the Arkansas Natural Resources Commission continually initiates projects for the control of nonpoint source pollution. The Arkansas Watershed Advisory Group (AWAG) initiates grass roots programs by helping citizen watershed groups achieve their goals and objectives.

Impaired Uses of Lakes

The drinking water use in nine lakes is listed as not supporting because of elevated concentrations of beryllium. The current human health criteria for beryllium in water is 0.076 ug/L. Concentrations in the nine lakes listed as impaired were generally less than 0.2 ug/L. This criterion is currently being reviewed. Eight lakes were listed because of turbidity criteria violations. Excessive silt is listed as the primary cause in three of these lakes. The cause of five additional lakes not attaining the turbidity criteria was listed as 'unknown." Additional investigations of these waterbodies are needed. In 2004, the Environmental Protection Agency listed six lakes as not attaining the aquatic life designated use because of nutrients. TMDLs and additional water quality data to address these listings are currently being developed.

The fishable/swimmable goals of the Clean Water Act have been attained in all lakes. However, fish consumption was not supported in some lakes (totaling 16,950 acres) because mercury concentrations have exceeded the Federal Food and Drug Administration's action levels (See Part III, Chapter Seven). Eleven additional publicly-owned lakes and several privately-owned lakes have health advisories limiting the consumption of certain size classes of certain species of fishes. See Part III Chapter Seven for additional details of the current health advisories on Arkansas publicly-owned lakes.

Table III-10: Lakes Use Support

Degree of Use Support	Assessment Category		Total Assessed (acres)
	Evaluated	Monitored	
Size Fully Supporting		248,153	248,153
Size Not Supporting		108,353	108,353
Total Assessed (acres)		356,506	356,506

CHAPTER SIX WETLANDS

When the first settlers arrived in Arkansas the wetland resources comprised over 8.5 million acres over the State's six ecoregions; most of these wetlands were in the Mississippi Alluvial Plain (Delta). Today, approximately 10 percent, or 800,000 acres, remain (Arkansas Department of Parks and Tourism, 1985).

The Delta is bordered by the Mississippi River on the east and extends to its most westward point at the base of the Ouachita Mountains near Little Rock. From there the Delta extends northeast along the "Fall Line" and Ozark Mountains' foothills into Missouri and southeast from Little Rock along the edge of the Gulf Coastal Plains to Louisiana. This area comprises approximately 15,625 square miles and all or part of 27 of the State's 75 counties.

The Delta's major streams north of the Arkansas River flow through channels carved by the Mississippi River. The Mississippi River once flowed west of Crowley's Ridge and carved portions of the channels that now form the Black, White, and Cache Rivers, and Bayou DeView. After the Mississippi River moved east of Crowley's Ridge, it carved a channel that is now the St. Francis River. Over the millenniums, the Mississippi River deposited silt and organic material over the Delta during floods that developed one of the nation's most fertile land areas. The flat slopes of the Delta and the frequent flooding events produced extensive water-tolerant hardwood trees and allowed the formation of numerous "swamps" or wetlands.

Those first settlers found vast acres of bottomland hardwoods in the swamps upon their arrival in Arkansas. For 200 years they cleared the timber to farm the rich, fertile soil. The process was slow and labor intensive with only occasional help from the federal government. After World War II, mechanization allowed the clearing of wetland acreage faster than ever before. A dozer could clear more land in one day than some families could clear in a year only a generation earlier. Ninety percent (90%) of wetland acreage cleared in the last 35 to 40 years has been due to the expansion of soybean production (Holder 1969).

In 1849-50, Congress passed the Swamp Land Acts, which transferred more than 7,686,000 acres of public domain land to the State of Arkansas. Funds collected from the sale of these lands were used for flood control structures in the Delta. But major floods occurred in 1858, 1862, 1865, 1871, 1874, 1882, 1883, and 1884, justifying the Mississippi River Commission. The Mississippi River Commission was a cooperative effort of the federal government and local interests, formed in 1879 to address the problems associated with these recurring floods. Levee boards and drainage districts were formed, resulting in swamp drainage and clearing and ditch and levee construction for flood control. The passage of the Flood Control Act of 1928 removed the requirement for the local interests to pay half the cost of levee construction on the Mississippi River. Passage of these various flood control acts resulted in the conversion of thousands of acres of wetlands into productive agricultural lands.

Act 561 of the 1995 State of Arkansas Statutes defines a wetland as "an area that has water at or near the surface of the ground at some time during the growing season (wetland hydrology). It contains plants adapted to wet habitats (hydrophytic vegetation) and is made up of soils that have developed under wet conditions (hydric soils) or any other definition promulgated by the Arkansas Natural Resources Commission (ANRC)."

The term “marsh” appears in the State law under the Arkansas Water and Air Pollution Control Act, Act 472 of 1949, as amended. Subdivision 9(a): “waters of the State, means all streams, lakes, marshes, ponds, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or borders upon this state or any portion thereof.”

Although the State does not have delegated 404 permitting authority, the State has used its Antidegradation Policy to protect wetland resources affected by projects requiring Section 404 dredge and fill permits. The State will deny water quality certification for such projects when, in the opinion of the State, the designated use will no longer be maintained and protected.

Currently, the State does not have a formal policy for Section 401 water quality certifications. Section 401 decisions made by the State are based on its Regulation No. 2, Regulation Establishing Water Quality Standard for Surface Water of the State of Arkansas.

In 1985, the Arkansas Department of Parks and Tourism (ADPT) prepared a Statewide Comprehensive Outdoor Recreation Plan (SCORP) to investigate wetland losses and propose a policy to abate these losses. The 1992 SCORP makes this Wetlands Issue Statement: “Arkansas must define and adopt a statewide no-net-loss wetland policy and take a proactive role to preserve, protect and restore our wetlands.”

Several state agencies are working independently to preserve wetlands within the State. The Arkansas Game and Fish Commission (AGFC), the State’s chief wildlife and fisheries agency, has a long standing commitment to protecting wetlands within the Delta because of its outstanding wildlife importance, particularly to migratory water fowl. The AGFC has acquired 12 areas within the Delta comprising more than 125,000 acres. The Arkansas Natural Heritage Commission (ANHC), an agency of the Department of Arkansas Heritage, focuses on the protection of rare plant and animal species and natural communities. This agency has made a comparable commitment of acquiring legal interest (fee title or conservation easement) in 57 areas of the State. Of these areas, 37 protect approximately 7,425 acres of wetlands and 29 miles of riparian corridor. The agency is also working cooperatively with landowners to manage wetlands along 16 miles of Bayou Dorcheat and its tributaries in Columbia and Lafayette Counties, involving approximately 11,000 acres of bottom land forest and wetlands.

The AGFC and ANHC have committed to additional investments in the Delta and have begun developing comprehensive plans for the Cache/Lower White River Joint Venture Project under the North American Waterfowl Management Plan, and the White River/Lower Arkansas Megasite Plan.

The AGFC and ANHC have also agreed to jointly purchase 3,750 acres of bottomland forest and cypress-tupelo swamp located in Seven Devils Swamp in southeast Arkansas. The Ramsar Convention, an international agreement providing the framework for international cooperation for conservation of wetland habitats, proclaimed the five state-and-federally-owned areas as “Wetlands of International Importance.” The designation of the Cache/Lower White River is only the eighth wetland area in the United States to be recognized as a wetland of international importance under the Ramsar Convention. It is one of only 19 such sites in the United States.

During 1992, the State of Arkansas developed its first comprehensive strategy for protecting wetlands within the State. Four State agencies - AGFC, ANRC, ANHC, and the Arkansas Department of Environmental Quality joined to discuss wetland protection efforts within the State. The group expanded to include the University of Arkansas Cooperative Extension Service, the Arkansas Forestry Commission, ADPT, and the Arkansas Highway and Transportation Department, and was named the Multi-Agency Wetlands Planning Team (MAWPT).

In 1993, then Governor Jim Guy Tucker created the Water Resource and Wetlands Task Force "to provide recommendations to the Governor regarding protection of Arkansas's water resources and wetlands." Protection and preservation of Arkansas's water resources, the development of a wetlands policy that meets or exceeds the national wetlands policy, and a cooperative effort towards the development of plans for wetlands restoration and agricultural management practices between Arkansas and seven other delta states was cited in the document. Task force membership included representatives from federal and state agencies, environmental organizations, tourism, agricultural interests, academic institutions, and members of the Arkansas General Assembly.

The Task Force developed the following mission statement:

> "The Wetlands and Water Resource Task Force is to develop recommendations to the Governor that will result in the preservation and protection of Arkansas water and wetland resources, including conserving, enhancing, and restoring the acreage, quality, biological diversity and ecosystem sustainability of Arkansas Wetlands, and recommendations regarding the long term health of the aquifers including surface water projects, restoration and clean water initiatives as they relate to agriculture and wetlands."

Acts 561 and 562 were enacted during the 1995 General Assembly as recommended by the Governor's Wetland Task Force. These acts established the riparian zone/ wetland creation tax credit program and wetland mitigation banking program.

The Arkansas Wetlands Conservation Plan consists of two elements:

1. Statewide strategies for wetland protection and restoration (available at www.mawpt.org).

2. Watershed wetland conservation strategies based on GIS inventories and analysis requiring local partnership and decision sharing.

The Governor's Water Resources and Wetlands Task Force no longer exists, but the MAWPT continues this important work. To date, the MAWPT has acquired funds to complete GIS wetland inventories and prioritization for wetland preservation and restoration in all nine of the Wetland Planning Areas of the Delta, and for the whole of the Arkansas Coastal Plain, Ouachita Mountains and Arkansas River Valley. The analyses are complete for all Delta watersheds (Bayou Meto, Bayou Bartholomew, Beouf River/Bayou Macon, lower White River, Black River, Cache River/Bayou DeView, L'Anguille River, and St. Francis River), as well as for the Delta as a whole. Results are being published in a Wetland Planning Area (WPA) reports for each watershed (available at www.mawpt.org). The reports for Bayou Meto and Bayou Bartholomew have been completed and the remaining Delta watershed reports are in various stages of completion. In addition, the MAWPT developed the Arkansas Wetland Strategy, a document containing policy, program, and legislation recommendations for the implementation of the Arkansas Wetland Conservation Plan.

The MAWPT has also been instrumental in developing the hydrogeomorphic approach to wetland classification and functional assessment for Arkansas. To date, the MAWPT has completed a classification for the entire State, which is published on the MAWPT website (www.mawpt.org). This classification includes keys, descriptions of each wetland class with block diagrams illustrating the landscape positions of different wetland community types within the class. Each community type also has a page with a description, photograph, distribution map, and dominant species list. The development of the assessment procedure requires the identification of functions performed by each subclass, development of models for each function that include variables scientifically shown to affect the function, and the calibration of these models using data for reference wetlands in a given geographic region. The MAWPT has identified functions and developed models for the wetlands of both the Delta and Coastal Plain regions. The MAWPT has collected data from nearly 500 reference wetlands to calibrate the models in the two regions. The calibration is complete and a draft of the Regional Guidebook for Conducting Functional Assessments of Forested Wetlands in the Delta Region of Arkansas has been written and is currently in review. A similar draft is being written for the Coastal Plain, and funds have been requested from USEPA to start field work in the Ouachita Mountains and Crowley's Ridge. The MAWPT plans to eventually develop regional assessment guidebooks for each of the five Wetland Planning Regions of Arkansas

The MAWPT has also completed several smaller education and public outreach projects. The MAWPT received a grant from USEPA to assist in developing a curriculum for the Potlach Educational Center at Cook's Lake. This curriculum covers wetland topics such as hydrology, water quality, hydric soils, the water cycle, geomorphology, herpetology, tree identification, map-reading skills, and chapters on birds, mammals, litter decomposers, and other wetland residents. The MAWPT has also assisted with presenting many teacher workshops, to help teachers incorporate wetland and water quality concepts into the classroom. The MAWPT published a Landowner's Guide to Voluntary Wetland Programs in Arkansas in 1996 and again in 2000. The MAWPT has also developed an extensive website with information on Arkansas wetlands, wetland functions, historic losses, the HGM classification, and most of the MAPWT publications, including the landowner's Guide, the Arkansas Wetland Strategy, and the Bayou Meto WPA Report.

The MAWPT is working cooperatively with the NRCS and The Nature Conservancy to restore a rare headwater swamp wetland in the Delta. They've also cooperated with the Arkansas Stream Team to restore approximately two miles of riparian habitat along Crooked Creek in the Ozark Mountains.

A 320-acre site in Chicot County, Arkansas, Referred to as the Camp Nine Mitigation Bank has been purchased by the State in order to establish the State's first wetland mitigation bank under Act 562 of 1995, the "Arkansas Wetlands Mitigation Bank Act." Credits from the Camp Nine Mitigation Bank (CNMB) can be purchased to offset unavoidable wetland impacts occurring in the southeast region of Arkansas. Further information about CNMB can be obtained by contacting the Arkansas Natural Resources Commission.

Literature Cited for Chapter Six

Arkansas Department of Parks and Tourism. 1995. *S.C.O.R.P. 95 Statewide Comprehensive Outdoor Recreation Plan*. Arkansas Department of Parks and Tourism, Little Rock, Arkansas.

Holder, T. 1969. *Disappearing Wetlands in Eastern Arkansas*. Arkansas Planning Commission, Little Rock, Arkansas.

Wetlands Bulletin. *The Ramsar Convention-International Effects, Potential in the U.S. 1988*. Michael Smart.

Interim Report of the Arkansas Water Resource and Wetlands Task Force. November 1994.

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CHAPTER SEVEN PUBLIC HEALTH/AQUATIC LIFE CONCERNS

Background

The 1994 Water Quality Inventory report contained an in-depth look at bioaccumulative compounds and trace metals in Arkansas's lakes and streams. It was the culmination of a cooperative effort with the Arkansas Game and Fish Commission (AGFC) to collect, analyze, and evaluate data on compounds that could affect public health or aquatic life. The report contained data collected from numerous streams, rivers, and lakes. Overall, data collection and/or analysis during the 1994 reporting period was much more extensive than usual. Since that report, the collection and analysis of data has been concentrated on evaluating the mercury problems discussed in the 1994 report.

During the 1996 reporting period, the Department's monitoring program concentrated on mercury and its effects on public health. Edible fish tissue (fillets), usually from predator fishes, was analyzed for metals and pesticides from 32 lakes and numerous stream segments. These results are documented in the "1996 Water Quality Inventory Report."

The fish tissue sampling program has been scaled back from the intensive sampling of the previous years. Since the 1996 reporting period, fish tissue has only been collected from those areas of the State with the greatest risk and highest concentrations of mercury and/or other fish tissue contaminants. From 1999-2004, fish tissue analyses were confined primarily to waters in Arkansas that were selected as a part of the "National Study of Chemical Residues in Lake Fish Tissue."

Public Health and Aquatic Life Impacts

Fish Consumption Advisories

Table III-11 lists the current fish consumption advisories for the State. The most significant health advisory changes in the State over the last four years have been the reduction in the total number of stream miles with dioxin advisories.

The Arkansas Department of Health is responsible for issuing fish consumption advisories. Few waters have been added to the fish consumption advisory list since the 1996 report. Some advisories concerning the consumption of fish tissue with mercury contamination have been better defined and some dioxin advisories have been removed and/or scaled back. It is important to contact the Department, the Arkansas Department of Health, or the Arkansas Game and Fish Commission for the latest advisories.

Table III-11: Fish Consumption Advisories in Place as of January, 2000

<table>
<tr><th rowspan="3">Waterbody /Reach No.</th><th rowspan="3">Type</th><th rowspan="3">Size Affected</th><th colspan="4">Type Fish Consumption Restricted</th><th rowspan="3">Pollutant of Concern</th></tr>
<tr><th colspan="2">No Consumption</th><th colspan="2">Lim. Consumption</th></tr>
<tr><th>Gen Pop</th><th>High Risk</th><th>Gen Pop</th><th>High Risk</th></tr>
<tr><td rowspan="2">Bayou Bartholomew
08040205–002
08040205–012</td><td>River</td><td>~48 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume flathead catfish, gar, bowfin, pickerel, and blue catfish over 20”, largemouth bass over 12”, or buffalo over 18”.
• The general public should not consume more than 2 meals per month of flathead catfish, gar, pickerel, bowfin, or blue catfish over 20” in length, largemouth bass over 12” in length, or buffalo over 18” in length.</td></tr>
<tr><td rowspan="2">Bayou Meto
08020402–007</td><td>Stream</td><td>~48 miles</td><td>X</td><td>X</td><td></td><td></td><td>Dioxin</td></tr>
<tr><td colspan="7">• Consumption of fish from this area is not recommended due to dioxin contamination. This applies to all risk groups.</td></tr>
<tr><td rowspan="2">Tributary of Big Cr
11140203–XXX</td><td>Stream</td><td>~2 miles</td><td>X</td><td>X</td><td></td><td></td><td>PCBs</td></tr>
<tr><td colspan="7">This stream is closed to fishing due to polychlorinated biphenyl contamination.</td></tr>
<tr><td rowspan="2">Big Johnson Lake[1]
(Calhoun County)</td><td>Lake</td><td>80 acres</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups have no restrictions on consumption of crappie or buffalo. They should not consume all other predators and non-predators.
• The general public has no restrictions on the consumption of crappie or buffalo. They should not consume more than two (2) meals per month of all other predators. There is no restriction on consumption of non-predator fish.</td></tr>
<tr><td rowspan="2">Champagnolle Cr.
08040201–003
L. Champagnolle
08040201–XXX</td><td>Stream</td><td>~20 miles</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species over 13”.
• The general public should not consume more than 2 meals per month of the predator species over 13”. There are no restrictions on non-predator species.</td></tr>
<tr><td rowspan="2">Columbia Lake</td><td>Lake</td><td>2,950 acres</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups do not have any restrictions on the consumption of crappie, channel or blue catfish. They should not consume all other predators and non-predators.
• The general public has no restrictions on the consumption of largemouth bass less than 16 inches in length, or crappie, channel and blue catfish. They should not consume morel than 2 meals per month of all other predators. There are no restrictions on non-predator fish.</td></tr>
<tr><td rowspan="2">Cove Creek Lake
(Perry County)</td><td>Lake</td><td>46 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass 12” or longer. There are no restrictions on all other predator or non-predator species.
• The general public should not consume more than 2 meals per months of largemouth bass 12-16” in length. They should not consume largemouth bass greater than 16” in length. There are no restrictions on all other predator or non-predator species.</td></tr>
<tr><td rowspan="2">Cut-Off Creek
08040205–007</td><td>Stream</td><td>16.8 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should consume no more than 2 meals per month of the predator species. They should d not consume the non-predator species.</td></tr>
<tr><td rowspan="2">Dorcheat Bayou
11140203–020
11140203–022
11140203–024
11140203–026</td><td>Stream</td><td>50.6 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should not consume largemouth bass >16” in length or consume more than 2 meals per month of all other predator species.</td></tr>
</table>

1 These oxbow lakes are listed specifically as advisory areas. See last row of table on page 92.

<table>
<tr><th rowspan="3">Waterbody /Reach No.</th><th rowspan="3">Type</th><th rowspan="3">Size Affected</th><th colspan="4">Type Fish Consumption Restricted</th><th rowspan="3">Pollutant of Concern</th></tr>
<tr><th colspan="2">No Consumption</th><th colspan="2">Lim. Consumption</th></tr>
<tr><th>Gen Pop</th><th>High Risk</th><th>Gen Pop</th><th>High Risk</th></tr>
<tr><td rowspan="2">Dry Fork Lake (Perry County)</td><td>Lake</td><td>104 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass 16” or longer.
• The general public should not consume more than 2 meals per month of largemouth bass 16” in length. There are no restrictions on all other predator and non-predator species.</td></tr>
<tr><td rowspan="2">Dupree Lake</td><td>Lake</td><td><10 acres</td><td>X</td><td>X</td><td></td><td></td><td>Dioxin</td></tr>
<tr><td colspan="7">• Consumption of fish from this area is not recommended due to dioxin contamination. This applies to all risk groups.</td></tr>
<tr><td rowspan="2">Felsenthal Lake</td><td>Lake</td><td>14,000 acres</td><td></td><td>X</td><td></td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups have no restrictions on the consumption of crappie and channel catfish 19” in length or less. They should not consume all other predators. There are no restrictions on the consumption of bluegill, but high risk groups should not consume all other non-predators.
• The general public should not consume more than 2 meals per month of blue catfish 18” in length or less. There are no restrictions on the consumption of crappie or channel catfish 19” in length or less. They should not consume all other predators. There are no restrictions on the consumption of bluegill, but the general public should not consume more than 2 meals a month of all other non-predator fish.</td></tr>
<tr><td rowspan="2">Fourche La Fave River 11110206–002</td><td>River</td><td>8.7 miles</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass 16” or longer. There are no restrictions on all other predator and non-predator species.
• The general public should not consume more than 2 meals per month of largemouth bass 16” or longer. There are no restrictions on all other predator and non-predator species.</td></tr>
<tr><td rowspan="2">Grays Lake (Cleveland County)</td><td>Lake</td><td>22 acres</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass over 16” in length, flathead catfish over 26” in length, or any gar, bowfin or pickerel.
• The general public should not consume more than two meals per month of gar, bowfin, pickerel, flathead catfish over 26” in length, or largemouth bass 13” to 16” in length.
• The general public should not consume any largemouth bass over 16” in length.</td></tr>
<tr><td rowspan="2">Johnson Hole (Van Buren County)</td><td>Lake</td><td>~50 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass over 16” in length.
• The general public should not consume largemouth bass over 16” in length.</td></tr>
<tr><td rowspan="2">Moro Creek 08040201–001</td><td>Stream</td><td>~12 miles</td><td>X</td><td>X</td><td></td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should not consume the predator species. They should not consume more than 2 meals per month of the non-predator species.</td></tr>
<tr><td rowspan="2">Nimrod Lake</td><td>Lake</td><td>3,600 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass 16” in length or greater.
• The general public should consume no more than 2 meals per month of largemouth bass 16” or longer. There are no restrictions on all other predators.</td></tr>
<tr><td rowspan="2">Ouachita River 08040201–002 08040201–004 08040202–002 08040202–003 08040202–004</td><td>River</td><td>66.3 miles</td><td>X</td><td>X</td><td></td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should not consume the predator species. They should not consume more than 2 meals per month of the non-predator species.</td></tr>
</table>

<table>
<tr><th rowspan="3">Waterbody /Reach No.</th><th rowspan="3">Type</th><th rowspan="3">Size Affected</th><th colspan="4">Type Fish Consumption Restricted</th><th rowspan="3">Pollutant of Concern</th></tr>
<tr><th colspan="2">No Consumption</th><th colspan="2">Lim. Consumption</th></tr>
<tr><th>Gen Pop</th><th>High Risk</th><th>Gen Pop</th><th>High Risk</th></tr>
<tr><td rowspan="2">Saline River
08040204–001
08040204–002</td><td>River</td><td>55.8 miles</td><td>X</td><td>X</td><td></td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should not consume the predator species. There are no restrictions on the non-predator species.</td></tr>
<tr><td rowspan="2">Saline River
08040204–004
08040204–006</td><td>River</td><td>33.9 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume predator or non-predator species.
• The general public should not consume more than 2 meals per month of the predator or non-predator species.</td></tr>
<tr><td rowspan="2">Shepherd Springs Lake (Crawford County)</td><td>Lake</td><td>552 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume black bass 16” or longer. There are no restrictions on all other predator or non-predator species.
• The general public should not consume more than 2 meals per month of black bass 16” to 20” long. No black bass over 20” should be consumed. There are no restrictions on all other predator or non-predator species.</td></tr>
<tr><td rowspan="2">South Fork Little Red River
11010014–036</td><td>River</td><td>2.0 miles</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume largemouth bass over 16” in length.
• The general public should not consume more than 2 meals per month of largemouth bass 16” long or greater. There are no restrictions for all other predators.</td></tr>
<tr><td rowspan="2">Lake Monticello (Drew County)</td><td>Lake</td><td>1,240 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume black bass, flathead or blue catfish, 12” or larger, or channel catfish 18” or larger.
• The general public should not consume more than 2 meals per month of black bass 12” to 15” in length, or channel catfish 18” or larger. The general public should not consume flathead catfish, blue catfish, or black bass over 15” in length.</td></tr>
<tr><td rowspan="2">Lake Winona (Saline County)</td><td>Lake</td><td>1,240 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">• High risk groups should not consume black bass 16” or larger.
• The general public should not consume more than two meals per month of black bass 16” or larger.</td></tr>
<tr><td rowspan="2">Oxbow Lakes
(See Previous Footnote)</td><td>All types</td><td>Total Area not known</td><td>X</td><td>X</td><td></td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">There is an advisory on all oxbow lakes, backwaters, overflow lakes and bar ditches formed by the Ouachita River below Camden. This includes waters inside the Felsenthal National Wildlife Refuge.
• High risk groups should not consume predator or non-predator species not listed below.
• The general public should not consume predator species not listed below. They should not consume more than 2 meals per month of all non-predator species not listed below. There are no restrictions on the consumption of buffalo or crappie.</td></tr>
</table>

Public Water Supply/Drinking Water Use

During 1995, water quality analyses included a comprehensive list of pesticides (see Table III-5) from at least one sampling event. These results indicated detectable levels of pesticides at some of the stations; however, none of the pesticide concentrations exceeded the Safe Drinking Water Act Maximum Contaminant Level (MCL) for that parameter.

The ambient monitoring network provided monthly data from all stations for nitrate and minerals (chlorides, sulfates, total dissolved solids) that were compared against the drinking water standards to assess the protection of the drinking water use. Of the more than 9,305 miles assessed for these parameters for drinking water use support, 280.7 miles were not meeting the use. Many of the exceedances were from nitrate values greater than 10 mg/L. In addition, several miles of streams have had the drinking water designation use removed through site specific amendments to the water quality standards.

Source Water Protection Program, Arkansas Department of Health

Arkansas's Source Water Protection Program (SWAP) is an USEPA program mandated by the 1996 amendments to the Safe Drinking Water Act that required each state to assess all public drinking water sources for vulnerability to contamination. Responsibility for the development of the SWAP plan and for conducting the vulnerability assessments was given to the Engineering Division at the Arkansas Department of Health (ADH), now the Division of Health within the Department of Health and Human Services.

Vulnerability assessment is a multi-step process consisting of accurate mapping of drinking water source locations, delineation of source water "assessment" areas where the water is likely derived from, mapping of potential contaminant locations within the assessment areas, and producing a susceptibility analysis using a Geographical Information System. The purpose of the SWAP was to establish a viable method for assessing vulnerability and for producing accurate maps intended to serve as the basis for source water protection planning by public water systems, their customers, and other interested parties. Source protection programs can help to ensure a continued safe drinking water supply, provide for monitoring flexibility, and limit capital expenditures for treatment. The results of the assessments can also be used by other government entities and conservation groups to better understand the cumulative effects of various human activities and help determine where the most critical problems are located within a watershed. Arkansas's SWAP was approved by USEPA Region 6 in November 1999, and the assessments were completed in May 2003. The Division of Health is now providing technical assistance for the development of source water protection plans, and continuing to produce SWAP reports as required, when new water systems or new drinking water sources come into existence. More information about the SWAP and source water protection planning can be accessed on the Division of Engineering's WEB site at http://www.healthyarkansas.com/eng/swp/swp.htm.

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PART IV WATER QUALITY LIMITED WATERBODIES 303(d) LIST

Introduction

Section 303(d) of the Clean Water Act requires states to identify waters which do not meet or are not expected to meet applicable water quality standards. These water bodies are compiled into a list known as the 303(d) list. The regulation (40 CFR 130.7) requires that each 303(d) list be prioritized and identify waters targeted for Total Maximum Daily Load (TMDL) development. The 303(d) list in this document has not yet been totally approved by USEPA.

As a result of several lawsuits concerning past 303(d)/TMDL processes, USEPA has issued numerous administrative interpretations, administrative procedures, policies, and guidance from both headquarters and regional offices for preparation of the 303(d) list. Currently, major revisions in the TMDL regulation process have been proposed; however, several controversial sections in the proposal have resulted in a stay of the new regulations. As a result, the 303(d) process and the 305(b) activities are driven by previous guidance and administrative directives. Recent USEPA guidance requests that the 303(d) Impaired Waterbody List be submitted with the 305(b) report as an *Integrated Water Quality Monitoring and Assessment Report*.

Methodology

The methodology used for listing of impaired waters (303(d)) is essentially the same as for the 305(b) assessments. This is detailed in Part III, Chapter Three of this document.

Water Quality Limited Waters

The 2006 list of impaired waterbody segments is divided into six tables. Table IV-1 is a list of stream segments in Category 4a, those not currently meeting water quality standards, but have completed TMDLs. These waters are illustrated in Figure IV-1. To date, 122 TMDLs have been developed for Arkansas's waterbodies.

The waters listed in Category 5a are those waters that are truly impaired and will require the development of a TMDL, unless some other pollution control mechanism is implemented and future assessments indicate full attainment of water quality standards. A key to the abbreviations used with the lists is attached. The Category 5a list includes 33 stream segments totaling almost 498 stream miles and 8 lakes totaling approximately 6,500 acres. These waters are illustrated in Figure IV-2.

There is only one stream segment, approximately nine stream miles, listed in Category 5b. This water is currently not meeting water quality standards. However, future changes to the water quality standards outlined in Regulation No. 2 could result in the de-listing of this stream segment.

Category 5c contains those stream segments where water quality data indicates impairment, but the data is questionable because of quality control/quality assurance issues. This category includes 21 stream segments totaling almost 288 stream miles. Most segments are listed because of either a metals contamination, or low dissolved oxygen or pH violations. Field QA/QC procedures will be verified to determine the accuracy of these listings.

The stream segments listed in Category 5d are those that need additional data verification in order to determine the accuracy of the assessment. There are currently 102 stream segments totaling approximately 1924 stream miles in this category. The majority of the listings are for various types of metals contamination. Others include elevated minerals or silt concentrations, and low dissolved oxygen values. Pathogen listings based on fecal coliform data are also listed. These stream segments are all listed for additional water quality assessment activities.

Stream segments listed in Category 5e are waters that are not currently meeting a water quality standards, however, “the basis for not meeting an applicable water quality standard is not caused by a pollutant, but is attributed to other types of pollution” (EPA, 2005). This is also known as natural or background water quality conditions.

Note: The 2006 list of impaired waterbodies (303(d) list) contained in this report has not yet been approved by the U. S. Environmental Protection Agency.

Key to Abbreviations in 303 (d) List

Priority Rank - A ranking of waters in order of need for corrective action taking into account the severity of the pollution and the designated uses of the waters.
H = High priority: highest risk of affecting public health or welfare; substantial impact on aquatic life uses.
M = Medium priority: moderate risk to public health, welfare or to aquatic life uses.
L = Low priority: lowest risk to public health or welfare; secondary impact on aquatic life uses.

Assessed Uses of Waters include: fish consumption, aquatic life communities, primary contact (swimmable), secondary contact (limited body contact), water supply for raw drinking water, agriculture and industrial uses.

S = use is fully supported
N = use not supported
R = designated use removed
M = monitored assessment
E = evaluated assessment

Sources of Contamination - the probable source of the contaminant causing impairment

AG = agriculture activities
SV = silviculture
SE[1] = surface erosion
UR = urban runoff
IP = industrial point source
MP = municipal point source
RC = road construction/maintenance
HP = hydropower
RE = resource extraction (mining; oil and gas extraction)
UN = unknown

Causes of Impairment - the identified contaminant

SI = siltation/turbidity
PA = pathogen indicator bacteria
PO = priority organics
AM = ammonia
NO3 = nitrate nitrogen
TP = total phosphorus
Al = aluminum
Cu = copper
Zn = Zinc
CL = chlorides
SO4 = sulfates
TDS = total dissolved solids
OE = organic enrichment/low dissolved oxygen
NU = nutrients[2]
DO = dissolved oxygen
Pb = Lead
Hg = mercury

Notes:
1 Surface Erosion – This category includes erosion from agriculture activities, unpaved road surfaces, in stream erosion, mainly from unstable stream banks, and any other land surface disturbing activity.
2 This listing was used in previous 303(d) lists. TMDLs are currently being developed for these listings.

H.U.C. - Reach - a numerical identifier of a specific segment of a stream

Miles - the total length (in miles) of a specific reach or segment of a stream

Station - water quality monitoring station number

Figure IV-1: Arkansas's Impaired Waterbodies with Completed TMDLs (Categories 4a)

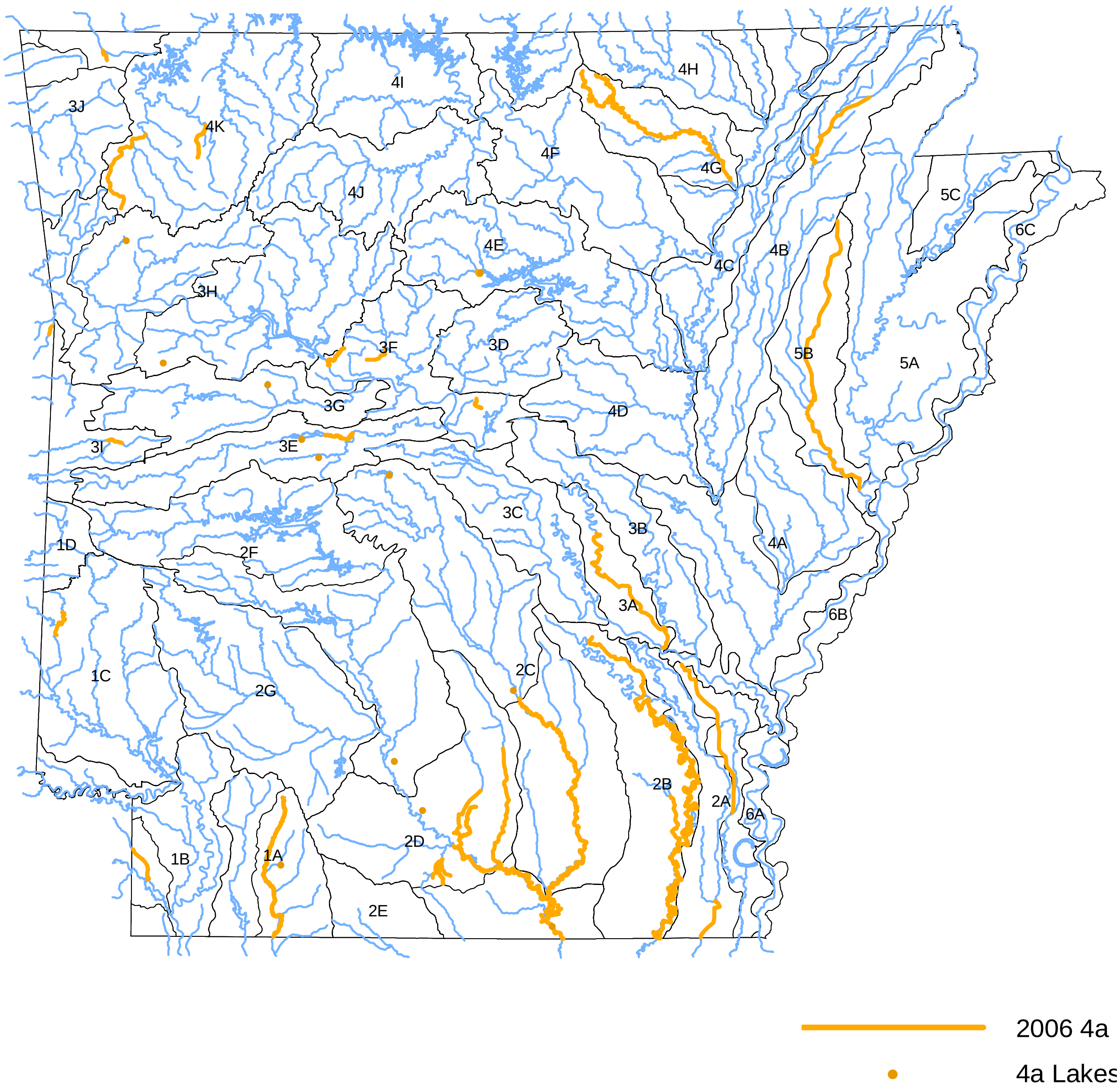

Figure IV-2: Arkansas's Impaired Waterbodies without Completed TMDLs
(Categories 5a-e)

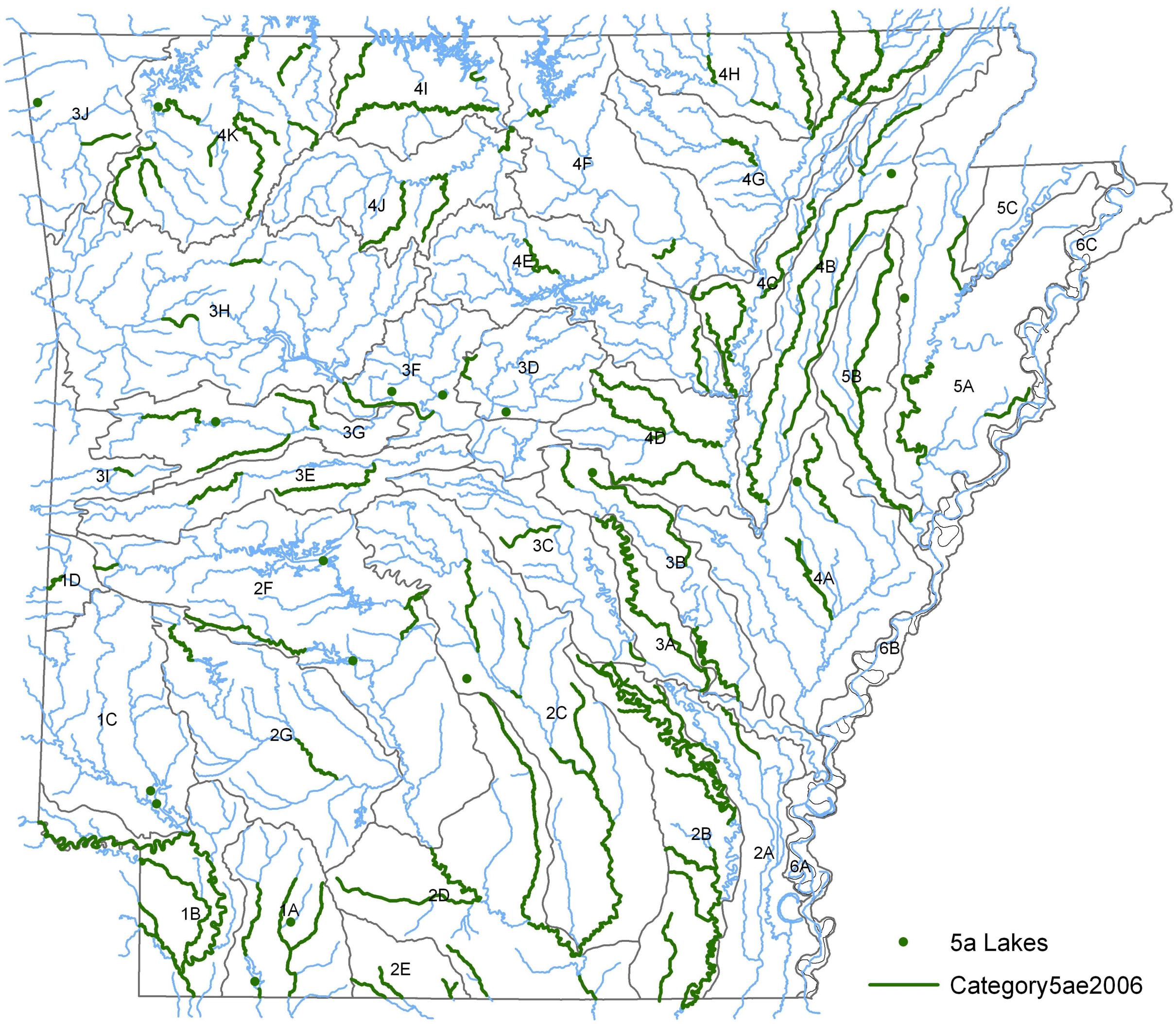

Table IV-1: Water Quality Limited Waterbodies (Category 4a) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	TMDL Date
Dorcheat Bayou	11140203	-022	1A	8.4	RED0015A	M	N						UN				HG				2002
Dorcheat Bayou	11140203	-020	1A	11.9		E	N						UN				HG				2002
Dorcheat Bayou	11140203	-026	1A	23.3	UWBDT01,02	M	N						UN				HG				2002
Dorcheat Bayou	11140203	-024	1A	7.0		E	N						UN				HG				2002
Days Creek	11140302	-003	1B	11.0	RED0004A	M					N		MP				NO3				2006
Rolling Fork	11140109	-919	1C	12.8	RED0058	M		N					IP	IP			NO3	TP			2006
Beouf River	8050001	-018	2A	49.4	OUA0015A	M		N					AG	AG			SI	SO4			2005
Oak Bayou	8050002	-010U	2A	18.3	OUA0179	M		N			N	N	AG	AG			SI	CL	TDS		2005
B. Bartholomew	8040205	-001	2B	60.1	OUA0013	M		N					AG				SI				2003
B. Bartholomew	8040205	-002	2B	17.9	OUA0154	M						N	UN				HG				2002
B. Bartholomew	8040205	-002	2B		UWBYB01	M	N	N					UN	AG			HG	SI			2002/03
Deep Bayou	8040205	-005	2B	28.9	OUA0151	M		N					AG				SI				2003
Cutoff Creek	8040205	-007	2B	16.8	UWCOC01	M	N						UN				HG				2002
B. Bartholomew	8040205	012U	2B	82.7	UWBYB02	M		N					AG				SI				2003
B. Bartholomew	8040205	-013	2B	33.9	UWBYB03	M		N					AG				SI				2003
B. Bartholomew	8040205	-012	2B	25	UWBYB02	M	N	N					UN	AG			HG	SI			2002/03
Saline River	8040203	-001	2C	0.2	OUA0010A,117	E	N						UN				HG				2002
Saline River	8040204	-001	2C	2.8		M	N						UN				HG				2002
Saline River	8040204	-002	2C	53		M	N						UN				HG				2002
Saline River	8040204	-004	2C	16.4		M	N						UN				HG				2002
Saline River	8040204	-006	2C	17.5	OUA0118	M	N						UN				HG				2002
Ouachita River	8040202	-002	2D	51.8	OUA0008B	M	N						UN				HG				2002
Ouachita River	8040202	-003	2D	8.4		M	N						UN				HG				2002
Ouachita River	8040202	-004	2D	49.2	OUA0124B	M	N						UN				HG				2002
Moro Creek	8040201	-001L	2D	54.4	OUA0028	M	N						UN				HG				2002
Ouachita River	8040201	-002	2D	22.5	OUA0124B	M	N						UN				HG				2002
Ouachita River	8040201	-004	2D	2.5	OUA0037	M	N						UN				HG				2002
L. Champagnolle Cr.	8040201	-003	2D			M	N						UN				HG				2002
Champagnolle	8040201	-003L	2D	20	UWCHC01	M	N						UN				HG				2002
Elcc Trib.	8040201	-606	2D	8.5	OUA0137A+	M		N			N		IP	IP			AM	CL	SO4	TDS	2002
Flat Cr.	8040201	-706	2D	16.0	OUA0137C	M		N			N		RE				CL	TDS			2003
Flat Cr.	8040201	-706	2D			M		N			N		RE				SO_4				2003
Salt Cr.	8040201	-806	2D	8.0	OUA0137D	M		N			N		RE				CL				2003
Salt Cr.	8040201	-806	2D			M		N			N		RE				TDS				2003
Fourche LaFave	11110206	-002	3E	8.7		M	N						UN				HG				2002
White Oak Creek	11110203	-927	3F	10.0	ARK0053	M		N					UN				SI				2006
Stone Dam Creek	11110203	-904	3F	3	ARK0051	M		N			N		MP	MP			AM	NO_3			2003
Whig Creek	11110203	-931	3F	10	ARK0067	M		N			N		MP				NO_3				2001
Whig Creek	11110203	-931	3F			M		N			N		MP				Cu				2003
Poteau River	11110105	-001	3I	2.0	ARK0014	M		N					SE				SI				2006
Poteau River	11110105	-031	3I	6.6	ARK0055	M		N					IP	MP			Cu	Zn	TP		2006
Cache River	8020302	-032	4B	11.4		E		N					AG				SI				2006
Cache River	8020302	-031	4B	3.4		E		N					AG				SI				2006
Cache River	8020302	-029	4B	3.9		E		N					AG				SI				2006
Cache River	8020302	-028	4B	5.9	UWCHR04	M		N					AG				SI				2006
Cache River	8020302	-027	4B	3.9		E		N					AG				SI				2006
S. Fk. L. Red River	11010014	-036	4E			M	N						UN				HG				2002

Table IV-2: Water Quality Limited Waterbodies (Category 4a Lakes) – 303(d) List

LAKE NAME	HUC	LAKE TYPE	PLNG SEG	ACRES	COUNTY	ASSESS	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	ECONDAR CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	CAUSE 1	CAUSE 2	CAUSE 3	TMDL DATE	Year Listed
Columbia	11140203	E	1A	2950	Columbia	M	N						UN			HG			2002	2002
First Old River	11140201	D	1B	200	Miller	M		N					UN			NU			2007	2004
Grand	8050002	E	2A	1400	Chicot	M		N					UN			NU			2007	2004
Grays	8040204	NC	2C	36	Cleveland	M	N						UN			HG			2004	2002
Monticello	8040204	B	2C	1520	Drew	M	N						UN			HG			2004	2002
Winona	8040203	A	2C	1240	Saline	M	N						UN			HG			2002	2002
Ouachita River Oxbows below Camden	8040202		2D		Ashley Calhoun Union Bradley	M	N						UN			HG			2002	2002
Big Johnson	8040201	NC	2D	49	Calhoun	M	N						UN			HG			2004	2002
Felsenthal	8040202	E	2D	14,000	Bradley	M	N						UN			HG			2004	2002
Cove Creek	11110202	B	3H	160	Logan	M	N						UN			HG			2002	2002
Nimrod	11110206	E	3E	3600	Yell	M	N						UN			HG			2002	2002
Dry Fork	11110206		3E		Perry	M	N						UN			HG			2002	202
Horseshoe	8020203	E	4A	1200	Crittenden	M		N					UN			NU			2007	2004
Frierson	8020302	C	4B	335	Greene	M		N					UN			SI			2007	2004
Johnson Hole	11010014	A	4E		Van Buren	M	N						UN			HG			2002	2002
Spring	11110204	B	3G	82	Yell	M	N						UN			HG			2004	2002
Old Town	8020302	D	5A	900	Phillips	M		N					UN			NU			2007	2004
Bear Creek	8020205	C	5B	625	Lee	M		N					UN			NU			2007	2004
Mallard	8050002	D	5C	300	Mississippi	M		N					UN			NU			2007	2004

Table IV-3: Water Quality Limited Waterbodies (Category 4b) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	Category	Priority	Year Listed
Mine Creek	11140109	-033B	1C	1.3	RED0048B	M		N					IP				DO	CU	Zn		4b	H	2004
Holly Creek	11140109	-013	1C	6.2	RED0034B	M		N					MP	IP			Zn				4b	H	2006
Rolling Fork	11140109	-919	1C	12.8	RED0058	M		N					IP				Cu				4b	H	2006
Bear Creek	11140109	-025	1C	17.3	RED0033	M					N		MP				NO3				4b	H	2004
Big Creek	8040203	-904	2C	10.0	OUA0018	M		N					MP	MP			NO3	TP	OE		4b	H	1998
Salt Creek	8040201	-806	2D	8.0	OUA0137D	M		N					IP				Cu				4b	H	2004
Flat Creek	8040201	-706	2D	16.0	OUA0137C	M		N					IP	IP			Cu	Zn			4b	H	2004
Elcc Trib.	8040201	-606	2D	8.5	OUA0137A+	M		N			N		IP	IP	IP		NO3	Cu	Zn		4b	H	2004
Bayou Meto	8020402	-007B	3B	44.8	ARK0050	M	N	N					IP	IP			PO	Zn			4b	H	1998/2006
Short Mountain Cr	11110202	-043	3H	14.9	ARK0011B	M		N					MP				Cu				4b	H	2004
Town Branch	11070208	-901	3J	3.0	ARK0056	M		N					MP				TP				4b	H	1998
Sager Creek	11110103	-932	3J	8.0	ARK0005	M					N		MP				NO3				4b	H	2006
Hicks Creek	11010004	-015	4F	9.1	WHI0065	M			N				MP				PA				4b	H	2006

Table IV-4: Water Quality Limited Waterbodies (Category 5a) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	Category	Priority
Sulphur River	11140302	-008	1B	0.8		E		N					SE				SI				5a	H
Sulphur River	11140302	-006	1B	6.5	RED0005	M		N					SE				SI				5a	H
Sulphur River	11140302	-004	1B	0.7		E		N					SE				SI				5a	H
Days Creek	11140302	-003	1B	11.0	RED0004A	M		N			N		SE	UN			SI				5a	H
Sulphur River	11140302	-002	1B	8.5		E		N					SE				SI				5a	H
Sulphur River	11140302	-001	1B	6.3		E		N					SE				SI				5a	H
Oak Bayou	8050002	-010U	2A	18.3	OUA0179	M		N			N	N	AG				TDS				5a	L
Saline River	8040203	-010	2C	29.8	OUA0026,41	M		N					SE	UN	UN		SI	TDS	SO4		5a	H
Big Creek	8040203	-904	2C	10.0	OUA0018	M		N					SE				SI				5a	H
Smackover Creek	8040201	-007	2D	29.1		E		N					SE	UN			SI	DO			5a	M
Smackover Creek	8040201	-006	2D	14.8	OUA0027	M		N					SE	UN			SI	DO			5a	M
Moro Creek	8040201	-001L	2D	12.0	OUA0028	M		N					SE				SI				5a	H
Moro Creek	8040201	-001U	2D	57.9		E		N					SE				SI				5a	H
Cove Creek	8040102	-902B	2F	9.6	OUA0159	M		N				N	RE	RE	RE	RE	pH	SO4	TDS	Zn	5a	H
Cove Creek	8040102	-902B	2F			M					N		RE	RE			Be	Cu			5a	H
Chamberlain Creek	8040102	-501	2F	2.5	OUA0104	M		N			N	N	RE	RE	RE	RE	pH	Cl	SO4	TDS	5a	H
Chamberlain Creek	8040102	-501	2F			M		N			N	N	RE	RE	RE	RE	Cd	Cu	Zn	Be	5a	H
Lucinda Creek	8040102	-500	2F	2.2	OUA0171B	M		N				N	RE	RE	RE	RE	pH	SO4	Zn	Be	5a	H
S. Fork Caddo	8040102	-023	2F	16.6	OUA0044	M		N					RE	RE			Cu	Zn			5a	H
Fourche Creek	11110207	-022	3C	9.2	ARK0131+	M		N					SE				SI				5a	H
Fourche LaFave R.	11110206	-007	3E			M		N					UN				SI				5a	H
Arkansas River	11110203	-031U	3F	2.0		M		N					HP				DO				5a	H
Poteau River	11110105	-031L	3I	6.6	ARK0055	M						N	IP/MP				CL	SO4	TDS		5a	M
Bayou DeView	8020302	-009	4B	20.3	WHI0026	M		N				N	AG	MP			TDS	CL			5a	H
North Fork River	11010006	-001	4F	4.2	USGS	M		N					HP				DO				5a	H
Current River	11010008	-017	4G			E		N					SE				SI				5a	M
Current River	11010008	-001	4G			M		N					SE				SI				5a	M
Crooked Creek	11010003	-048	4I	31.7	WHI0048A	M		N					RE				Temp				5a	L
White River	11010003	-002U	4I	3.0	USGS	M		N					HP				DO				5a	H
Holman Creek	11010001	-059	4K	9.1	WHI0070	M					N	N	MP				TDS				5a	L
West Fork	11010001	-024	4K	27.2	WHI0051	M		N				N	UN				DO				5a	M
L' Anguille River	8020205	-005	5B	44.1	UWLGR02	M						N	AG	AG	AG		CL	SO4	TDS		5a	L
L' Anguille River	8020205	-004	5B	16.0	UWLGR01	M						N	AG	AG			CL	TDS			5a	L
L' Anguille River	8020205	-003	5B	16.8		E						N	AG	AG			CL	TDS			5a	L
L' Anguille River	8020205	-002	5B	1.8		E						N	AG	AG			CL	TDS			5a	L
L' Anguille River	8020205	-001	5B	19.7	FRA0010	M						N	AG	AG			CL	TDS			5a	L

Table IV-5: Water Quality Limited Waterbodies (Category 5a Lakes) – 303(d) List

LAKE NAME	HUC	LAKE TYPE	PLNG SEG	ACRES	COUNTY	ASSESS	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	ECONDAR CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE				CAUSE					
													1	2	3	4	1	2	3	4	Category	Priority
Earling	11140205	E	1A	7000	Lafayette	M					N		UN				Be				5d	L
Columbia	11140203	E	1A	2950	Columbia	M					N		UN				Be				5d	L
Millwood	11140109	E	1C	29,500	Little River	M					N		UN				Be				5d	L
DeQueen	1114109	A	1C	1680	Sevier	M					N		UN				Be				5d	L
Cox Creek	8040203	C	2C	300	Grant	M		N					UN				UN*				5d	L
DeGray	8040102	A	2F	13,200	Clark	M					N		UN				Be				5d	L
Ouachita	8040101	A	2F	40,100	Garland	M					N		UN				Be				5d	L
Pickthorne	8020402	D	3B	207	Lonoke	M		N					UN				UN*				5d	L
Beaverfork	11110205	B	3D	900	Faulkner	M					N		UN				Be				5d	L
Atkins	11110203	C	3F	750	Pope	M					N		UN				Be				5d	L
Overcup	11110203	C	3F	1025	Conway	M					N		UN				Be				5d	L
Blue Mountian	11110204	E	3G	2900	Logan	M		N					UN				SI				5d	L
Swepco	11110103	B	3J	531	Benton	M		N					UN				UN*				5d	L
Greenlee	8020304	D	4A	300	Monroe	M		N					UN				UN*				5d	L
Frierson	8020302	C	4B	335	Greene	M		N					UN				Cu				5a	M
Beaver - Upper	1101001	A	4K	1500	Madison	M		N					SE				SI				5a	H
Poinsette	8020203	C	5A	550	Poinsette	M		N					UN				UN*				5d	L

Table IV-6: Water Quality Limited Waterbodies (Category 5b-c) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	Category	Priority
B. Bartholomew	8040205	-001	2B	60.1	OUA0013	M						N	UN				Pb				5b	M
Caney Creek	8020203	-901	5B	9.0	FRA0034	M						N	MP				TDS				5b	L
Big Creek	8040203	-904	2C			M		N			N		UN	UN	UN		Pb	DO	Be		5c	L
Walker Branch	8040206	-916	2E	3.0		E		N					RE				Zn				5c	M
Little Cornie Bayou	8040206	-816	2E	3.0		E		N					RE				Zn				5c	M
Little Cornie Bayou	8040206	-716	2E	5.0		E		N					RE				Zn				5c	M
Little Cornie Creek	8040206	-016	2E	18.0		E		N					RE				Zn				5c	M
Big Cornie Creek	8040206	-015	2E	15.0	OUA0002	M						N	RE				Zn				5c	M
Caddo River	8040102	-019	2F	7.7		E		N					RE				Zn				5c	L
Caddo River	8040102	-018	2F	4.1		E		N					RE				Zn				5c	L
Caddo River	8040102	-016	2F	13.5	OUA0023	M		N					RE				Zn				5c	L
Fourche Creek	11110207	-024	3C	11.2	ARK0130+	M		N					UN				DO				5c	L
Fourche Creek	11110207	-022	3C			M		N					UN				DO				5c	L
Black River	11010007	-002	4G	22.7	WHI0003	M		N					UN				DO				5c	L
Black River	11010007	-001	4G	24.2		E		N					UN				DO				5c	L
Current River	11010008	-017	4G	12.0		E		N					UN				DO				5c	M
Current River	11010008	-001	4G	23.6	WHI0004	M		N					UN				DO				5c	M
Black River	11010009	-005	4G	17.5	WHI0025	M		N					AG				DO				5c	L
Spring River	11010010	-003	4H	9.4	WHI0021	M		N					UN				DO				5c	M
Eleven Point River	11010011	-001	4H	33.1	WHI0005B	M		N					UN				DO				5c	M
Buffalo River	11010005	-005	4J	6.9	WHI0049A	M		N					UN				DO				5c	M
St. Francis River	8020203	-014	5A	22.8	FRA0008	M		N					UN				DO				5c	L
Second Creek	8020205	-008	5B	16.4	FRA0012	M		N					AG				DO				5c	L

Table IV-7: Water Quality Limited Waterbodies (Category 5d) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	Category	Priority
Dorcheat Bayou	11140203	-022	1A	8.4	RED0015A	M						N	UN	UN	UN	SE	SO4	TDS	Pb	SI	5d	L
Dorcheat Bayou	11140203	-020	1A	11.9		E						N	UN	UN	UN	SE	SO4	TDS	Pb	SI	5d	L
Big Creek	11140203	-923	1A	18.5	UWBIG01	E		N					IP				Pb				5d	L
Bodcau Creek	11140205	-006	1A	22.4	RED0027	M		N					UN	UN	SE		Zn	Pb	SI		5d	M
Bodcau Creek	11140205	-002	1A	6.0		E		N					UN	UN	SE		Zn	Pb	SI		5d	M
Days Creek	11140302	-003	1B	11.0		M		N					UN				Pb				5d	L
Chemin-A-Haut Cr	8040205	-907	2B	30.5	OUA0012	M			N				UN				PA				5d	M
Cross Bayou	8040205	-905	2B	2.4	OUA0152	M				N			UN				PA				5d	M
Main Street Ditch	8040205	-909	2B	2.0	OUA0146	M		N					UR	UR			Cu	Pb			5d	M
Melton's Creek	8040205	-903	2B	8.7	OUA0148	M			N				UN				PA				5d	M
Harding Creek	8040205	-902	2B	4.6	OUA0145	M		N		N			UR	UR	UR	UR	PA	Cu	Pb	Zn	5d	M
Bayou Imbeau	8040205	-910	2B	7.5	OUA0147	M		N					UR				Pb				5d	M
Able's Creek	8040205	-911	2B	14.6	OUA0158	M		N			N		UN	SE			Be	SI			5d	M
Bearhouse Creek	8040205	-901	2B	24.4	OUA0155	M		N	N				UN	UN			PA	Pb			5d	M
B. Bartholomew	8040205	-013	2B	33.9	UWBYB03	M			N			N	AG	AG	AG	AG	CL	TDS	PA	DO	5d	M
Cut-Off Creek	8040205	-007	2B	16.8	UWCOC01	M		N					UN				SI				5d	M
B. Bartholomew	8040205	-006	2B	82.3	OUA0033	M		N					AG				Pb				5d	M
Deep Bayou	8040205	-005	2B	28.9	OUA0151	M			N				AG				PA				5d	M
B. Bartholomew	8040205	-002	2B	17.9	OUA0154	M		N				N	AG				CL				5d	M
B. Bartholomew	8040205	012U	2B	82.7	UWBYB02	M		N				N	AG	AG			CL	TDS			5d	M
Overflow Creek	8040205	-908	2B	9.9	OUA0012A	M		N					UN	UN			SI	Cl			5d	M
Saline River	8040203	-007	2C	3.8	OUA0042	M					N		UN				Be				5d	L
Saline River	8040204	-006	2C	17.5	OUA0118	M					N	N	UN	UN			Be	TDS			5d	L
Big Creek	8040204	-005	2C	28.9	OUA0043	M		N			N		SE	UN	UN		SI	Be	pH		5d	L
Saline River	8040204	-004	2C	16.4		E		N					UN	UN	UN		Zn	Cu	Be		5d	L
Saline River	8040204	-002	2C	53	OUA0010A+	M		N					UN	UN	UN		Zn	Cu	Be		5d	L
Saline River	8040204	-001	2C	2.8		E		N					UN	UN	UN		Zn	Cu	Be		5d	L
Smackover Creek	8040201	-007	2D			E		N					IP	IP			Zn	Pb			5d	L
Smackover Creek	8040201	-006	2D			M		N					IP	IP			Zn	Pb			5d	L
Ouachita River	8040201	-005	2D	34.2	OUA0037	M		N					UN	UN			Cu	Zn			5d	L
Moro Creek	8040201	-001L	2D			M		N					UN	UN			Pb	Zn			5d	L
Moro Creek	8040201	-001U	2D			E		N					UN	UN			Pb	Zn			5d	L
Bayou De L'Outre	8040202	-008	2D	10.6		E		N					RE/IP/MP				Pb	Zn			5d	M
Bayou De L'Outre	8040202	-008	2D			E						N	RE/IP/MP				TDS	SO4			5d	M
Bayou De L'Outre	8040202	-007	2D	6.9		E		N					RE/IP/MP				Pb	Zn			5d	M
Bayou De L'Outre	8040202	-007	2D			E						N	RE/IP/MP				TDS	SO4			5d	M
Bayou De L'Outre	8040202	-006	2D	32.4	OUA0005	M		N					RE/IP/MP				Pb	Zn			5d	M
Bayou De L'Outre	8040202	-006	2D			M						N	RE/IP/MP				TDS	SO4			5d	M
Ouachita River	8040202	-004	2D	28.9	OUA0124B	M		N					UN				Zn				5d	L
Ouachita River	8040202	-002	2D	4.0	OUA0008B	M		N					UN				Zn				5d	L
Walker Branch	8040206	-916	2E			E						N	RE				SO4				5d	M
Little Cornie Bayou	8040206	-816	2E			E						N	RE				SO4				5d	M
Little Cornie Bayou	8040206	-716	2E			E						N	RE				SO4				5d	M
Little Cornie Creek	8040206	-016	2E			E						N	RE				SO4				5d	M
Big Cornie Creek	8040206	-015	2E			M		N			N		RE	UN			SO4	Be			5d	M
Ouachita River	8040102	-007	2F	14.5	OUA0006	M					N		UN				Be				5d	L
Prairie Creek	8040101	-048	2F	10.0	OUA0040	M		N					SE				SI				5d	M
D.C. Creek	8040102	-923	2F	5.0	OUA0044T	M					N		RE				Be				5d	L
Caddo River	8040102	-016	2F			M					N		RE				Be				5d	L
L. Missouri River	8040103	-008	2G	19.6	OUA0035	M		N					SE	UN			SI	Cu			5d	L
L. Missouri River	8040103	-022	2G	17.6	OUA0022	M		N					UN				Zn				5d	L
Arkansas River	11110207	-001	3C	6.7	ARK0048	M					N		UN				Be				5d	L
Fourche Creek	11110207	-024	3C			M					N		UN				Be				5d	L
Fourche Creek	11110207	-022	3C			M		N					UN	UN			Pb	Zn			5d	L

Table IV-7 (cont.): Water Quality Limited Waterbodies (Category 5d) – 303(d) List

STREAM NAME	HUC	RCH	PLNG	MILES	MONITORING	ASSESS	FISH	AQUATIC	PRIMARY	SECONDARY	DRINKING	AGRI &	SOURCE				CAUSE					
			SEG		STATIONS	TYPE	COMSUMP	LIFE	CONTACT	CONTACT	WATER	INDUSTRY	1	2	3	4	1	2	3	4	Category	Priority
Cypress Creek	11110205	-017A	3D	11.2	ARK0132	M		N					AG	AG			Cu	Zn			5d	L
Petit Jean River	11110204	-011	3G	21.6	ARK0034	M					N		UN				Be				5d	L
Clear Creek	11110103	-029	3J	13.5	ARK0010C	M			N				UR				PA				5d	L
Prairie Cypress	8020304	-014	4A			M		N					AG				Pb				5d	L
Big Creek	8020304	-010	4A	34.3	UWBGC03	M						N	AG	AG			CL	TDS			5d	L
Cache River	8020302	-032	4B	11.4		E		N					AG	AG			Pb	TDS			5d	L
Cache River	8020302	-031	4B	3.4		E		N					AG	AG			Pb	TDS			5d	L
Cache River	8020302	-029	4B	3.9		E		N					AG	AG			Pb	TDS			5d	L
Cache River	8020302	-028	4B	5.9	UWCHR04	M		N					AG	AG			Pb	TDS			5d	L
Cache River	8020302	-027	4B	3.9		E		N					AG	AG			Pb	TDS			5d	L
Cache River	8020302	-021	4B	18.4		E		N					AG				Pb				5d	L
Cache River	8020302	-020	4B	22.6	UWCHR03	M		N					AG				Pb				5d	L
Cache River	8020302	-019	4B	13.7		E		N					AG				Pb				5d	L
Cache River	8020302	-018	4B	25.0	UWCHR02	M		N					AG				Pb				5d	L
Cache River	8020302	-017	4B	15.8		E		N					AG				Pb				5d	L
Cache River	8020302	-016	4B	21.8	WHI0032	M		N					AG				Pb				5d	L
Bayou DeView	8020302	-009	4B			M		N					MP	MP	MP	MP	Al	Cu	Pb	Zn	5d	L
Bayou DeView	8020302	-007	4B	18.2		E		N					AG				Pb				5d	L
Bayou DeView	8020302	-006	4B	10.2		E		N					AG				Pb				5d	L
Bayou DeView	8020302	-005	4B	8.6		E		N					AG				Pb				5d	L
Bayou DeView	8020302	-004	4B	21.2	UWBDV02	M		N					AG				Pb				5d	L
Lost Creek Ditch	8020302	-009U	4B	7.9	WHI0172	M		N			N		IP	IP	IP	UN	Cu	Pb	Zn	Be	5d	M
Departee Creek	11010013	-020	4C	46.1	UWDTC01	M		N					AG				Zn				5d	L
Glaise Creek	11010013	-021	4C	30.1	UWGSC01	M		N					AG				Zn				5d	L
Cypress Bayou	8020301	-010	4D	5.0	UWCPB01	M		N					AG				Pb				5d	L
Bull Bayou	8020301	-009	4D	29.0	UWBLB01	M		N					AG				Zn				5d	L
Bayou Des Arc	8020301	-007	4D	36.4	UWBDA01	M		N					AG				Zn				5d	L
Bayou Des Arc	8020301	-006	4D	17.8	WHI0056	M		N					AG				Zn				5d	L
M. Fk. Little Red	11010014	-028	4E	12.0		E		N	N				UN	UN			PA	DO			5d	H
M. Fk. Little Red	11010014	-027	4E	8.8	WHI0043	M		N	N				UN	UN			PA	DO			5d	H
Overflow Creek	11010014	-006	4E	21.7	UWOFC01	M		N					AG				Zn				5d	L
Overflow Creek	11010014	-004	4E	0.6		E		N					AG				Zn				5d	L
Greenbrier Creek	11010014	-017	4F	10.6	WHI0167	M		N					UN				DO				5d	L
Fourche River	11010009	-008	4G	25.0	WHI0170	M		N					SE				SI				5d	L
Strawberry R.	11010012	-006	4G	19.0	WHI0024	M		N					AG				DO				5d	M
Spring River	11010010	-003	4H			M		N					SE				SI				5d	M
Warm Fork Spring	11010010	-008t	4H	3.1	WHI0006A	M		N				N	UN	UN			DO	TDS			5d	M
Bear Creek	11010003	-045	4I	25.9	WHI0174	M					N		UN				Be				5d	L
Bear Creek	11010005	-026	4J	23.9	UWBRK01+	M						N	MP				TDS				5d	L
Kings River	11010001	-037	4K	19.1	WHI0009A	M						N	UN				TDS				5d	L
Kings River	11010001	-042	4K	39.5	WHI0123	M					N	N	UN	UN			Be	TDS			5d	L
Dry Fork Creek	11010001	-043	4K	16.5	WHI0127	M					N		UN				Be				5d	L
Osage Creek	11010001	-047	4K	13.4	WHI0130	M					N		UN				Be				5d	L
Yocum Creek	11010001	-052	4K	16.2	WHI0137	M					N		UN				Be				5d	L
White River	11010001	-027L	4K	23.8	WHI0106	M		N			N		UN	UN			DO	Be			5d	H
M. F. White River	11010001	-026L	4K	8.1	WHI0103	M		N					UN				DO				5d	M
War Eagle Creek	11010001	-034	4K	22.2	WHI0116	M					N		UN				Be				5d	M
St. Francis River	8020203	-014	5A			M		N			N		UN	UN	UN		Cu	CL	Be		5d	L
St. Francis River	8020203	-009	5A	17.1		E		N					AG				CL				5d	L
St. Francis River	8020203	-008	5A	55.9	FRA0013	M		N					AG				CL				5d	L
L' Anguille River	8020205	-005	5B			M		N					AG				Pb				5d	L
L' Anguille River	8020205	-004	5B			M		N					AG				Pb				5d	L
Prairie Creek	8020205	-901	5B	12.8	FRA0035	M						N	AG	AG	AG		CL	SO4	TDS		5d	L

Table IV-8: Water Quality Limited Waterbodies (Category 5e) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS TYPE	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	Category	Priority
Dorcheat Bayou	11140203	-026L	1A	11.7	UWBDT02	M		N					UN	UN			pH	DO			5e	L
Dorcheat Bayou	11140203	-022	1A			M		N					UN				pH				5e	L
Dorcheat Bayou	11140203	-020	1A			E		N					UN				pH				5e	L
Dorcheat Bayou	11140203	-024	1A	7.0		E		N					UN				pH				5e	L
Bodcau Creek	11140205	-006	1A			M		N					UN				pH				5e	L
Bodcau Creek	11140205	-002	1A			E		N					UN				pH				5e	L
Red River	11140106	-025	1B	8.0		E						N	UN				CL				5e	L
Red River	11140106	-005	1B	25.3	RED0025	M						N	UN				CL				5e	L
Red River	11140106	-003	1B	9.8		E						N	UN				CL				5e	L
Red River	11140106	-001	1B	34.8		E						N	UN				CL				5e	L
McKinney Bayou	11140201	-014	1B	21.6	RED0055	M						N	UN	UN			TDS	SO4			5e	L
McKinney Bayou	11140201	-012	1B	23.1	RED0054	M						N	UN	UN			TDS	SO4			5e	L
Red River	11140201	-011	1B	15.2	RED0046	M						N	UN				TDS				5e	L
Red River	11140201	-007	1B	40.1	RED0045	M						N	UN				TDS				5e	L
Red River	11140201	-005	1B	12.0		E						N	UN				TDS				5e	L
Red River	11140201	-004	1B	4.0		E						N	UN				TDS				5e	L
Red River	11140201	-003	1B	15.5	RED0009	M						N	UN				TDS				5e	L
Sulphur River	11140302	-008	1B			E		N					UN				Temp				5e	L
Sulphur River	11140302	-006	1B			M		N					UN				Temp				5e	L
Sulphur River	11140302	-004	1B			E		N					UN				Temp				5e	L
Sulphur River	11140302	-002	1B	8.5		E		N					UN				Temp				5e	L
Sulphur River	11140302	-001	1B	6.3		E		N					UN				Temp				5e	L
Mountain Fork	11140108	-014	1D	11.0	RED0001	M		N					UN				Temp				5e	L
Chemin-A-Haut Cr	8040205	-907	2B	30.5	OUA0012	M		N					UN				DO				5e	L
Main Street Ditch	8040205	-909	2B			M		N					UN				DO				5e	L
Melton's Creek	8040205	-903	2B			M		N					UN				DO				5e	L
Bayou Imbeau	8040205	-910	2B			M		N					UN				DO				5e	L
Wolf Creek	8040205		2B			M		N					UN				DO				5e	L
Bearhouse Creek	8040205	-901	2B			M		N					UN				DO				5e	L
Cut-Off Creek	8040205	-007	2B			M		N					UN				DO				5e	L
B. Bartholomew	8040205	-006	2B			M		N					UN				DO				5e	L
Jack's Bayou	8040205	-904	2B	6.0	OUA0150	M		N					UN				DO				5e	L
B. Bartholomew	8040205	-002	2B			M		N					UN				DO				5e	L
B. Bartholomew	8040205	012U	2B			M		N					UN				DO				5e	L
Wabbaseka Bayou	8020401	-003	3A	101.7	UWWSB01	M		N					UN				DO				5e	L
Bayou Two Prairie	8020402	-006	3B	44.7	ARK0097	M		N					UN				DO				5e	L
Bayou Meto	8020402	-003	3B	39.8	ARK0023	M		N					UN				DO				5e	L
Bayou Meto	8020402	-001	3B	4.3		E		N					UN				DO				5e	L
Bayou Meto	8020402	-007A	3B	12.3	ARK0060	M		N					UN				DO				5e	L
S. Fourche LaFave	11110206	-014	3E	26.1	ARK0052	M		N					UN				DO				5e	L
S. Fourche LaFave	11110206	-013	3E	10.3		E		N					UN				DO				5e	L
Fourche LaFave R.	11110206	-007	3E	20.2	ARK0037	M		N					UN				DO				5e	L
Arkansas River	11110203	-031L	3F	9.4	ARK0032	M						N	UN				TDS				5e	L
Arkansas River	11110203	-030	3F	5.1		E						N	UN				TDS				5e	L
Arkansas River	11110203	-028	3F	1.2		E						N	UN				TDS				5e	L
Arkansas River	11110203	-027	3F	9.9		E						N	UN				TDS				5e	L
Arkansas River	11110203	-026	3F	2.6	ARK0031	M						N	UN				TDS				5e	L
Dutch Creek	11110204	-015	3G	28.9	ARK0057	M		N					UN				DO				5e	L
Chickalah Creek	11110204	-002	3G	19.3	ARK0058	M		N					UN				DO				5e	L
Arkansas River	11110201	-001	3H	12.4	ARK0033	M						N	UN				TDS				5e	L
Mulberry River	11110201	-009	3H	9.1	ARK0138	M		N					UN				pH				5e	L

Table IV-8 (cont.): Water Quality Limited Waterbodies (Category 5e) – 303(d) List

STREAM NAME	HUC	RCH	PLNG	MILES	MONITORING	ASSESS	FISH	AQUATIC	PRIMARY	SECONDARY	DRINKING	AGRI &	SOURCE				CAUSE					
			SEG		STATIONS	TYPE	COMSUMP	LIFE	CONTACT	CONTACT	WATER	INDUSTRY	1	2	3	4	1	2	3	4	Category	Priority
Boat Gunwale Slash	8020304	-914	4A	5.0	WHI0074	M		N					UN				DO				5e	L
Prairie Cypress	8020304	-014	4A	26.1	WHI0073	M		N					UN				DO				5e	L
Village Creek	11010013	-008	4C	13.0		E		N					UN				DO				5e	L
Village Creek	11010013	-007	4C	1.2		E		N					UN				DO				5e	L
Village Creek	11010013	-006	4C	25.2	UWVGC01+	M		N					UN				DO				5e	L
Wattensaw Bayou	8020301	-015	4D	48.2	WHI0072	M		N					UN				DO				5e	L
White River	11010004	-014	4F	4.7	WHI0046	M		N					UN				Temp				5e	L
Spring River	11010010	-007	4H	4.0		E		N					UN				Temp				5e	L
Spring River	11010010	-006	4H	5.3	WHI0022	M		N					UN				Temp				5e	L
Crooked Creek	11010003	-048	4I			M						N	UN				TDS				5e	L
Crooked Creek	11010003	-049	4I	36.2	WHI0067	M						N	UN	UN	UN		TDS	CL	Be		5e	L
Buffalo River	11010005	-001	4J	11.3	BUFR09	M		N					UN				Temp				5e	L
Richland Creek	11010005	-024	4J	28.7	BUFT09	M		N					UN				Temp				5e	L
White River	11010001	-023	4K	6.2	WHI0052	M						N	UN	UN	UN		TDS	CL	SO4		5e	M
West Fork	11010001	-024	4K			M						N	UN	UN			SO4	TDS			5e	M
Ten Mile Bayou	8020203	-006t	5A	17.3	FRA0029	M		N					AG				DO				5e	L
L' Anguille River	8020205	-005	5B			M		N					UN				DO				5e	L
L' Anguille River	8020205	-004	5B			M		N					UN				DO				5e	L
L' Anguille River	8020205	-003	5B			E		N					UN				DO				5e	L
L' Anguille River	8020205	-002	5B			E		N					UN				DO				5e	L
L' Anguille River	8020205	-001	5B			M		N					UN				DO				5e	L

PART V GROUND WATER ASSESSMENT

Introduction

Section 106(e) of the Clean Water Act specifies that each state monitor the quality of its ground water resources and report the results to Congress on a biennial basis in its state 305(b) report. The 1996 guidance for preparation of the 305(b) report contained many changes from the original broad-based approach, which is evidenced by the changes in the 1996 report for Arkansas. These changes included two tables; 1) a summary of state ground water protection programs, and 2) a listing of the major sources of contamination in the State. The table format was designed by the USEPA primarily for uniformity in reporting by the states.

Current guidance documents have varied little from the changes documented in the 1996 guidance. The USEPA continues to encourage states to: 1) work toward assessing all ground waters of the state from the various aquifers, 2) use prescribed table formats for consistency among all states of the nation, and 3) describe major changes in ground water protection programs including legislative amendments and policy directives. The USEPA also strongly re-emphasized the goal of reporting ground water quality for specific aquifers or hydrologic setting by the year 2006. ADEQ is currently on goal for collecting data from all fresh-water aquifer by the end of 2006, though reporting by aquifers will not take place until 2008.

Because summarizing the assessment of the entire state's ground water resources on a biennial basis is such a monumental and burdensome task, the USEPA has recommended reporting only on changes since the last hard-copy report. As such, the following is a summary of changes since the last publication of the 2004 Arkansas Water Quality Inventory Report, and mainly includes tasks and data for FY04 and FY05 (October 2003 through September 2005). However, because of the three-year rotational period for the monitoring areas, and for completeness of major program changes in other areas in the last five years, the present report may include some older information.

Overview

Shallow fresh-water aquifer systems are found throughout Arkansas, and supply an abundance of high-quality ground water for a wide range of uses including industrial, municipal, agricultural, and domestic users. Ground water is one of the most important sources of water supply in Arkansas and accounts for approximately 60 percent of the total water use in the State. Most all of the surficial aquifers supply water of good to very good quality, ranging from calcium-bicarbonate to sodium-bicarbonate water types. Areas of poor water quality can result from both natural and anthropogenic sources. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts include both point and nonpoint sources of contamination. Nonpoint sources can result in large areas of impact, although contaminant concentrations typically are significantly lower than point sources, and the contaminants typically represent soluble, non-reactive species. Point sources of contamination often result in elevated levels of contaminants which exceed federal maximum contaminant levels (MCL); however, the extent of contamination normally is confined to a small area with little to no offsite migration or impact to receptors.

Water-quality concerns resulting from natural water-rock interaction range from simple hardness issues related to high concentrations of dissolved calcium and magnesium to high concentrations of iron related to the dissolution of iron-oxide coatings from the aquifer sediments. Isolated areas of concern from natural sources include a large area of saltwater intrusion in Chicot County (southeast Arkansas), in which chloride concentrations range upwards to 1600 mg/L. Isolated areas of elevated chloride (100-300 mg/L) additionally are found in several locations throughout the alluvial aquifer in eastern Arkansas, although the sources are poorly understood at the present time. Elevated radon and fluoride values occur sporadically in some of the Paleozoic aquifer systems in north Arkansas. Elevated arsenic concentrations are found in the alluvial aquifer and range upwards to 70 ug/L. The arsenic concentrations exceed the MCL of 10 ug/L and appear to result from the reductive dissolution of iron oxides, which contain co-precipitated trace metals including arsenic. Elevated iron concentrations are ubiquitous throughout the alluvial aquifer in eastern Arkansas, and reach concentrations as high as 70 mg/L. Elevated iron concentrations do not present a health hazard, but do present problems related to both aesthetic concerns (staining, taste, etc.) and in industrial applications, where high-quality water is required for equipment and other uses.

Nonpoint sources of contamination range from elevated nutrients and bacteria in shallow aquifers in northern Arkansas, associated with increased animal production and septic systems, to low-level pesticide detections in eastern Arkansas, associated with row-crop agricultural practices. Pesticides are detected in approximately 30 percent of the total wells sampled by ADEQ in the shallow alluvial aquifer in eastern Arkansas; however, most concentrations range from 2-5 orders of magnitude below MCLs for the various pesticides detected up through 2005. Point sources of contamination include landfills, underground storage tanks, leaking waste- and process-water holding lagoons, industrial facilities, military installations and petroleum operations. Although these potential sources of contamination range upwards to greater than ten thousand for hazardous waste generators and underground storage tanks, recorded instances of offsite migration of contaminants are probably less than one hundred. However, costs associated with alternate water supply for impacted users can exceed one million dollars, and total contamination remediation costs can exceed several million dollars at a single site. The cost of contamination-prevention measures are far below the costs of remediation and the current focus of both federal and state regulators is in the area of contamination prevention and wellhead protection. A critical problem exists not only in protection of ground water quality, but additionally in the protection of diminishing ground water supplies in areas where agricultural, municipal and industrial needs have placed a large stress on the production capabilities of certain aquifer systems.

Ground water in Arkansas occurs in two general geologic settings, which are represented by five major physiographic regions of the state: the Ozarks, the Arkansas River Valley, the Ouachita Mountains, the Gulf Coastal Plain, and the Mississippi Alluvial Valley. The aquifer systems in eastern Arkansas (Gulf Coastal Plain and the Mississippi Alluvial Valley) dominantly are represented by alternating sequences of gravel, sand, silt, and clay, which form both confining layers and aquifers. The main aquifer systems are located in the Quaternary deposits (the alluvial aquifer), the Cockfield Formation, the Sparta Formation, the Wilcox Group, the Nacatoch Sand, and the Tokio Formation (Table V-1). The Mississippi River Valley alluvial aquifer and the Sparta aquifer are the most important aquifers in eastern Arkansas, together

Table V-1: Generalized Stratiographic Column of the Gulf Coastal Plain of Southern and Eastern Arkansas (modified from Haley and Others, 1993).

ERA	SYSTEM	SERIES	GROUP	FORMATION
Cenozoic	Quaternary	Holocene & Pleistocene		Alluvium & Terrace Deposits *
	Tertiary	Eocene	Jackson	Undifferentiated
			Claiborne	Cockfield Formation *
				Cook Mountain Formation
				Sparta and Memphis Sand *
				Cane River Formation
				Carrizo Sand
		Eocene / Paleocene	Wilcox	Undifferentiated *
		Paleocene	Midway	Undifferentiated
Mesozoic	Cretaceous	Upper Cretaceous		Arkadelphia Marl
				Nacatoch Sand *
				Tokio Formation *
				Undifferentiated
Paleozoic	Undifferentiated	Undifferentiated		Undifferentiated

(* denotes major aquifers)

supplying more than 95 percent of the ground water used in this region of the State. The thickness of the alluvial aquifer ranges from approximately 50 and 150 feet, produces an average of 1600 gpm to irrigation wells, and is used mainly for purposes of irrigation. The Sparta is used mainly for municipal supply and industrial use, although declining levels in the alluvial aquifer in some areas have resulted in more frequent use of the Sparta aquifer for irrigation uses.

Three aquifers, which are part of the Ozark Plateaus Aquifer System, are located within northern Arkansas (Table V-2). The Springfield Plateau aquifer is generally under unconfined conditions, with ground water movement occurring through fractures and solution cavities formed by dissolution of carbonate rock. Local discharge is through springs and streams. The Ozark aquifer is generally under confined conditions, especially where overlain by the units of the Springfield Plateau aquifer. Most wells in the Springfield Plateau and upper units in the Ozark aquifer yield 5-10 gpm on the average, with yields greater than 25 gpm in rare cases. The Roubidoux Formation and the Gunter Sandstone Member of the Van Buren Formation in northern Arkansas constitute the only significant aquifer system in the Ozarks, and are used extensively for municipal supply systems, where surface water sources are unavailable. Together these units may yield up to 500 gpm to wells.

Table V-2: Generalized Stratigraphic Units in Northern Arkansas with Corresponding Geohydrologic Units (modified from Imes and Emmett, 1994).

ERA	SYSTEM	FORMATION	GEOHYDROLOGIC UNIT	GEOHYDROLOGIC SYSTEM
Paleozoic	Pennsylvanian	Atoka Formation		Western Interior Plains Confining System
		Bloyd Formation		
		Hale Formation		
	Mississippian	Pitkin Limestone		
		Fayetteville Shale		
		Batesville Sandstone		
		Moorefield Formation		
		Boone Formation	Springfield Plateau Aquifer	Ozark Plateaus Aquifer System
		St. Joe Limestone Member		
	Mississippian / Devonian	Chattanooga Shale	Ozark Confining Unit	
	Devonian	Clifty Limestone	Ozark Aquifer	
		Penters Chert		
	Silurian	Lafferty Limestone		
		St.Clair Limestone		
		Brassfield Limestone		
	Ordovician	Cason Shale		
		Fernvale Limestone		
		Kimmswick Limestone		
		Plattin Limestone		
		Joachim Dolomite		
		St. Peter Sandstone		
		Everton Formation		
		Smithville Formation		
		Powell Dolomite		
		Cotter Dolomite		
		Jefferson City Dolomite		
		Roubidoux Formation		
		Gasconade Dolomite		
		Van Buren Formation		
		Gunter Sandstone Member		
	Cambrian	Eminence Dolomite		
		Potosi Dolomite		
		Doe Run Dolomite	St. Francois Confining Unit	
		Derby Dolomite		
		Davis Formation		
		Bonneterre Dolomite	St. Francois Aquifer	
		Regan Sandstone		
		Lamotte Sandstone		

The Western Interior Highlands (Arkansas River Valley, Ouachita Mountains) are underlain by thick sequences of consolidated rocks of predominantly Paleozoic age consisting mostly of sandstones, shale, and novaculite (Table V-3). Ground water in these consolidated rocks occurs primarily in fractures and joints in the sandstones and shales. These rocks are important both as domestic and municipal supplies. Wells throughout western Arkansas average about 150 feet in depth and normally produce less than 10 gpm.

In regard to water-quantity issues in Arkansas, the greatest area of concern is the extensive use of the alluvial aquifer (primarily for irrigation purposes) and the Sparta aquifer (primarily for municipal and industrial supply) in eastern Arkansas. While the alluvial aquifer and the Sparta aquifer have historically provided abundant water, neither will be able to sustain current rates of pumping indefinitely. Water levels in both aquifers have declined substantially across broad, regional-scale areas, and large cones of depression have developed. A cone of depression is a depression in a water table caused by a pumping well. As pumping continues over time, a cone of depression grows and many individual cones of depression can coalesce into larger cones, eventually forming a single huge cone of regional scale. If pumping from the alluvial and Sparta aquifers continues to exceed sustainable rates, water levels will continue to decline and eventually reach a level that water cannot be pumped at the rates needed to support all users.

Even though the amount of water withdrawn annually from the Sparta aquifer is much less than what is withdrawn from the alluvial aquifer, the extensive water-level declines observed in the Sparta aquifer and the development of cones of depression indicate that water is being withdrawn from the Sparta aquifer at rates that are much greater than the rate at which water is being recharged to the aquifer. The Sparta aquifer will not indefinitely sustain the current rates of withdrawals, and certainly will not be able to sustain the continued growth in withdrawal rates observed in many areas. This growth in observed withdrawal rates will result in accelerated water-level declines. The impact of increased pumping will be particularly pronounced in areas where high-volume, agricultural alluvial aquifer users are beginning to tap the Sparta as a supplemental source of water.

Shallow fresh-water aquifer systems are found throughout Arkansas, and supply an abundance of high-quality ground water for a wide range of uses including industrial, municipal, agricultural and domestic users. Ground water is one of the most important sources of water supply in Arkansas and accounts for approximately 60 percent of the total water use in the State. Most all of the surficial aquifers supply water of good to very good quality, ranging from calcium-bicarbonate to sodium-bicarbonate water types. Areas of poor water quality can result from both natural and anthropogenic sources. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts include both point and nonpoint sources of contamination. Nonpoint sources can result in large areas of impact, although contaminant concentrations typically are significantly lower than point sources, and the contaminants typically represent soluble, non-reactive species. Point sources of contamination often result in elevated levels of contaminants which exceed federal maximum contaminant levels; however, the extent of contamination normally is confined to a small area with little to no offsite migration or impact to receptors.

Table V-3: Generalized Stratigraphic Column of the Arkansas River Valley and Ouachita Mountain Region. (modified from Haley and Others, 1993)

<table>
<tr><th>ERA</th><th>SYSTEM</th><th>FORMATION</th></tr>
<tr><td>Cenozoic</td><td>Quaternary</td><td>Alluvium & Terrace Deposits</td></tr>
<tr><td rowspan="6">Paleozoic</td><td>Pennsylvanian</td><td>Boggy Formation
Savanna Formation
McAlester Formation
Hartshorne Sandstone
Atoka Formation
Johns Valley Shale
Jackfork Sandstone</td></tr>
<tr><td rowspan="2">Mississippian</td><td>Stanley Shale</td></tr>
<tr><td rowspan="2">Arkansas Novaculite</td></tr>
<tr><td>Devonian</td></tr>
<tr><td>Silurian</td><td>Missouri Mountain Shale
Blaylock Sandstone</td></tr>
<tr><td>Ordovician</td><td>Polk Creek Shale
Big Fork Chert
Womble Shale
Blakely Sandstone
Mazarn Shale
Crystal Mountain Sandstone
Collier Shale</td></tr>
</table>

Water-quality concerns resulting from natural water-rock interaction range from simple hardness issues related to high concentrations of dissolved calcium and magnesium to high concentrations of iron related to the dissolution of iron-oxide coatings from the aquifer sediments. Isolated areas of concern from natural sources include a large area of saltwater intrusion in Chicot County (southeast Arkansas), in which chloride concentrations range upwards to 1600 mg/L. Isolated areas of elevated chloride (100-300 mg/L) additionally are found in several locations throughout the alluvial aquifer in eastern Arkansas, although the sources are poorly understood at the present time. Elevated radon and fluoride values occur sporadically in some of the Paleozoic aquifer systems in north Arkansas. The MCL for arsenic was recently lowered from 50 ug/L to 10 ug/L. Although no municipal systems are currently in violation of the new standard, several domestic users of ground water from the alluvial aquifer in eastern Arkansas may be impacted according to recent studies by ADEQ. Arsenic concentrations in the alluvial aquifer range upwards to 50 ug/L and appear to result from the reductive dissolution of iron oxides, which contain co-precipitated trace metals including arsenic. Elevated iron concentrations are ubiquitous throughout the alluvial aquifer in eastern Arkansas, and reach concentrations as high as 70 mg/L. Elevated iron concentrations do not present a health hazard, but do present problems related to both aesthetic concerns (staining, taste, etc.) and in industrial applications, where high-quality water is required for equipment and other uses.

Nonpoint sources of contamination range from elevated nutrients and bacteria in shallow aquifers in northern Arkansas associated with increased animal production and septic systems, to low-level pesticide detections in eastern Arkansas associated with row-crop agricultural practices. Detection percentages for pesticides range upwards to 30 percent of the total wells sampled for pesticides in the shallow alluvial aquifer in eastern Arkansas; however, most concentrations range from 2-5 orders of magnitude below MCLs for the various pesticides detected up through 2003. Point sources of contamination include landfills, underground storage tanks, leaking waste- and process-water holding lagoons, industrial facilities, military installations, and petroleum operations. Although these potential sources of contamination range upwards to greater than ten thousand for hazardous waste generators and underground storage tanks, recorded instances of offsite migration of contaminants are probably less than one hundred. However, costs associated with alternate water supply for impacted users can exceed one million dollars, and total contamination remediation costs can exceed several million dollars at a single site. The cost of contamination-prevention measures are far below the costs of remediation, and the current focus of both federal and state regulators is in the area of contamination prevention and wellhead protection. A critical problem exists not only in protection of ground water quality, but additionally in the protection of diminishing ground water supplies in areas where agricultural, municipal and industrial needs have placed a large stress on the production capabilities of certain aquifer systems.

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The Interior Highlands (the Ozarks, the Arkansas River Valley, and the Ouachita Mountains) are underlain by thick sequences of consolidated rocks of predominantly Paleozoic age consisting mostly of limestones, dolomites, sandstones, and shale. Ground water in these consolidated rocks occur primarily in fractures and joints in the sandstones and shales, in addition to fractures and solution openings in the limestones and dolomites. These rocks are important both as domestic and municipal supplies. Wells throughout western Arkansas average about 150 feet in depth and normally produce less than 10 gpm. Yields greater than 25 gpm are rare in this area. The Roubidoux Formation and the Gunter Sandstone Member of the Van Buren Formation constitute the only significant aquifer system in the Ozarks, and are used extensively for municipal supply systems, where surface water sources are unavailable. Together these units may yield up to 500 gpm to wells.

In regard to water-quantity issues in Arkansas, the greatest area of concern is the extensive use of the alluvial aquifer (primarily for irrigation purposes) and the Sparta aquifer (primarily for municipal and industrial supply) in eastern Arkansas. While the alluvial aquifer and the Sparta aquifer have historically provided abundant water, neither will be able to sustain current rates of pumpage indefinitely. Water levels in both aquifers have declined substantially across broad, regional-scale areas, and large cones of depression have developed. A cone of depression is a depression in a water table caused by a pumping well. As pumping continues over time, a cone of depression grows and many individual cones of depression can coalesce into larger cones, eventually forming a single huge cone of regional scale. If pumpage from the alluvial and Sparta aquifers continues to exceed sustainable rates, water levels will continue to decline and eventually reach a level at which water cannot be pumped at the rates needed to support all users.

Even though the amount of water withdrawn annually from the Sparta aquifer is much less than what is withdrawn from the alluvial aquifer, the extensive water-level declines observed in the Sparta aquifer and the development of cones of depression indicate that water is being withdrawn from the Sparta aquifer at rates that are much greater than the rate at which water is being recharged to the aquifer. The Sparta aquifer will not indefinitely sustain the current rates of withdrawals, and certainly will not be able to sustain the continued growth in withdrawal rates observed in many areas. This growth in observed withdrawal rates will result in accelerated water-level declines. The impact of increased pumping will be particularly pronounced in areas where high-volume, agricultural alluvial aquifer users are beginning to tap the Sparta as a supplemental source of water.

CHAPTER ONE GROUND WATER PROTECTION PROGRAMS

There are two main components of ground water protection: 1) ensuring the available quantity necessary for the various uses, and 2) protecting existing ground water quality. Because of the large scope of both activities, the protection mechanisms commonly are addressed by multi-agency, multi-discipline approaches. Ground water restoration unfortunately continues to demand a large portion of available resources in the form of remediation efforts, where protection mechanisms have failed or where not in place historically. Most of the remedial activities are the responsibility of divisions of ADEQ. ADEQ has been authorized by the USEPA to administer federal programs consistent with the Safe Drinking Water Act (SDWA), Resource Conservation Recovery Act (RCRA), and the Clean Water Act (CWA), among others.

The multi-agency approach to ground water protection has been manifested especially in the last 10 to 15 years, which has seen an increase in joint ventures by both federal and state agencies in the monitoring and protection of Arkansas's ground water resources. Current ground water protection activities frequently involve joint efforts by two or more agencies, including state and federal agencies and universities.

Ground water Availability and Use

Each year, over 6,600 million gallons per day (mgd) of ground water is pumped from the State's aquifers. The greatest volume (6318 mgd) is pumped from the Mississippi River Valley alluvial aquifer (alluvial aquifer), primarily for irrigation purposes; the next greatest is from the Sparta-Memphis Sand aquifer system (approximately 244 mgd), which is used for municipal, irrigation, and industrial purposes. Ground water use in Arkansas has increased by 74 percent since 1985, including a 400 percent increase in use from the alluvial aquifer in Arkansas County alone.

Increased demand on ground water resulted in water-level declines and water quality degradation in many areas of the State. This resulted in the passage of Act 154 of 1991, which identifies critical ground water areas in the State and regulate the usage. Classification of critical ground water areas is based on certain criteria, including water levels below the top of a given formation (confined aquifer), saturated thickness of the formation less than 50 percent of the total formation thickness (unconfined aquifer), water-level declines of more than one foot per year over a five year period, and trends indicating degradation of water quality (ANRC, 1998). Recent policy changes place an increased emphasis on the achievement of sustainable yield of all the State's aquifers. Determination of sustainable yield is determined by the ANRC and has been a long-term project in cooperation with the Arkansas District of the US Geological Survey (USGS).

In 1995, the Sparta aquifer was designated as a critical ground water area by the Arkansas Natural Resources Commission (ANRC) in south Arkansas in a five-county area (Ouachita, Calhoun, Bradley, Columbia, and Union). In 1998, the ANRC designated an area encompassing Jefferson, Arkansas, Prairie, Lonoke and parts of Pulaski and White counties as a critical ground water area for the alluvial and Sparta aquifers. Priority study areas for present and future analyses include the alluvial and Sparta aquifers in parts of northeastern and southeastern

Arkansas, including the Cache and St. Francis study areas in northeast Arkansas and the Boeuf-Tensas study area in southeast Arkansas.

Information used to evaluate water-level trends from the various aquifers are based on a water-level monitoring measurement network maintained under cooperative agreements between the ANRC, USGS, the Arkansas Geological Commission, and the Natural Resources Conservation Service (NRCS). Through these cooperative agreements, over 1500 measurements are collected annually. Trends in water-level changes are monitored by the ANRC for use in evaluating potential critical-use areas within the State.

Water use registration for all wells capable of producing 50,000 gallons per day has been required since 1985, along with an annual water use registration fee. Arkansas Act 1426 was promulgated in 2001 for the purpose of requiring a properly functioning metering device for any well constructed after September 30, 2001, which withdraws ground water from a sustaining aquifer. The act further stipulates that after September 30, 2006, all wells withdrawing ground water from a sustaining aquifer shall have a properly functioning meter. Sustaining aquifers include the Sparta, Memphis, Cockfield, Cane River, Carrizo, Wilcox, Nacatoch, Roubidoux, and the Gunter aquifers. The alluvial aquifer is not considered a sustaining aquifer, and domestic wells are specifically exempt from the metering requirement.

The ANRC has recently undertaken the task of considering formal recommendation of sustainable yield for the Sparta/Memphis aquifer in eastern and southern Arkansas. This process will build on the ground water flow model sustainable yield estimates produced through a cooperative effort with the USGS, Arkansas District.

Ground water Quality Protection and Restoration

There are many ground water protection programs within the State that include both regulatory and voluntary ground water contamination prevention activities. These programs include prevention of contamination from both point sources and nonpoint sources. The point-source prevention programs are almost entirely regulatory programs and are administered by ADEQ (indicated by ADEQ next to the headings which follow), while the majority of nonpoint sources are related to agriculture and other land-use activities and commonly include joint efforts by several agencies.

Act 472 of 1949 designates ADEQ as the lead authority for development and implementation of ground water quality standards. As part of ADEQ's 10-year Strategic Plan, the Department has committed to the development of state-promulgated ground water standards for protection of the State's ground water aquifers. A ground water task force was assembled with members from all the divisions of ADEQ charged with protection of ground water. Water Division staff have currently updated a library of standards within the United States that were first gathered in 1990 and 1991. Together with a review of standards from other states' and discussions with ground water personnel from other states, ADEQ should be able to draft a set of standards that will fully protect Arkansas's ground water resources.

Regulated Storage Tank Division (ADEQ)

The Regulated Storage Tank (RST) Division at ADEQ has program responsibility for implementing the federal underground storage tank (UST) program in Arkansas, and for the clean-up of aboveground storage tank releases from Part 112 ASTs.

During this reporting period the RST Division has experienced significant developments including:

> The Energy Policy Act of 2005 will have a significant impact on RST programs in the coming months and years. In addition to more frequent inspections of regulated tanks, new tank installations will require additional measures to protect ground water, tank manufacturers and installers may be subject to financial responsibility requirements, tank operators will receive training/certification, and substandard tank systems will be prohibited from receiving delivery of regulated substances. Available program funding may be applied more flexibly to include release prevention activities as well as release cleanups.
>
> Claims for cleanup and third-party compensatory damages against the Arkansas Petroleum Storage Tank Trust Fund continue to increase. In October 2005, the Petroleum Environmental Assurance Fee was increased to 3/10 of one cent per gallon motor fuel or special distillate fuel purchased or imported into the state.
>
> The storage tank installed inventory has shown some growth in inventory commensurate with normal economic development. As of March 9, 2006, there were 13,562 regulated tanks located at 5,924 facilities.
>
> The pollution prevention aspects of the federal UST program are demonstrating some level of success. The number of confirmed releases peaked in the third quarter of 2001, and has been slowly declining since that time with a compliance average of 69 percent as of October 2005.

Underground Injection Control Program (ADEQ)

The Underground Injection Control Program (UIC) regulates the disposal of waste waters into appropriate underground reservoirs under the authority of Part C of the federal Safe Deinkinf Water Act (SDWA). Congress passed the SDWA in 1974 requiring USEPA to establish a system of regulations for injection activities. The regulations are designed to establish minimum requirements for controlling all injection activities, to provide mechanisms for implementation and authorization of enforcement authority, and to provide protection of underground sources of drinking water (USDW).

Arkansas was given authority to administer the UIC program as a primacy state in 1982 and is 75 percent funded by a grant from USEPA. This primacy authority (primary enforcement authority) allows ADEQ to regulate Class I, Class III, Class IV, and Class V wells. The Arkansas Oil and Gas Commission (AOGC) regulate the Class II and Class V bromine-related, spent-brine disposal wells. Protecting USDWs is accomplished through the issuance of permits, inspections, annual testing, continuous monitoring, and enforcement of the regulations in 40 CFR Parts 124, 144 and 146.

There are 14 active Class I injection wells permitted in the State. There are five hazardous and nine nonhazardous injection wells. Four of these wells are “shut-in” or temporarily abandoned and not currently injecting. These wells inject into underground, saline-filled formations at depths ranging from 2500’ to 8700’ below ground surface. In December 2003, one hazardous well was plugged and abandoned, and in July 2005, one nonhazardous well was plugged and abandoned. No significant noncompliance or similar violations occurred. A work over to replace tubing and packer was completed on one nonhazardous well in September 2005. All wells passed their annual mechanical integrity testing (MIT) requirements. Permit renewal applications were submitted for eight of the wells.

ADEQ completed program revisions to comply with Federal Rule revisions effective April 5, 2000, that addressed Class V wells. Regulation No. 17 was adopted by the Pollution Control and Ecology Commission in February 2005, and program revision documents were submitted USEPA Region 6 in May 2005, with final revisions submitted in August 2005. The revisions added requirements for two sub-categories of Class V wells, large-capacity cesspools and motor-vehicle waste disposal wells, links the Class V program to the source water assessment program and added new definitions. These well types were already regulated under existing Arkansas state laws and were previously subject to closure.

In June 2004, a landowner contacted ADEQ regarding a salt water release and possible contamination of a shallow water-filled gravel pit on her property. Further investigation through site visits, sampling and additional study have been conducted at the site to determine the cause of the contamination. Because the elevated chlorides and temperatures in the pit, ADEQ is working with the AOGC, since there are Class II disposal wells in the vicinity.

Solid Waste Management Division (ADEQ)

Municipal solid waste landfills, industrial landfills, transfer stations, waste-tire collection facilities, composting facilities and material recycling centers, which are properly designed, managed and adequately financed, all provide Arkansans environmentally safe options for solid waste collection and disposal. The Solid Waste Management Division (SWMD) Recycling Branch continues to work with potential waste stream users to identify and provide beneficial end uses for all types of waste streams (metals, glass, wood, paper, rubber, and plastics). These efforts facilitate reductions in waste stream volumes transported to and disposed in Arkansas’s landfills. As population numbers increase statewide, it will become increasingly difficult for solid waste companies to permit new or expand existing solid waste disposal facilities. Consequently, waste stream reduction via recycling becomes increasingly important in extending the life of existing permitted disposal facilities. The SWMD continues to provide education, funding, and technical assistance to communities, businesses and individuals for waste reduction, recycling, and development of viable markets for recycled materials.

Solid Waste Management Divinsion (SWMD) staff in 2005 successfully completed the implementation of necessary revisions to Regulation 22. There had been no previous revisions or updates since its adoption in April 1995. As a result, many statutory and legislative changes had been made which necessitated changes to Regulation 22. As a result of the current revisions, Regulation 22 is more concise, comprehensive and easier to understand by the regulated community.

The Landfill Post Closure Trust Fund was established by Act 1127 of 1993 and landfill operators have since this date paid $10 million into the Trust Fund. The fund is set up to address environmental threats at closed landfill sites for sites where an environment threat exists and corrective action may be required to remedy the situation.

In 2005, the SWMD implemented site assessment activities at four closed landfill sites in northwest Arkansas (C&L, Parson's, Fulton 1 and 3). Post Closure Trust Fund monies were used by Technical Branch staff to purchase water-quality sampling equipment, to perform site reconnaissance, and to sample surface and ground water at these locations. Initial sampling results were evaluated to determine if contamination was present at levels which could be a threat to human health and the environment. These site studies are ongoing and additional sampling efforts will be undertaken in 2006 to continue the site evaluation process.

In 2004, ADEQ received Suppplemental Environmental Projcets (SEP) monies in response to an enforcement action undertaken by ADEQ against a landfill operator in northwest Arkansas. The monies were allocated for the implementation of a Water Quality Inventory in watershed basins in Washington and Benton Counties. The study is currently ongoing and will eventually provide surface- and ground water quality information, a delineation of area watershed basins, a spring inventory, and other useful water-quality information from the area. The investigation is directed by Dr. Ralph Davis and Dr. Van Brahana of the University of Arkansas at Fayetteville. ADEQ is providing laboratory services for water quality analysis. Once completed, SWMD Technical Branch staff and the researchers will review the findings and interpret the results of the investigation. The information will hopefully allow ADEQ staff and other interested parties to better understand the hydrogeologic framework of the area and better track potential sources of contamination in these watershed basins.

Hazardous Waste Division (ADEQ)

Act 2141 of the 2005 legislative session (Senate Bill 936) establishes a professional certification program for individuals who conduct Phase I environmental site assessments and Phase II or Comprehensive Site assessments, as well as contractors that conduct site investigations, response and remedial actions pursuant to either the Arkansas Hazardous Waste Management Act, the Arkansas Remedial Trust Fund Act, or the Arkansas Voluntary Clean-Up Act. Act 2141 establishes a competency-based program with a set of minimum qualification standards as well as a demonstration of knowledge and experience in the environmental site assessments and in response to remediation of contaminated sites.

ADEQ, with the advice of stakeholders, will be drafting a new Regulation No. 32 to determine how these certifications will be implemented. Until these regulations are finalized, contractors and consultants may file a notice of intent with ADEQ that they anticipate qualifying under the certification program.

Regulation No. 23

Regulation No. 23, Hazardous Waste Management, was last updated to include revisions to monitoring and testing standards, and became effective on March 22, 2006. This revision will allow the use of alternative test methods to those required by SW 846 as long as the alternate test methods meet the required data quality objectives.

Regulation No. 29

Regulation No. 29, Arkansas Brownfields Redevelopment, was last updated to include residential sites as eligible sites for redevelopment under the Brownfields Redevelopment Program. The regulation became effective on March 3, 2006.

Regulation No. 30

Regulation No. 30, The Arkansas Remedial Action Trust Fund Hazardous Substance Site Priority List, was last updated on October 28, 2005. Seven sites were added to the investigation category and one site was added to the remediation category.

Investigation Category

Fashion Park Cleaners, Little Rock
Tankersley/White Dairy, Ft. Smith
Huntco/Jms, Hickman
I Can Inc., Lonoke
General Dynamics Corporation, East Camden
I. Easter Property, Pine Bluff
Hadco, Gillham
Butler Elementary School, Madison

Remediation Category

General Dynamics Corporation, East Camden

ADEQ Ground Water Remediation Level Interim Policy and Technical Guidance

ADEQ has developed an interim policy for the establishment of ground water remediation levels. This policy will apply to divisions responsible for the oversight of ground water remediation within ADEQ. The purpose of this policy is to establish consistent methods for ground water remediation levels regardless of the media division having principal responsibility for the action.

Until final regulations are promulgated by the Arkansas Pollution Control and Ecology Commission that are specific to the establishment of ground water remediation levels, such levels will be established on a case-by-case basis under this interim policy.

Ground water Contamination Prevention Programs

Although the objectives of all ground water protection programs are to protect and preserve ground water quality, early legislation primarily was based on problematic, known sources of contamination and response to contamination events. The problems of technical-feasibility constraints and the large costs associated with cleanup activities mandated a new approach for preventing ground water contamination. New regulatory programs focused on stricter controls aimed at preventing releases from regulated facilities. Throughout the 1990s, there has been an increasing amount of effort and funds expended toward voluntary programs, which strive to protect existing ground water quality through outreach and assistance programs.

Wellhead Protection Program (Arkansas Department of Health)

The Arkansas Wellhead Protection Program (WHPP) is designed to prevent contamination of underground sources of water used by Public Water Suppliers (PWS). The WHPP was authorized in the 1986 Amendments to the federal SDWA and assigned to the Department of Health, now the Division of Health within the Arkansas Department of Health and Human Services (ADHHS). Wellhead Protection is a voluntary program that is developed by PWS and local communities with technical assistance and guidance provided by ADHHS. A WHPP minimizes the potential for contamination by: 1) identifying the probable area that contributes water to municipal water supply wells, and 2) implementing measures within the Wellhead Protection Area (WHPA) that will help avoid costly ground water cleanup or development of alternative water supplies.

The program is administered according to three main program elements: 1) delineating a WHPA for each well or wellhead; 2) identifying all potential man-made sources of contaminants injurious to public health within each WHP area; and 3) developing strategies and means to manage the WHPA so as to protect the ground water resource from contamination. The more successful WHP Programs integrate outreach activities to increase public awareness and coordinate local pollution prevention efforts with existing programs. Assistance in targeting local contacts and citizens groups is provided to public water systems, local officials, and utilities during development and implementation of a WHPP. Emphasis is placed on public participation and control, to establish local solutions to local problems.

An ongoing goal of the program is integration of the WHPP and the Source Water Assessment and Protection program (SWAP), a similar program authorized in the 1996 amendments to the SDWA and completed in 2003. The SWAP entailed assessment of all sources of Public Water Supply (surface water supplies as well as ground water sources) for their vulnerability to contamination. The SWAP was partly modeled after the WHPP and extended its emphasis on contamination prevention to all drinking water sources. The SWAP reports sent to each PWS were intended to serve as the basis for protection planning efforts now being encouraged by USEPA's Source Water Protection staff. In keeping with long-term planning goals and guidance from USEPA, Arkansas has been combining the functions of the WHPP and SWAP programs where appropriate, since the two programs share many of the same objectives and techniques.

One source water protection activity coordinated by the Arkansas source protection program is technical review and comment on permitting actions or land disturbing activities of other agencies and organizations to assess potential adverse effects on drinking water sources. This process, intended mainly to protect surface water sources, results in the review and tracking of approximately 500 permit applications per year, primarily NPDES permits, Oil and Gas drilling permits, and land application permits.

Technical assistance with proper sitting and design of public water supply wells is another important mandate of the WHPP. Wellhead Protection staff geologists review over 50 proposed well designs and analyze drill cuttings for about 20 wells each year and produce detailed construction recommendations and maps for district staff use for each proposal.

Conversion of formation structure maps into electronic GIS layers, although rigorous and time-consuming has been a focus in the past year. These layers have improved and expedited geologic analysis for new source evaluations and other Source Protection efforts, and will be of considerable benefit to other organizations once completed. An informal technology exchange with the local USGS Water Science office has been initiated to speed up the mapping, which will aid a current modeling project by their hydrology section. GIS conversion processes learned previously by the WHPP staff also have been transferred to the Arkansas Geological Commission; following a demonstration by the WHPP staff, the AGC transitioned from paper maps to the use of georeferenced images of the field maps to accelerate and improve the accuracy of their ongoing digitization process.

Compiling and maintaining a database of well information and other data has long been an integral part of the program, which supports various aspects of the Health Division's Public Water Supply Supervision Program. Comprehensive hydrologic information is presently available for over 920 public water supply wells in the state. This data is often used by other agencies and organizations as well.

Water Well Construction Commission

Act 641 of 1969 created the Arkansas Water Well Construction Commission (AWWCC), which provides for the proper development of ground water in an orderly, sanitary, and safe manner. Standards ensure proper well-construction and pump-installation procedures. Administration of the licensing and registration of drillers and pump installers, as well as technical assistance, has been provided by the ANRC since 1995, and includes full-time field inspectors, management, and technical-support personnel. Act 297 of 2003 (SB 241) authorizes the AWWCC to develop an apprenticeship program for drillers and pump installers and adds a continuing education requirement for drillers and pump installers. It ties the AWWCC's ability to seek criminal penalties into the criminal justice system, so that assisting law enforcement officers and judicial personnel can draw upon pre-existing knowledge of Class A misdemeanor, Class B misdemeanor, and Class D felony. It increases the amount of civil penalties the Commission may seek from $500 to $2,500. It requires contractors to obtain a bond of $10,000 rather than $2,000 to protect consumers. This act contained an emergency clause making it effective July 1, 2003. Continuing Education Units have also been recently added to licensing requirements for Arkansas water well contractors.

Several part-time employees assist in water-well construction report data entry into a data base, which includes information on well construction. The data base is designed to access and correlate information such as well-construction details, depth to static water level and water-producing formations, well yield, pump-setting information, and the geologic setting of each well, and has recently been linked to the USGS water use database.

Act 855 of 2003 (SB 702) provides a means of holding persons who violate Arkansas law regarding water well construction accountable for their actions. Persons who continuously violate Arkansas law requiring that they first obtain the proper registration, licensure, training for construction of water wells, and required minimum bond to protect well owners will find their property subject to forfeiture. The act authorizes law enforcement agencies to forfeit property and provides a forfeiture process to be followed by the prosecuting attorney. If no one can show why the property should not be confiscated, the property will be disposed of at public auction to the highest bidder. Sale proceeds and other monies forfeited shall be applied to entities in the order listed. This act became effective March 31, 2003.

CHAPTER TWO GROUND WATER QUALITY MONITORING

Ground water quality monitoring is performed on many levels including ongoing ambient monitoring, short-term, research-oriented monitoring, and mandated monitoring at regulated sites. The availability of the resulting data is thus dependent on the monitoring goals, and ranges from hard-copy format in the form of reports and/or journal articles to publicly-accessible, computer storage formats such as the USEPA's STORET data base. Comparison of data from the various sources is difficult because of the differences in parameter lists, laboratory instrumentation and methods, and reporting criteria.

Ambient Ground water Quality Monitoring

Ongoing ambient monitoring is performed primarily by two organizations: ADEQ and the USGS. Ongoing monitoring also takes places at numerous ADEQ-regulated facilities within the State. However, because the purpose of the monitoring is to evaluate potential and actual anthropogenic impacts, the data may be questionable for use as natural or background quality information, and the parameter list often includes a limited set of constituents. In the absence of other data, monitoring results from these sites, especially from background wells, can be a valuable source of information.

Monitoring of public water-supply wells by the ADHHS also provides another source of data. The ADHHS is the primacy agency for the federal SDWA, which applies to drinking water purveyors. The ADHHS monitors approximately 1200 wells every three years. The Total Coliform Rule requires sampling on a monthly basis, with the number of samples dependent on the size of population. Nitrate monitoring is conducted on a yearly basis unless a sample greater than or equal to 50 percent of the MCL triggers the need for increased frequency. However, the data is limited by the required list of analytes and the fact that disinfection, among other processes performed on finished water, can alter the original chemical composition.

Raw-water sampling is conducted under existing SDWA rules and is required under several forthcoming rules. Raw-water sampling has been implemented in order to detect microbial contaminants for ground water wells that may be directly influenced by surface water (Surface Water Treatment Rule); this sampling includes weekly raw-water bacteriological testing, and may include temperature measurements and microscopic particulate analysis to detect insects or other microorganisms, algae, organic debris, or large-diameter pathogens. Raw-water sampling will be implemented in the near future for wells which are in hydrologically-sensitive aquifers and may be at risk from sources of viral contamination (Proposed Ground Water Rule). This sampling will include, at a minimum, analysis of raw water for *E. coli* on a monthly or quarterly basis. Raw-water sampling will also be implemented in the future for wells that have been determined to be directly influenced by surface water and are at risk of contamination with surface water pathogens (Proposed Long Term 2 Enhanced Surface Water Treatment Rule). This sampling will include bi-weekly or monthly analysis of raw water for *E. coli* and/or cryptosporidium oocysts.

The USGS has 25 master wells scattered throughout the State, and these wells are sampled regularly every five years. The other wells utilized by the USGS are sampled for special investigations and do not provide long-term data for trend analyses. Most of the data derived from water-quality investigations is located in reports, which are easily obtainable at the local or national level. The USGS, in cooperation with the ANRC, additionally monitors 100 wells in the Sparta aquifer and 100 wells in the alluvial aquifer for chloride and conductivity on a 3-year rotational basis; and 50 wells in both the Sparta and alluvial aquifers for conductivity on a 1-year rotational basis. Although limited in the number of constituents, the relatively large number of wells provides a means of documenting general water-quality trends over time, through the plotting and comparison of isopleth maps and the use of statistical programs.

United States Geological Survey

The USGS has 25 master wells scattered throughout the State, and these wells are sampled regularly every five years. The other wells utilized by the USGS are sampled for special investigations and do not provide long-term data for trend analyses. Most of the data derived from water-quality investigations is located in reports, which are easily obtainable at the local or national level. The USGS, in cooperation with the ANRC, additionally monitors 100 wells in the Sparta aquifer and 100 wells in the alluvial aquifer for chloride and conductivity on a 3-year rotational basis, and 50 wells in both the Sparta and alluvial aquifers for conductivity on a 1-year rotational basis. Although limited in the number of constituents, the relatively large number of wells provides a means of documenting general water-quality trends over time, through the plotting and comparison of isopleth maps and the use of statistical programs.

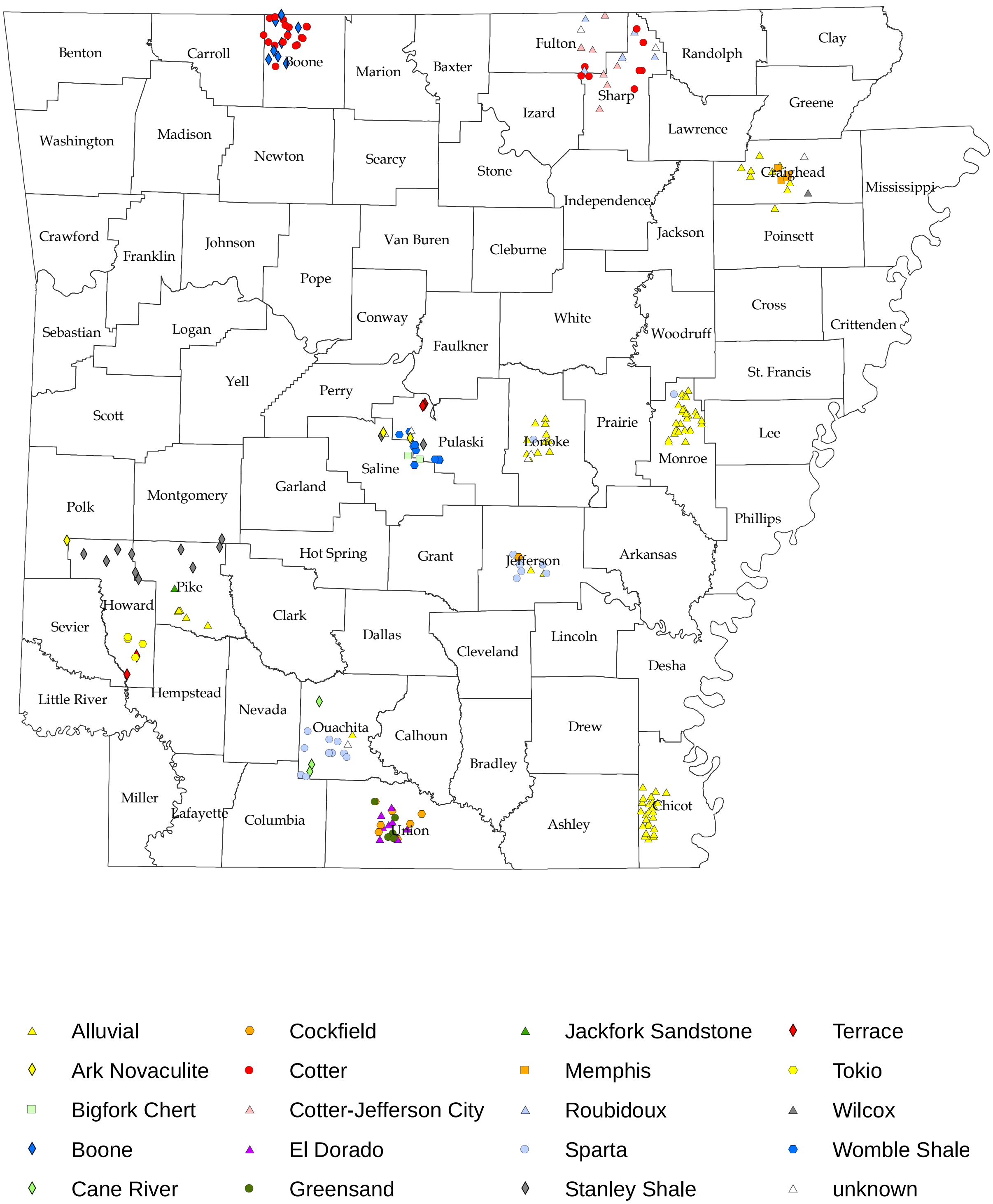
Arkansas Department of Environmental Quality

The Arkansas Ambient Ground water Monitoring Program (Program) was begun in 1986 by ADEQ to monitor overall ground water quality in the State. The program, which was originally called the Arkansas Prototype Monitoring Program, was renamed to better describe the program activities. The program currently consists of ten monitoring areas throughout Arkansas (Figure V-1). The monitoring areas were selected to gather water-quality data from various aquifers in select, representative areas of the State and to evaluate potential impacts from multiple land uses. The monitoring areas historically were sampled on an approximate three-year basis, but more recently have been sampled on a two-year monitoring cycle.

The monitoring areas are affected by agricultural, industrial practices or a combination of both sources. Potential impacts from anthropogenic sources include organic and inorganic compounds. In addition, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - Superfund) facilities, RCRA facilities, MSW landfills, and underground storage tank (UST) sites, potentially threaten or have impacted ground water in the monitoring areas.

Because of the various potential sources of contamination among the different monitoring areas and the costs and time associated with laboratory analysis, each area has a specific parameter list to best evaluate water quality. All of the monitoring areas include field analysis of pH, conductivity, and temperature, laboratory analysis of nutrients, major cations and anions, total dissolved solids (TDS) and trace metals. Ground water samples obtained from areas potentially impacted by industry are analyzed for volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC). Ground water samples obtained from areas potentially impacted by agricultural activities are analyzed for pesticides. The current and proposed monitoring areas are listed below.

Figure V-1: Arkansas's Ground water Monitoring Wells



Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area

The Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area in southwest Arkansas is in a region including Paleozoic rocks of the Ouachita Mountains physiographic province and Cretaceous rocks and Quaternary deposits of the Gulf Coastal Plain physiographic province. The Paleozoic and Cretaceous aquifers associated with these provinces are new additions to the ground water monitoring network. Addition of this monitoring area serves to expand the knowledge of baseline ground water quality of the numerous state aquifers and determine the possible deleterious effects of the agricultural industry of this region. Potential agricultural impacts to ground water in this region include extensive swine, broiler and cattle operations. Currently, the monitoring area includes Howard and Pike counties and was first sampled in FY04. A total of 25 wells and one spring were sampled during the initial sampling event.

Ground water samples from the northern part of the study area along the southern margin of the Ouachita Mountains were obtained from the Devonian- to Pennsylvanian-aged Arkansas Novaculite, Stanley Shale, and Jackfork Sandstone formations. Samples taken in the southern part of the study area within the northern part of the Gulf Coastal Plain were obtained from the Cretaceous-aged Tokio Formation and Quaternary (Pleistocene and Holocene) deposits comprising the alluvial aquifer. The majority of municipalities within the two-county area derive their drinking water from surface sources. However, large numbers of domestic and livestock wells exist that will enable future sampling from additional Cretaceous formations within the study area. Information related to the sampling sites and their locations is listed in Table 19B in Appendix B.

Water quality in the study area is generally good. One of twenty-six samples, from a shallow well in the Stanley Shale, exceeded the MCL for nitrate-nitrogen (10 mg/L) at 14 mg/L, while the concentrations in the remainder of the samples were well below 1.0 mg/L. Chloride concentrations were notably highest in the alluvial aquifer, particularly the Holocene sediments, ranging from 30.9 to 385.0 mg/L in four of the five samples from this interval. Three samples exceeded the secondary maximum contaminant level (SMCL) for iron (0.3 mg/L), ranging from 1.41 to 40.4 mg/L. SMCLs are unenforceable federal guidelines regarding taste, odor, color, and other aesthetic (cosmetic) effects of drinking water. Eight samples exceeded the SMCL for manganese (0.05 mg/L) and ranged from 0.109 to 1.590 mg/L. Seven of eight of these detections were in samples derived from the Stanley Shale. TDS concentrations exceeded the suggested SMCL of 500 mg/L in two of the twenty-six samples. Arsenic was detected in four samples at concentrations ranging from 1.03 to 3.91 ug/L; however, these concentrations are well below the MCL for arsenic of 10 ug/L. Three of the arsenic detections were from the alluvial aquifer. Selected descriptive statistics are listed in Table 20B in Appendix B.

Brinkley Monitoring Area

The Brinkley Monitoring Area encompasses the town of Brinkley and surrounding areas in northern Monroe County. It is located within the Mississippi Embayment physiographic province. The alluvial and Sparta aquifers provide 100 percent of community water needs. The primary uses are for drinking water and crop irrigation. Monitoring in this area was initiated during FY89 because of elevated chloride levels and potential impacts from pesticides to the alluvial aquifer. A total of 28 ground water wells, 27 from the alluvial aquifer and 1 from the Sparta aquifer, were sampled during the most recent sampling event in June 2005.

Chloride levels ranged from 13.5 to 535.0 mg/L, and 7 of the 28 wells exceeded the 250 mg/L SMCL. Iron concentrations exceeded the SMCL of 0.3 mg/L in 26 of 27 alluvial aquifer wells, and manganese concentrations exceeded the SMCL of 0.05 mg/L in all alluvial aquifer samples. TDS concentrations exceeded the SMCL of 500 mg/L for TDS in 21 of the 28 samples. Arsenic was detected in 11 of the 27 alluvial aquifer samples at concentrations ranging from 0.55 to 21.5 ug/L, however, only 1 sample exceeding the MCL for arsenic of 10 ug/L. This well is used for irrigation purposes only and is not used as a source of drinking water. Pesticide analyses were last performed on 12 of the irrigation-well samples in FY98. At that time, bentazon was detected in three of the samples and was the only pesticide detected in the pesticide scan. Information related to the wells and a summary of analyses for all wells are located in Tables 1B and 2B in Appendix B.

Chicot Monitoring Area

The Chicot Monitoring Area is located west and south of the town of Lake Village in Chicot County, and is also in the Mississippi Embayment physiographic province. The alluvial aquifer is the only actively-used water source and is used for crop irrigation, fish farming, and municipal drinking water. In addition to potential impacts from pesticides, a zone of high chloride exists in western Chicot County. Although the high chloride water appears to benefit fish farming, it is detrimental to crops. Ground water monitoring in the Chicot monitoring area began during the third quarter of FY90 and originally consisted of ten wells.

The number of sampled wells was increased during the fourth quarter of FY97 to 26 wells to better evaluate general water quality and the potential for expansion of the zone of elevated chloride concentrations. A summary of the sampling sites and their locations is in Table 3B in Appendix B of this report. Chloride was detected in 21 of 26 wells at concentrations at or above the recommended SMCL of 250 mg/L. Iron was detected in 24 of 26 wells above the recommended SMCL of 0.3 mg/L. Measured TDS was above the recommended SMCL of 500 mg/L in all wells. Manganese was detected in 24 of 26 wells above the recommended SMCL of 0.05 mg/L. Selected descriptive statistics are listed in Table 4B in Appendix B of this report. In addition to the routine analyses, pesticide analysis was conducted on selected samples that were adjacent to active crop-growing areas. Bentazon and p-p'-DDT were detected in two different wells at levels below their HALs. These data are summarized in Table 19B in Appendix B.

An extensive investigation was initiated in the spring of 2000 to evaluate the source and extent of saltwater intrusion in Chicot County, Arkansas. A general background and problem statement detailing past studies and preliminary findings is located in Kresse, et al. (2000). By the start of 2003, 249 wells had been sampled in Chicot County, including 217 wells in the alluvial aquifer, 27 wells in the Cockfield Formation, 4 wells in the Sparta aquifer and 1 well in the Wilcox Formation. Five monitoring wells were drilled and completed in the Cockfield Formation and one monitoring well was completed in the Sparta aquifer during the spring and summer of 2000. Personnel from the USGS provided electrical logs of the borings during the drilling operation. Analyses performed on the alluvial wells included chloride, bromide, fluoride and sulfate in addition to field measurements of pH, temperature, and electrical conductance. All other well samples were analyzed for a complete set of analyses including nutrients, major cations and anions, total dissolved solids, and trace metals.

In early spring of 2002, prior to the irrigation season, water levels were measured in 100 alluvial wells to determine depth to water and ground water flow directions. All data has been compiled, and chloride isoconcentration maps have been produced for both the alluvial and Cockfield aquifer systems, in addition to a potentiometric surface map for the alluvial aquifer. Personnel from the Chicot County Conservation District assisted in surveying elevations of three wells at one site, which included a Cockfield and Sparta monitoring well, in addition to an existing shallow well (alluvial) supplying a fish pond. Water-level measurements demonstrate a downward component of flow from shallow to deep for all three aquifer systems. A report summarizing these findings has yet to be published. Further monitoring of Chicot County is slated for the summer of 2006.

El Dorado Monitoring Area

The El Dorado Monitoring Area includes the town of El Dorado and surrounding areas in central Union County and is located in the Gulf Coastal Plain physiographic province. Three aquifers, the Cockfield, Upper Sparta (Greensand), and Lower Sparta (El Dorado), were sampled in this area. The Cockfield aquifer is used primarily as a domestic drinking-water supply. The Greensand aquifer is used for domestic and industrial purposes. The El Dorado aquifer is used for industrial and municipal purposes. The El Dorado area is highly industrialized; primarily oil, gas, and bromide production. Several national and international corporations have production and refining plants in the area. Potential threats to ground water, particularly the shallow Cockfield aquifer, are numerous. Ground water monitoring in the El Dorado Monitoring Area began in the first quarter of FY87 with the most recent sampling event conducted during the fourth quarter of FY04.

Ground water samples were obtained from eleven wells in the El Dorado aquifer, five wells in the Greensand aquifer and eight wells in the Cockfield aquifer. In addition to the routine parameters, the samples obtained from the Cockfield aquifer were analyzed for VOCs and SVOCs. A summary of the sampling sites and their locations is in Table 5B in Appendix B of this report. Overall ground water quality of all three aquifers is good. Iron was detected in 5 of 24 wells above the recommended SMCL of 0.3 mg/L and manganese was detected in 3 of 24 wells above the recommended SMCL of 0.05 mg/L. Selected descriptive statistics are listed in Table 6B in Appendix B of this report. One sample, UNI094, had a trace detection of chloroform at 0.707 ug/L. The well owner, on the advice of a friend, had placed a large dose of household bleach into the well several months prior to the sampling date, and claimed to perform this disinfection technique twice a year. The resident is presently using municipal water for drinking purposes, and uses the well for watering purposes only.

Hardy Monitoring Area

The Hardy Monitoring Area is located in northeast Arkansas in Sharp and Fulton counties. The area was first sampled in May 1998, and the FY05 sampling event included 2 springsand 24 wells ranging in depth from 120 to 1590 feet. Table 7B in Appendix B contains locations and well depths for all wells. The area was originally chosen because of the lack of water-quality data from the Lower Ordovician-aged rocks along the eastern end of the Ozark Plateaus physiographic province. The wells penetrate and receive water from various formations including the Cotter and Jefferson City Dolomites, the Roubidoux Formation, and the Gunter Sandstone Member of the Gasconade Formation.

The water type is calcium plus magnesium bicarbonate, in which equivalent concentrations of magnesium are approximately equal to equivalent concentrations of calcium in virtually every well-water sample. Sodium was less than 5 mg/L in all but 2 samples. TDS was not run for the FY05 sampling event, however, TDS concentrations from the FY03 sampling event were below 500 mg/L in all wells and springs including 4 wells exceeding 1000 feet in depth, and averaged 296 mg/L. The 4 deep wells had a lower mean nitrate-nitrogen concentration (~ 0.23 mg/L) than the overall mean for all wells (1.03 mg/L). Average TDS, nitrate, and other parameters compared closely with the Ozark aquifer samples from the Omaha Monitoring Area. A summary of the data from the 2005 sampling event is located in Table 8B in Appendix B.

Jonesboro Monitoring Area

The Jonesboro Monitoring Area includes the town of Jonesboro and surrounding areas in central Craighead County and northern Poinsett County and is located in the Mississippi Embayment physiographic province. The alluvial aquifer and the Memphis (northern extension of the Sparta) aquifer are the primary ground water sources in this area. The monitoring area was selected because of the large population using ground water, the exposed condition of the municipal wells, and the extensive drawdown in the alluvial aquifer. This area of depression coincided with drawdown in the underlying Memphis aquifer, indicating minimal or no confining units between the two aquifers. In addition, many potential contaminant sources exist in the area including pesticides, industrial solvents, landfill leachate, and septic systems. This area was originally sampled during the third quarter of FY89 and was last sampled in July, 2003. Information related to the wells sampled for the Jonesboro Monitoring Area is located in Table 9B of Appendix B.

The water ranged from a calcium-bicarbonate to a strongly sodium-bicarbonate water type, with an intermediate mixed-water type containing approximate equal portions of calcium, sodium, and magnesium. Two of the six Memphis aquifer samples were strongly sodium bicarbonate, containing sodium concentrations that comprised over 85 percent of the total cations. These 2 wells were greater than 800 feet in depth. Nine of the fourteen alluvial aquifer water samples had calcium concentrations which comprised over 50 percent of the total cations (calcium-bicarbonate water type), and the rest of the wells were a mixed-water type. This suggests a gradual chemical evolution from a calcium-dominated water type in the shallow alluvial aquifer to sodium-dominated water at depth within the Memphis aquifer. Overall water quality is suitable for most all uses, with TDS concentrations ranging from 71.5 to 703.0 mg/L. The highest nitrate-nitrogen concentration (2.08 mg/L) was in a Memphis aquifer water sample, and 3 of the 4 nitrate-nitrogen concentrations greater than 1.0 mg/L were in alluvial samples. All of the samples extracted from the Memphis aquifer, except for one sample, had nitrate-nitrogen concentrations of less than 1.0 mg/L. A summary of the water analyses is in Table 10B of Appendix B.

Lonoke Monitoring Area

The Lonoke Monitoring Area includes the town of Lonoke and surrounding areas in central Lonoke County and is also located in the Mississippi Embayment physiographic province. Ground water is withdrawn from the alluvial and Sparta aquifers for agricultural, domestic, and municipal use. This monitoring area was selected because it represents a rural, agricultural community that relies entirely on ground water for all of its water needs. Pesticides are the primary potential contaminants in the area. Ground water monitoring in the Lonoke Monitoring Area began in 1988 with the most recent sampling event occurring in the fourth quarter of FY04. Ground water samples were obtained from thirteen wells screened in the alluvial aquifer and two wells completed in the Sparta aquifer. A summary of the sampling sites and their locations is in Table 11B in Appendix B of this report. Ground water quality is generally good. Iron was detected in all 15 wells above the recommended SMCL of 0.3 mg/L, and ranged from 0.526 mg/L to 22.9 mg/L. Manganese also was detected in all wells above the recommended SMCL of 0.05 mg/L, and ranged from 0.243 to 2.46 mg/L. Measured TDS was above the recommended SMCL of 500 mg/L in one well. Selected descriptive statistics are listed in Table 12B in Appendix B of this report. In addition, the pesticide metolachlor was detected in one well (LON009A) at 0.054 ug/L; however, this concentration is well below the USEPA HAL for metolachlor of 100 ug/L. These data are summarized in Table 19B in Appendix B.

Northeastern Ouachita Mountains Monitoring Area

The Northeastern Ouachita Mountains Monitoring Area is located in central Arkansas within Pulaski and Saline counties in the Ouachita Mountains physiographic province. Strata within this monitoring area consist of Paleozoic sandstones, shales, novaculites, and cherts. These strata were intensely folded and faulted during the late Paleozoic into generally east-west trending anticlines and synclines, and imbricate strike ridges and valleys. Deviations and intersections are frequent; however, many of the ridges are short and overlapping, curved, or hooked, following the outcrops of truncated plunging folds. Typically, novaculite or sandstone forms prominent ridge tops, while intervening valleys are composed mainly of shales. Initial sampling took place during the fourth quarter of FY04 and the first quarter of FY05, and was limited to rural areas where domestic wells, springs, and small community systems were available. This area was chosen for study to establish baseline ground water quality for several Paleozoic aquifers previously excluded from the monitoring network, to evaluate possible anthropogenic effects of ensuing commercial and residential development, and to identify the potential impact of septic systems and livestock and poultry production to domestic wells, area springs and community water systems. A total of 27 wells and 2 springs were sampled during the initial sampling event. For this sampling event, laboratory analyses were limited to inorganic chemistry and nutrients.

Paleozoic strata exposed at the surface include formations ranging in age from Ordovician through Mississippian. Because 24 of the 27 wells are completed in bedrock, they are dominantly uncased and may receive water from more than one formation. Because of the structurally complex nature of the area geology, each well was assigned to the formation the well penetrates at the surface. As such, 18 samples were taken from the Ordovician-aged Womble Shale, 3 from the Ordovician-aged Bigfork Chert, 2 from the Devonian- to Mississippian-aged Arkansas Novaculite, 2 from the Mississippian-aged Stanley Shale, and 1 from a spring at the Ordovician-aged Bigfork Chert/Polk Creek Shale contact. Three wells serve the Roland, Natural Steps and Pinnacle area, and are completed in Quaternary terrace deposits of the alluvial aquifer west of the Arkansas River in Roland. Information related to the wells and springs sampled for this monitoring area is located in Table 21B of Appendix B.

The water samples from the Arkansas Novaculite and 2 of the 3 from the Bigfork Chert had notably lower pH values than the remaining samples, ranging from 4.49 to 5.65. Additionally, these were the softest water samples of all samples with hardness concentrations ranging from

0.7 to 11 mg/L as calcium carbonate. The low pH and very low hardness may be a function of both relatively short residence time and lithology. The two water samples from the Stanley Shale differed markedly from the Womble Shale samples in terms of hardness. Both samples from the Stanley Shale are classified as soft, while 15 of 18 of the Womble Shale water samples are classified as very hard.

Overall ground water quality was good. Iron concentrations exceeded the SMCL of 0.3 mg/L in three samples and ranged from 0.707 to 5.91 mg/L. Manganese concentrations exceeded the SMCL of 0.05 mg/L in eight samples and ranged from 0.057 to 0.735 mg/L. Arsenic was detected in 16 of 29 samples and ranged from <0.50 to 3.39 ug/L with a mean concentration of 1.30 ug/L, however, they were below the 10 ug/L MCL. Nitrate-nitrogen concentrations >1.0 mg/L were found in 11 of 29 samples, and ranged from 1.02 to 12.80 mg/L. One sample exceeded the 10 mg/L MCL for nitrate-nitrogen. Six of these 11 nitrate detections were confined to an area where septic systems are used exclusively, livestock is present, and chicken houses were located historically. Selected descriptive statistics are listed in Table 22B in Appendix B.

Omaha Monitoring Area

The Omaha Monitoring Area encompasses the northwest quarter of Boone County and is located in the Ozark Plateaus physiographic province. Ground water is obtained from the Springfield Plateau and Ozark aquifers, which are in limestone and dolostone formations, respectively. Ground water monitoring was initiated to evaluate potential impacts in an area of karst topography. Potential contaminant sources include abundant livestock farms and USTs. In addition, ground water contamination was documented within the monitoring area at a former wood treatment plant; a listed Superfund site. Ground water samples are obtained from a combination of wells and springs and monitoring began during the first and second quarters of FY89 with the most recent sampling event occurring during the third quarter of FY05.

Ground water samples were obtained from nine springs and seventeen wells. With one exception, all of the springs discharge from the Springfield Plateau aquifer. Similarly, all but one of the wells penetrates the Ozark aquifer. A summary of the sampling sites and their locations is in Table 13B in Appendix B of this report. Nitrite-nitrogen was detected in all well and spring samples from both the Ozark and Springfield Plateau aquifers. Nitrate-nitrogen concentrations were highest in the Springfield Plateau aquifer spring samples, ranging from 1.32 to 8.42 mg/L, with a mean concentration of 3.52 mg/L. Nitrate-nitrogen concentrations from the Ozark aquifer samples ranged from 0.01 to 7.98 mg/L, with a mean concentration of 1.48 mg/L.

Arsenic was detected in six Ozark aquifer samples at concentrations ranging from 0.61 to 4.86 ug/L; however, these concentrations are lower than the 10 ug/L MCL. Selected descriptive statistics are listed in Table 14B in Appendix B. One of the ground water samples, BNE013, taken from a spring located down gradient of the Superfund site has been consistently analyzed for SVOC constituents throughout the monitoring program. The first sampling event in 1987 revealed a pentachlorophenol (PCP) concentration of 1,200 ug/L, followed by an increase to 3,023 ug/L in the fall of 1989. The HWD approved a clay cap for the contaminated area, which was completed in 1995. The second quarter of 1996 sampling revealed a PCP concentration of 1,447 ug/L, followed by a concentration of 707 ug/L in FY99, and a further decrease to 190 ug/L in the most recent FY05 sampling event. The HWD recently initiated a proactive program of flushing hydrogen peroxide-enriched water through a well completed in an onsite sinkhole, the source of the original concentration, and concentrations are now consistently below 100 ug/L.

Ouachita County Monitoring Area

The Ouachita County Monitoring Area is located in western Ouachita County and includes the city of Camden. This monitoring area is located in the Gulf Coastal Plain physiographic province within the recharge area of the Sparta aquifer; the second most heavily-used aquifer in the State. In addition, a portion of the Cockfield aquifer recharge area is located in the southwestern portion of this monitoring area. Ground water is the primary water source used for domestic, municipal, and industrial purposes. Ground water monitoring began during the first quarter of FY86 and has continued on a three-year interval. The most recent sampling event occurred during the second quarter of FY04.

Ground water samples were obtained from 14 shallow to moderately-deep wells and one spring. Most of the wells penetrate into the Sparta aquifer; however, several wells potentially penetrate the underlying Cane River Formation. This formation is considered the lower confining unit of the Sparta; however, some minor water-bearing zones exist which are used for domestic water supplies. A summary of the sampling sites and their locations is in Table 15B in Appendix B. Water quality in this monitoring area is also good, with TDS concentrations ranging from 19.5 to 207.0 mg/L. Water type is variable and generally ranges from a calcium-bicarbonate water type at shallow depths to a sodium-bicarbonate water type in the deeper portions of the aquifer. Iron was detected in 6 of 15 wells above the recommended SMCL of 0.3 mg/L. Manganese was detected in 1 of 15 wells above the recommended SMCL of 0.05 mg/L. Selected descriptive statistics are listed in Table 16B in Appendix B.

Pine Bluff Monitoring Area

The Pine Bluff Monitoring Area includes the town of Pine Bluff and surrounding areas in central Jefferson County. The monitoring area straddles the boundary between the Gulf Coastal Plain and Mississippi Embayment physiographic provinces. Ground water in the area is withdrawn from the alluvial, Cockfield, and Sparta aquifers, which are the only sources of water to the community. The alluvial and Cockfield aquifers are used primarily for irrigation and domestic purposes, while the Sparta is used for municipal and industrial purposes. The Pine Bluff monitoring area was originally sampled during the first quarter of FY87. The most recent sampling event occurred during the fourth quarter of FY04.

Three wells penetrate the Cockfield aquifer, four wells penetrate the alluvial aquifer, and ten wells penetrate the Sparta aquifer. A summary of the sampling sites and their locations is in Table 17B in Appendix B of this report. The ground water quality was generally good. The alluvial aquifer produces a calcium-bicarbonate water type; whereas, the Cockfield and Sparta aquifers produce a sodium-bicarbonate water type. Arsenic was detected in two alluvial aquifer samples at 3.32 ug/L and 28.9 ug/L. The latter concentration exceeds the USEPA MCL of 10 ug/L for arsenic; however, this well is used for irrigation purposes only. Iron was detected in 15 of the 17 wells above the recommended SMCL of 0.3 mg/L. Manganese was detected in 15 of 17 wells above the recommended SMCL of 0.05 mg/L. TDS exceeded the SMCL of 500 mg/L in one alluvial aquifer well at a concentration of 692 mg/L. Selected descriptive statistics are listed in Table 18B in Appendix B. VOC analysis was conducted on the four alluvial samples. Methylene chloride, a common laboratory contaminant, was detected in the four samples.

Short-Term Water Quality Monitoring (Special Investigations)

An extensive ground water quality data base has been developed as a result of numerous investigations primarily by the U of A at Fayetteville, USGS, and ADEQ. However, most of this information is available by hard-copy only in the form of reports and publications. A search of the list of publications for all organizations will reveal numerous ground water investigative reports for different areas of the State. These investigations are a valuable source of ground water quality data. However, similar caveats apply to the quality of the data as discussed above concerning data from regulated sites, in that some of these investigations may be performed at sites with known sources of contamination and do not necessarily represent ambient or background water quality.

United States Geological Survey

During FY04 and FY05, the USGS Arkansas Water Science Center (WSC) was involved in several projects related to the assessment of ground water quantity and quality issues. Many of the projects involved cooperative efforts with other state agencies and are described below.

Ground water data collection activities in the State continue with high visibility resulting from increasing public and agency concerns over drawdowns in the Sparta and Alluvial aquifers. Continuing USGS ground water programs include: a cooperative program to monitor the ground water levels of Arkansas's eight major aquifers on a rotating basis, collection of conductance samples, the master wells ground water quality program, operation of continuous ground water recorders including one real-time station, geophysical logging of wells and conducting one aquifer test on a yearly basis. The Arkansas WSC collected specific conductance from 50 wells, water-level measurements in over 300 alluvial aquifer wells, and 330 water levels from the Sparta aquifer as part of the 3-year rotating ground water program.

A 2-year streamflow gain and loss synoptic study evaluated the ground water and surface water interactions and assessed base-flow water quality and quantity within the Buffalo River from the upstream park boundary to the confluence with the White River. Objectives included: 1) identify spatial locations of streamflow gain and loss; 2) assess base-flow water quality in the Buffalo River and selected tributaries; and 3) quantify the proportion of total annual streamflow contributed by base flow at gauged sites. A seepage run was conducted and data analysis and report writing occurred.

The delineation of the recharge area for the cold-water component of flow in the thermal springs of Hot Springs National Park was determined in a 2-year. Flow from the thermal water springs follows a long, deeply plunging flow path, attaining its high temperature; flow from the cold-water component of the springs follows a shorter, shallow flow path representing local recharge and is susceptible to contamination from urban land-use activities. This project defined the approximate boundaries of the cold-water recharge area and the approximate times of travel from different points within the recharge area. In Hot Springs National Park, a previous study sampled several springs and monitored temperature in nine springs to determine the local, cold-water recharge contribution to the hot springs.

The three ground water flow and conjunctive-use optimization models (two alluvial and one Sparta) are now complete. Each of the optimization models provides estimates of "sustainable yield" based on constraints that are consistent with criteria used by the ANRC. ANRC is extremely interested in the results of all three of these modeling studies and is funding a continuing "modeling technical assistance" project that will assist ANRC personnel at public meetings, prepare and conduct presentations, publish fact sheets, and run additional scenarios. The models have helped ANRC understand how redefining certain constraints may affect sustainable yield from the aquifer and rivers, aerial distribution of withdrawals contributing to sustainable yield, and/or total maximum conjunctive withdrawals.

The Sparta aquifer is a major water resource for municipal, industrial, and agricultural uses in Union County with water-level declines of more than 390 feet in some areas. Local industry, the city of El Dorado, and Union County currently are working to reduce withdrawals from the Sparta aquifer through water reuse and withdrawing surface water for industry. The impact of these conservation efforts in the recovery of water levels within the Sparta aquifer are being monitored in this study as well as any changes in water-quality characteristics of the aquifer system. This 5-year study is providing continuous, real-time, web-accessible water-level data from a network of 8 wells and periodic water-quality data (conductance and chloride) from a network of 12 wells withdrawing water from the Sparta aquifer to detect trends. This project is in its third year and is funded by the Union County Water Conservation Board (UCWCB) through a USEPA grant. The USGS is working closely with the consulting firm Burns and McDonnell who are under contract to the UCWCB and act as their staff.

The Ozark Plateaus study unit of the USGS National Water-Quality Assessment Program was selected in 2004 as one of three new Nutrient Enrichment and Ecology Topic (NEET) study units. Approximately 30 stream sites in Arkansas, Missouri, and Oklahoma will be selected in 2005 and sampled in 2006. The sites will span the range of nutrient concentrations in streams in non-urban settings in the Springfield and Salem Plateaus. Sampling of water quality, benthic macroinvertebrates, and periphyton were conducted at two trend stream sites in 2005. Ground water sampling of six wells were conducted in western Arkansas, western Missouri, and eastern Oklahoma in 2005.

The Ozark cavefish's (*Amblyopsis rosae*) distribution includes Missouri, Arkansas, and Oklahoma, and was listed as a threatened species in November of 1984 due to threats from human disturbance and water quality. The extent and location of the local recharge areas that contribute water to selected caves where the cavefish live in the Ozark Plateaus in Arkansas and Oklahoma is unknown. The sources of water in caves are from aquifers whose recharge area may be the local surface water drainage divide or from geologic/aquifer outcrop areas located at a distant. The objective of this 3-year study is to collect hydrologic information that will provide a preliminary delineation of the boundaries of the local recharge to six caves in the Ozark Plateaus of Arkansas and Oklahoma.

Arkansas Department of Environmental Quality

A review of existing water-quality data sets from ADEQ files was conducted in FY03 to assess the occurrence, distribution, and concentration of arsenic (As) in various aquifer systems throughout Arkansas, with particular emphasis on elevated As in the alluvial aquifer of eastern Arkansas. The assessment of As in ground water was prompted by the USEPA revision of the MCL for As from 50 ug/L to 10 ug/L. The final rule was published in the Federal Register on January 22, 2001 (USEPA, 2001). A review of the ground water quality data reveals that As concentrations >10 ug/L have been found solely in ground water within the Quaternary alluvial sediments in eastern Arkansas. Although As concentrations in samples from mineralized fault zones and whole-rock demonstrate the potential for ground water contamination in the Ozark and Ouachita Mountain regions of Arkansas, no As concentrations >10 ug/L have been documented in ground water samples from these regions of the state.

Preliminary evidence from the statistical treatment of existing data sets suggested that elevated levels of As in the alluvial aquifer of eastern Arkansas were the result of the dissolution of As-bearing Fe oxyhydroxide coatings on the sand grains serving as the aquifer material. The primary evidence for reductive dissolution of the Fe oxides was based on geochemical trends of reduction-sensitive parameters including As, NO_3-N, NH_4-N and Fe. The oxidation of low-grade lignite and weathered peat is proposed as the reduction driver in the alluvial aquifer, based on numerous drill logs documenting abundant organic matter. The past use of arsenical pesticides were ruled out as a potential source based on the low-leaching potential, competition with phosphorus in the formation of insoluble salts, the lack of As concentrations in ground water with TDS concentrations <175 mg/L, and the inverse relation of As with NO_3-N and ortho-P concentrations (Kresse and Fazio, 2003).

ADEQ ground water program personnel initiated an intensive sampling program in FY05 with the intent of sampling approximately one well per square mile in the upper Bayou Bartholomew watershed to assess the aerial distribution of As with respect to geology and other attributes. A total of 109 water samples were collected from irrigation wells in the upper portion of the Bayou Bartholomew watershed in Jefferson County. The investigation demonstrated that elevated As (>10 ug/L) occurs almost solely in stream channel deposits (Qcm), with low arsenic concentrations in the over bank deposits (Qso). Ground water from the Qso deposits contained significantly higher sulfate concentrations than ground water in the Qcm deposits. A strong inverse relationship between As and sulfate concentrations tends to support an earlier theory of sulfide formation as a solubility control on soluble As in ground water.

Following completion of the well-sampling program, ADEQ worked with the Arkansas Geological Commission to drill approximately nine borings in Jefferson County, including the collection of 60-65 grab samples of cuttings from the borings. The USGS National Geochemical Survey Project, under the guidance of Andrew Grosz, was designed to create a consistent national geochemical database from approximately 25,000 stream sediment and soil samples with an average grid spacing of 17km and which have all been analyzed with the same analytical routines. The USGS in Reston, Virginia, performs analysis of the sediment samples, and Mr. Grosz had agreed to sample the cuttings from the borings installed for the As monitoring program in the Bayou Bartholomew watershed. The USGS laboratory has a rather extensive backlog of samples, and the analyses are not expected to be completed until 2007. ADEQ hopes to use this data to show the vertical distribution and range of As in sediments within sediment profiles from different geologic settings in the upper Bayou Bartholomew watershed in Jefferson County.

Presently, ADEQ is assisting the University of Arkansas in a detailed, state-of-the-science, investigation into sources of As in the upper Bayou Bartholomew watershed in Jefferson County. The investigation is comprised of the coring of three holes along a line perpendicular to Bayou Bartholomew and including both the Qcm and Qso exposures, leaching of sediment samples from the core according to a tiered extraction process, X-ray diffraction of sediments, As speciation of ground water samples from wells installed in the three borings, and other activities to evaluate present theories derived from existing water-quality analyses in the area. Activities including in the first part of 2006 include drilling of the holes, coring for sediment samples, installation of wells, and the start of sediment extraction. Activities are slated for completion within the second half of 2006.

University of Arkansas at Fayetteville

The University of Arkansas at Fayetteville (U of A) has been involved in ground water quality investigations for almost three decades. Early studies focused on recording and describing general water quality in the shallow aquifer systems in northwest Arkansas, but have advanced to include investigations of the various ground water flow components in both the unsaturated and saturated zones of karst areas; impacts to ground water quality from point source and nonpoint sources in northwest Arkansas; fate and transport of pollutants in shallow ground water systems; and modeling of both flow and contaminant transport with particular emphasis on karst ground water flow systems. In recent years, the U of A has extended their boundaries of investigations to include ground water investigations in the eastern portion of the state, including contaminant transport and vertical and horizontal flow determinations in the Sparta and alluvial aquifer systems. The following is a summary of research that is being conducted presently or has been completed within the last two years at the U of A. Much of this research has been funded or performed in conjunction with state agencies and furthers the goals of the State in preserving ground water quality and quantity throughout Arkansas. Additionally, much of the research has been performed at the Savoy Experimental Watershed (SEW), which is a joint effort of the University of Arkansas Departments of Animal Science and Geology, ADEQ, the Agricultural Research Service of the USDA, and USGS. The 1250-hectare site is unique in that it is truly an experimental watershed with heavily-forested areas and limited grazing on small, pastured sections.

In a cooperative study between NRCS National Water Management Center (NWMC), U of A, and ADEQ, nitrate processing is being characterized in karst hydrogeological zones, particularly in the interflow zone (zone). Nutrient processing that may occur in the zone, which has increased ground water retention time and water-matrix interaction, is important because of the lack of processing in the focused-flow karst soil areas. Nitrate processing was characterized using dissolved organic carbon concentration and bioavailability, and concentration of reactive (nitrate) versus conservative (chloride) species. Also, concentration and isotopic composition of nitrate was used to determine the extent of denitrification and immobilization of nitrate. Study results show that 30 percent of the nitrate moving through the zone can be microbially processed. The level of processing is dependent upon flow-path and hydrologic conditions. Bioavailability of DOC is increased relative to the focused-flow area under high flow conditions. Nitrogen and oxygen stable isotope data suggest denitrification is occurring. The zone appears to be potentially important for nitrate attenuation in karst settings. Work in progress will better quantify processing rates and differences in flow paths. A related study--applying concepts learned in the biogeochemical study described above--also being conducted by the NWMC, U of A, and ADEQ is examining water-quality effects and behavior of nutrients from a swine waste storage lagoon in mantled karst terrane. The lagoon is an anaerobic swine waste lagoon constructed at the Savoy Swine Facility in compliance with Natural Resources Conservation Service Conservation Waste Storage Practice Standard no. 313. Nine shallow monitoring wells were augered to refusal in the regolith. Shallow ground water from wells, springs and an interceptor trench was sampled and analyzed for nutrients, major cations, and major anions during high-flow and low-flow conditions. Results from ground water sampling indicate concentrations of chloride and nitrate were higher than concentrations from non-agricultural land-use areas in the Ozarks, but were statistically insignificant compared to concentrations near the site prior to the construction of the swine facility. The differences in concentrations of chloride during high and low-flow conditions were determined to vary because of dilution, in contrast with nitrate for which decreases in concentrations probably represented biological processing. The results of an electromagnetic geophysical survey indicated no preferential flow paths from the swine waste lagoon.

In order to better characterize nutrient processing and potentially identify preferential zones of flow, two additional shallow ground water interception trenches have recently been completed. Additional monitoring wells also are planned. Water samples taken from the lagoon, trenches, wells, and surface waters presumed to be impacted by anaerobic lagoon leachate will be analyzed for isotope ^{15}N and isotope ^{18}O of nitrate in an effort to define source(s) in the waters and to quantify denitrification indicated by earlier results. Samples also will be analyzed for stable hydrogen isotope ratios and isotope ^{18}O of water and isotope ^{13}C of DIC/DOC to analyze microbial activity in the system and determine mixing relationships between ground waters.

Another study at the U of A involved the application of multiple tracers to elucidate complex transport phenomena in a karst spring system. Multiple tracers were injected into a losing stream on the recessional limb of a storm hydrograph to characterize structural and stratigraphic controls on ground water flow, and to elucidate the fate and transport of sediment and *Escherichia coli* (*E. coli*) in the mantled karst aquifer at the SEW. Rhodamine WT, fluorescein, lanthanum-labeled clay, and europium-labeled *E. coli* were injected under natural gradient into the losing stream approximately 490 m and 453 m up gradient from two primary spring discharge points. Discrete time-series of samples were collected to characterize tracer breakthrough at each spring under a steadily recessing hydrograph for the first 10-days following injection, and then over several storm-induced transient flows for the next 35 days.

Tracer breakthrough data indicated the arrival of suspended solids and *E. coli* approximately 10.7- and 5.9-hours, respectively, ahead of the conservative-dye tracers at the more distant spring (490 m down gradient) but later than the arrival of the conservative tracers at the proximal spring. The early arrival of sediment and *E. coli* at the distal spring is hypothesized to result from differential gravitational settling in pools along the flow path and preferential flow into conduits connected to these pools, coupled with the effect of pore size exclusion. It is proposed that the observed sequence of tracer arrival at the proximal spring is also a function of tracer density. The more dense sediment and *E. coli* settle into the pools along the flow path and thus are retarded relative to the more conservative dyes. During storm-induced recharge events, all tracers were observed to arrive simultaneously at both springs. The difference in the arrival time of all tracers under storm-induced transient flow was only an hour, arriving first at the overflow spring and second at the underflow spring. This pattern of movement suggests that the tracers are being stored in pools in the subsurface during periods of low-flow and are flushed by the onset of more turbulent flow associated with storm-induced recharge, moving to the primary spring discharge points as a pulse on the rising limb of the hydrograph. This pulse arrives first at the closer overflow spring because of higher transmissivity along that specific flow path (Davis, et. al. 2005).

Pesticide Investigations

The study of pesticide impacts to shallow ground water is listed separately from short-term monitoring activities because of the ongoing efforts and long-term implications of the monitoring process. The use of pesticides is one of the largest potential sources of nonpoint contamination in eastern Arkansas, where row-crop agriculture dominates the land use in this part of the state. Although use of fertilizers serve as a potential source of nitrogen to the alluvial aquifer, irrigation wells consistently reveal nitrate-nitrogen as nitrogen concentrations below 1.0 mg/L with mean and median concentrations below 0.1 mg/L (Kresse and Fazio, 2002). Early stages of pesticide monitoring were characterized by the gathering of extensive well-water pesticide data for purposes of evaluating the extent and magnitude of contamination, in addition to determining the pesticides posing the greatest problem from both frequency and magnitude of detections.

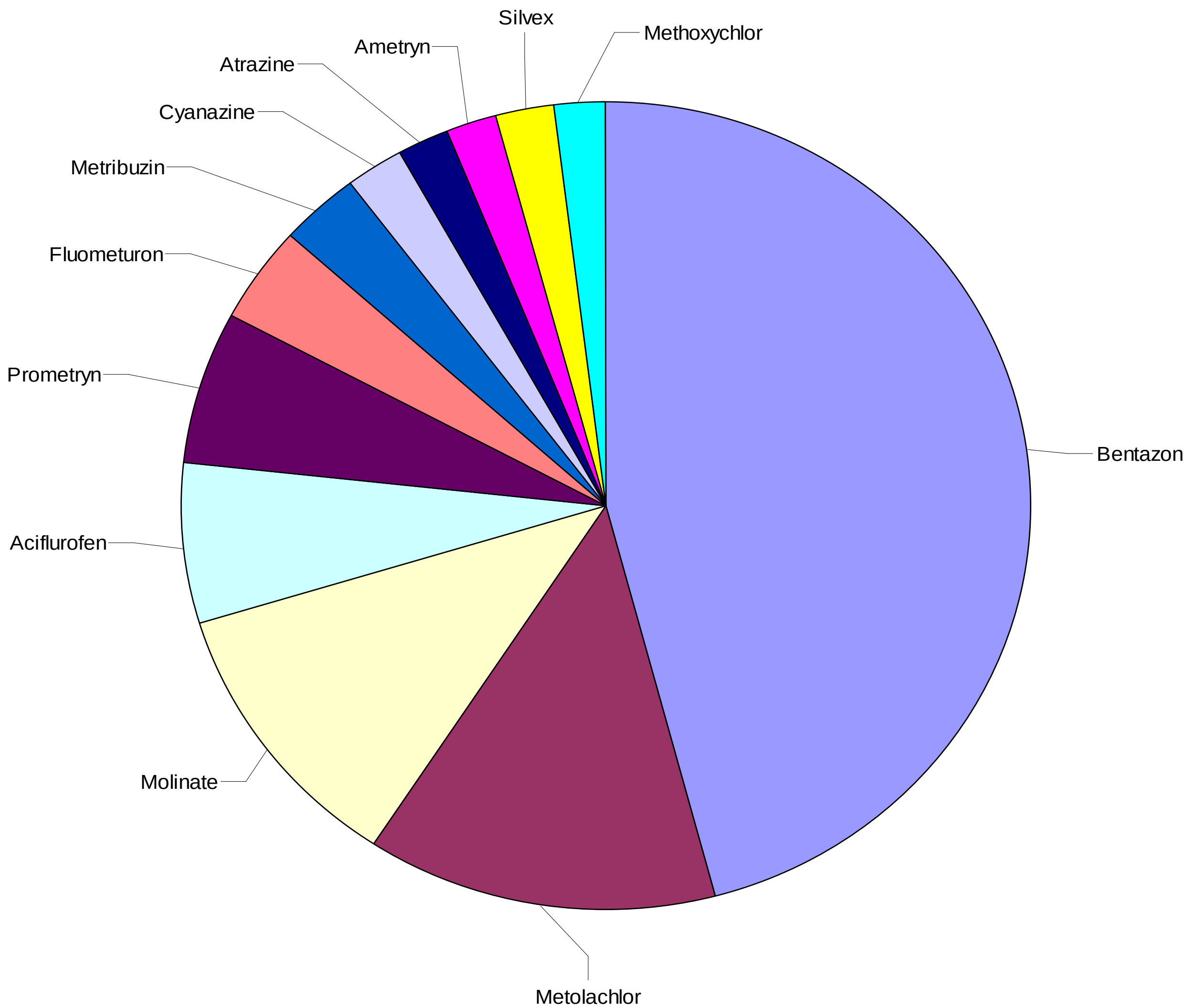
Ongoing pesticide monitoring had been performed in the past primarily by the University of Arkansas Water Resources Center (AWRC) and ADEQ. Monitoring by the AWRC was funded under the USEPA FIFRA program, which is delegated by the Arkansas State Plant Board (ASPB). The AWRC began pesticide monitoring in 1992 and provided pesticide monitoring and analysis services to the ASPB on a yearly basis with an average of about 40 sampling sites per year. In 2002, the ASPB made the decision to perform both the sampling and analysis portions of the program in-house, and 2001 was the last year for monitoring by the AWRC. The ASPB began active monitoring in the summer of 2004. ADEQ monitors pesticides as part of the Ambient Monitoring Program in areas where pesticide use is prevalent, and also conducts special pesticide monitoring as the responsible agency for assessing waters of the state. The USGS has also monitored for the occurrence of pesticides as part of the NAWQA Program.

Several documents serve as an introduction into the types and concentrations of pesticides detected to date in eastern Arkansas within the alluvial aquifer. Steele, et al. (2002) lists results from the most recent (Phase VIII) sampling period by the AWRC, and also provides an excellent background including the results from all previous sampling periods conducted by the AWRC. Kresse, et al. (1997) provides an overview of the occurrence of pesticides in the alluvial aquifer in eastern Arkansas including the results from the sampling of 77 wells in parts of Arkansas, Phillips and Desha counties; a discussion of the type and chemical properties of the pesticides; and a section on potential transport mechanisms for the movement of pesticides into the ground water system. Kresse and Fazio (2002) present the results of the sampling of 120 wells in the Bayou Bartholomew watershed with a discussion on sources of pesticide contamination. Because ADEQ performs a complete chemical analysis of all wells monitored as part of the ongoing pesticide monitoring program, the data also serves as an excellent data base for inorganic chemistry and water quality associated with the alluvial aquifer in eastern Arkansas. Because there was a difference in both the laboratory equipment and protocol for qualifying the data from the pesticide monitoring in eastern Arkansas, there was a difference in the detection frequency between AWRC and ADEQ in the last decade. The rate of detection for the AWRC averaged approximately 5 percent of total wells; whereas the detection rate for ADEQ is closer to 30 percent or more for all samples analyzed to date. However, in spite of these differences, both organizations have noted that bentazon accounts for the highest percentage of total detected pesticides; accounting for over 45 percent of the total detections of the combined pesticide detections by both organizations (Figure V-2). Although not the highest-use pesticide, bentazon is problematic from the standpoint of its high solubility and relatively low sorption properties (Kresse, et al., 1997).

The ASPB sampled 54 domestic wells in 2004 and 70 wells in 2005, covering 14 counties in eastern Arkansas. Only one well in each season contained a detectable pesticide for a detection rate of approximately 1.5 percent. The trend for a lower detection rate for the ASPB coincides with the previous lower rate during the years in which the analyses were performed by the AWRC. The ASPB samples only domestic wells, although all homes tend to be surrounded by or in the proximity of agricultural lands. The ASPB also tends to have higher detection limits than either ADEQ or USGS, although it has not been determined if all ADEQ detections are beneath the detection limits for the ASPB laboratory. A series of meetings have been set to determine site locations, well depths, laboratory detection limits, and other criteria which may assist in determining differences in the current detection rate by the ASPB.

The source of the pesticide contamination is poorly understood at the present time, and point sources (spills, well contamination, etc.) versus nonpoint sources (general application and soil infiltration) as the principal source and transport mechanism for delivery to the ground water table is a topic of debate both nationwide and within Arkansas. Data gathered to date appear to strongly support general application (nonpoint source) followed by flushing through the upper soils as a likely candidate for most of the detections. This theory is supported by the fact that only medium to high solubility pesticides are found in ground water, together with the overall low concentrations for the detections. Migration of contaminants along faulty casing or backflow through the well should result in a suite of pesticides, certainly including the highest use pesticides, regardless of pesticide solubility. One of the more promising aspects of the monitoring to the present date is that the concentrations are low and all detections have been below federal requirements and recommendations (MCLs and HALs). Most all of the detections are in the low ug/L range and are dominantly between 3-5 orders of magnitude below the listed MCLs and HALs (Kresse, et al., 2002).

Figure V-2: Pesticide Detections
Percent of pesticide detections for combined data from ADEQ and AWRC
for more than one pesticide detection.



CHAPTER THREE GROUND WATER/SURFACE WATER INTERACTIONS

The physical interaction of ground and surface water, manifested in the form of losing and gaining streams, impacts regulatory, pollution-prevention, and research programs. This problem has plagued ADEQ in policy and regulatory development and in regulation and cleanup at contaminated sites. Standards used for remediation of ground water contamination associated with an industrial site may adhere to ground water uses; however, these same concentrations may violate stream standards where the ground water discharges into a given stream. In addition, over-pumping of ground water, which previously provided base flow to a stream, may reduce the stream storage during dry periods resulting in an impact to the use of the stream. In the Gulf Coastal Plain and Mississippi Embayment, such reversal of a gaining stream to a losing stream has been documented in Ackerman (1996).

Water-quality relationships between ground water and surface water in eastern Arkansas are not well understood at the present time. Although both water sources are intensely sampled for general water quality and pesticides, the influence of one source as a contaminant transport pathway to the other source has not been identified. One possible mechanism for the occurrence of pesticides in ground water in eastern Arkansas is the recharge of pesticide-contaminated stream water in losing-stream segments. However, analysis of pesticide data indicates some differences in the types and amounts of pesticides detected in surface water versus those detected in ground water (Kresse et al., 1997). The investigation of saltwater contamination in Chicot County included review of both stream-station and ground water data to evaluate the potential for chloride contamination of streams from high-chloride, base-flow contributions. However, elevated chlorides occurred in the streams predominantly during the summer months, which might reflect runoff from ground water irrigated fields rather than base-flow contributions.

In northwest Arkansas, both hydrologic budget analyses and contaminant transport have been studied to a greater degree in terms of surface water/ground water interaction than in any other portion of the State. During the last decade, numerous investigations coupled with ongoing monitoring efforts have been performed by dominantly multi-agency coalitions including ADEQ, University of Arkansas at Fayetteville, USGS, ANRC, and the National Park Service. Some of the studies have concentrated on nutrient budgets in addition to hydrologic budgets, while others focus on water-quality monitoring coupled with implementation of Best Management Practices (BMP). All studies, however, contain components of surface- and ground water interaction.

Nine river sites, twenty tributaries, and three springs are routinely sampled as part of Buffalo National River's Water Quality Monitoring Program. Of the monitored springs, Gilbert Spring has the highest average fecal coliform counts and nitrate-N concentrations and showed a positive trend for fecal coliform concentrations over ten years of monitoring. Storm-flow sampling revealed fecal coliform counts as high as 17,700 colonies/100mL from this spring. Highest nitrate concentrations are observed during base-flow. Higher and increasing concentrations of bacteria at Gilbert Spring appear to be related to cattle and dairy operations in the Dry Creek drainage, which is pirated by Gilbert Spring.

Mill Creek is a major tributary to the Buffalo National River that has been shown to contribute 96 percent of the nitrate/nitrite-nitrogen load to the Buffalo River below their confluence. Macroinvertebrate community structure and function analyses demonstrate this nitrate load and other pollutants detrimentally affect biologic communities within Mill Creek and the Buffalo River. A synoptic survey of Mill Creek revealed nitrate and orthophosphate concentrations increase upstream to peak at two springs near its head waters. Subsequent dye-tracing showed that the recharge area for these springs extended far beyond their surface watershed and into the adjacent Crooked Creek basin. Geologic mapping indicates that these springs discharge from the base of the Boone Formation, a 120-meter thick karst aquifer, and are localized near the corner of a fault-bounded block that extends beneath both watersheds.

Flow and water-quality measurements taken from 1998 to the present date and from both streams and springs in the adjoining Crooked Creek and Mill Creek basins help define and characterize the interbasin recharge. Stream discharge/watershed area ratios employed early in the study raised initial suspicions of interbasin transfer; later they verified the accuracy of the dye-trace delineated basins. Water-quality analyses showed that springs in the Mill Creek basin that receive interbasin recharge have similar water quality to both streams and springs in the Crooked Creek basin and reflect the more intense agricultural land use occurring in the Crooked Creek basin.

Continued efforts in determining ground water contributions to the Buffalo River, especially in regard to defining ground water recharge zones outside of the Buffalo River watershed, has resulted in the delineation and characterization of ground water recharge in the vicinity of Davis Creek and John Eddings Cave. The Davis Creek watershed is approximately 10 square miles and has numerous places where the water goes subsurface and resurfaces down gradient. A total of 17 traces were conducted in the Davis Creek watershed and surrounding areas between May 2002 and May 2003. A total of 13 ground water traces were conducted for the John Eddings Cave/Elm Springs portion of the study, including four separate types of dye, between April 2001, and April 2002. The Davis Creek traces were made to delineate the recharge area of the Davis Creek basin, while additionally investigating the relationship between Mitch Hill Spring and the Davis Creek basin. Some conclusions regarding the traces were that the total recharge area for Mitch Hill Spring (31,774 acres) is large relative to its surface watershed (2,277 acres), that most of the Davis Creek watershed provides recharge to Mitch Hill Spring, and that the total recharge area for Davis Creek (20,301 acres) is only slightly larger than its surface watershed (18,016 acres). Conclusions regarding the John Eddings Cave/Elm Springs traces were that while Elm Spring and John Eddings Cave are located relatively close to each other, they do not share a common recharge area and are hydrologically isolated from each other, that the total recharge area for John Eddings Cave (231 acres) is roughly three times larger than its surface watershed (75 acres), and that the total recharge area for Elm Spring (1,772 acres) is over twice as large as its surface water recharge area (755 acres) (Mott, 2003). The National Park Service remains committed to delineating and characterizing ground water flow and quality to determine ground water flow contributions and ground water quality impacts from pirated subsurface basins outside of the Buffalo National River watershed.

Several of the U of A investigations involve surface/ground water interaction as a major component of these studies because of the abundant karst features associated with the study sites, including sinkholes, losing stream segments, and springs, which interact on a small spatial scale. The movement of contaminants, especially within the mantled karst aquifer system, has significant impact on both surface and subsurface water quality because of the high degree of surface water and ground water interaction. Many of the subsurface fracture and bedding plane flow paths ultimately exit as springs and seeps, which are tributary to nearby primary streams. The multiple tracer study at the Savoy site, described in the "special investigations" section above, has confirmed that a wet-weather losing stream has dual terminal springs located approximately 0.5 kilometers from the losing stream section. Based on the results of modeling at the site, the researchers demonstrated that MODFLOW can be used to simulate steady-state flow in mantled karst aquifers with the condition that sufficient detailed data are available to identify matrix and fracture flow paths (Davis et.al. 2006).

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CHAPTER FOUR MAJOR SOURCES OF CONTAMINATION

There are numerous potential and actual sources of ground water contamination in the State. Most of the sources are common to all states and include anthropogenic as well as natural sources of contamination. It is difficult to define which sources have the greatest impact on ground water quality, because each source varies in the aerial extent of resulting contamination and in the impact to water quality. For example, a hazardous waste site may result in a severe impact to ground water with numerous organic contaminants exceeding drinking-water standards. However, the aerial extent of the contaminant plume may be very limited with no known receptors at risk. Conversely, contamination from agricultural activities may be aerially extensive with little or no impacts to use of the water for drinking and/or other purposes.

Potential point sources of contamination from disposal sites, underground storage tanks, mining operations and other activities are regulated under various programs within ADEQ. Agriculture and other land-use activities commonly are addressed by voluntary BMPs, which strive to protect ground water by educating farmers and others on management strategies. These programs are described in some detail in the section titled "Ground water Protection Programs."

Several investigations have documented nitrate problems in northwest Arkansas, and ongoing monitoring programs in the Coastal Plain area of the State have revealed numerous detections of low-concentration pesticides in conjunction with row-crop agriculture. Saltwater intrusion is a localized but very serious problem related to heavy drawdown, irrigation practices, and/or the area hydrogeology. Brine contamination is also a localized problem related to improperly lined surface impoundments, corroded casing of injection wells, or from earlier improper disposal to the land surface or streams. The Surface Water Treatment Rule (SWTR) has focused attention on microbial contamination in our public water systems. Recent documented waterborne disease outbreaks have been a cause of national concern. The intent of ADEQ's ongoing, ambient water-quality monitoring program is to document changes in the quality of ground water over time; to determine if known areas of contamination are expanding (i.e., areas of saltwater intrusion), and to assist in water-quality planning.

In addition to anthropogenic sources of contamination, water-quality degradation has been documented from natural sources including saline water and naturally-occurring radioactivity. These contaminants are often unique to the stratigraphy of the aquifer and are related to environments in which the strata were deposited. Also, it is important to differentiate sources of water-quality data when evaluating ground water contamination. Contaminants documented in a water-supply system, domestic or municipal, may be related to problems in the distribution line or plumbing. As such, these problems may reflect contamination within the system, but not related to actual ground water quality. Table V-4 lists the major potential sources of contamination.

The USEPA 1996 305(b) guidelines encourage each state to list the 10 highest priority sources of ground water contamination. The factors considered when selecting these priority sources of ground water contamination in Table V-4 are listed in order of importance next to each source. However, the contaminant sources are not ranked. The following factors are listed below:

Table V-4: Major Sources of Groung water Contimination

Contaminant Source	Ten Highest Priority Sources (X)	Factors Considered	Contaminants
Agricultural Activities			
Agricultural Chemical Facilities			
Animal Feedlots	X	1,4,5,6	
Drainage Wells			
Fertilizer Applications	X	1,4,5,6	
Irrigation Practices			
Pesticide Applications	X	1,5,6	
Storage & Treatment Activities			
Land Application			
Material Stockpiles			
Storage Tanks Above Ground			
Storage Tanks Underground	X	1,2,3,4,5	
Surface Impoundments	X	1,3,4,5	
Waste Piles			
Waste Tailings			
Disposal Activities			
Deep Injection Wells			
Landfills	X	1,3,5,6	
Septic Systems	X	1,3,4,5	
Shallow Injection Wells			
Other			
Hazardous Waste Generators			
Hazardous Waste Sites	X	1,2,3,5,6	
Industrial Facilities			
Material Transfer Operations			
Mining and Mine Drainage			
Pipelines and Sewer Lines			
Salt Storage and Road Salting			
Salt Water Intrusion	X	1,3,4	
Spills	X	1,2,3,5	
Transportation of Materials			
Urban Runoff			

1) Human health and/or environmental risk (toxicity)
2) Size of the population at risk
3) Location of the sources relative to drinking water sources
4) Number and/or size of contaminant sources
5) Hydrogeologic sensitivity
6) State findings, other findings
7) Other criteria

The following contaminants are considered to be associated with each of the sources that were checked:

A) Inorganic pesticides
B) Organic pesticides
C) Halogenated solvents
D) Petroleum compounds
E) Nitrate
F) Fluoride
G) Salinity/brine
H) Metals
I) Radionuclides
J) Bacteria
K) Protozoa
L) Viruses
M) Other

Table V-5 lists the present status of the State Ground Water Protection Programs. As can be seen, most of the programs are fully established or are in the process of implementation. One progressive step that ADEQ's Water Division has taken toward early detection at facilities with potential sources of ground water contamination is to include ground water monitoring requirements for certain facilities within NPDES and State Programs (no discharge) permits. This procedure assists in assessing the impact from sludge application, manure spreading, earthen lagoons, and other sources of potential ground water contamination. Currently, the State Programs Branch has begun the permitting of commercial soil treatment facilities for treatment of petroleum contaminated soils. Ground water Protection Program personnel are active in reviewing these permits in order to insure that ground water will be protected beneath these facilities. In addition to these steps, the Ground water Protection Program is actively involved in expanding existing monitoring areas for further inclusion of aquifer systems which lack adequate monitoring, in addition to actively initiating and cooperating on numerous special investigations into ground water threats statewide including confined animal operations, use of pesticides, and saltwater intrusion. The Water Division has also teamed with other divisions to craft a draft policy and technical guidance for setting consistent ground water remediation criteria across all programs. Both the draft policy and technical guidance were completed and signed by the Director in 2006.

Table V-5: Summary of State Ground water Protection Programs

Program or Activities	Check (X)	Implementation Status	Responsible State Agency
Act SARA Title III Program	X	Fully Established	ADEQ
Ambient Ground Water Monitoring	X	Fully Established	ADEQ
Aquifer Vulnerability Assessment	X	Continuing Efforts	ANRC/U of A
Aquifer Mapping	X	Continuing Efforts	Multi-Agency
Aquifer Characterization	X	Continuing Efforts	Multi-Agency
Comprehensive Data Management	X	Under Development	ANRC
USEPA Endorsed CSGWPP	X	Pending	ANRC
Ground Water Discharge Permit	NA	NA	ADEQ
Ground Water – BMPs	X	Continuing Efforts	Multi-Agency
Ground Water Legislation	X	Usage only/Established	ANRC
Ground Water Classification	X	Continuing Efforts	ADEQ/ANRC
Ground Water Quality Standards	X	Under Development	ADEQ
Interagency Coordination – GW	X	Continuing Efforts	ANRC
Nonpoint Source Controls	X	Continuing Efforts	ANRC/ADEQ
Pesticide State Mgmt Plan	X	Fully Established	SPB
Pollution Prevention Program	X	Continuing Efforts	ADEQ, ANRC, ADH, ASP, CES, NRCS
RCRA Primacy	X	Fully Established	ADEQ
State Superfund	X	Fully Established	ADEQ
State RCRA Program – More Strict than RCRA Primacy	NA	NA	ADEQ
State Septic Tank Regulations	X	Fully Established	ADH, ADEQ
UST Installation Requirements	X	Fully Established	ADEQ
UST Remediation Fund	X	Fully Established	ADEQ
UST Permit Program	X	Fully Established	ADEQ
UIC Program	X	Fully Established	ADEQ
Vulnerability Assessment for Drinking Water/Wellhead Protection	X	Continuing Efforts	ADH
Well Abandonment Regs.	X	Fully Established	AWWCC/ANRC
USEPA-Approved WHPP	X	Fully Established	ADH
Well Installation Regulations	X	Fully Established	AWWCC/ANRC

ADEQ: Arkansas Department of Environmental Quality; AS&WCC: Arkansas Natural Resources Commission; ADH: Arkansas Department of Health; SPB: Arkansas State Plant Board; NRCS: Natural Resources Conservation Service; CES: University of Arkansas Cooperative Extension Service; AWWCC: Arkansas Water Well Construction Commission.

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PART VI PUBLIC PARTICIPATION

The Public Participation Program at ADEQ is designed to be an active program to seek out those who can provide useful inputs and those who will be affected by ADEQ activities. The program includes provisions for disseminating information to the public through easily accessible avenues. These avenues include, but are not limited to, local media, internet access, and information depositories located throughout the State. Additional avenues include the publication and distribution of newsletters, informational pamphlets, and activity reports, and the participation of ADEQ representatives at public meeting, hearings, and citizen group gatherings.

The purpose of the public participation program at ADEQ is to inform affected Arkansans, organizations, and public officials of the factors involved in, and of decisions contemplated in, ADEQ activities. It is also used to incorporate public thinking into planning decisions and to provide all citizens and organizations an equal opportunity to influence the design of alternatives and selection of choices. This process will produce activities that have substantial community support.

The current Public Participation Program at ADEQ complies with all applicable regulations and guidelines of the FWPCA amendments of 1979 40 CFR, Parts 25 and 35

For additional information concerning the Public Participation Program at ADEQ, visit the Water Division web site http://www.adeq.state.ar.us/water/reports_data.htm and go to the Continuing Planning Process document.

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APPENDIX A WATERBODY-SPECIFIC INFORMATION BY PLANNING SEGMENT

A segment-specific water quality analysis was conducted for each of the 38 planning segments utilizing the monitoring network stations and other available data. Support or nonsupport of a designated use was assessed by using the assessment methodology described earlier.

Data included for each planning segment includes:

1. A description of the segment location and its major waters.
2. A narrative summary of the water quality within the segment.
3. A planning segment map with river reaches identified by hydrologic unit code and reach numbers, and includes monitoring stations and NPDES permitted discharges.
4. An assessment of use support by river reach.
5. A listing of permitted discharges within the segment.
6. Water quality statistics for selected sits.

The stream reach assessment tables utilize the following abbreviations:

General

E = evaluated assessment
M = monitored assessment
U = unassessed (unknown)
S = use supported
N = use not supported
R = use removed

Causes

SI = siltation/turbidity
AM = ammonia
NO_3 = nitrogen
TP = Total Phosphorus
NU = Nutrients (NO_3, TP)
DO = dissolved oxygen
PA = pathogen indicators (bacteria)
CL = Chlorides
SO_4 = Sulfates
TDS = Total Dissolved Solids
OE = organic enrichment
PO = priority organics
Al = aluminum
Cu = copper
Pb = lead
Zn = zinc
Hg = mercury

Designated Uses

FC = fish consumption
AL = aquatic life use
PC = swimming (primary contact)
SC = secondary contact
DW = drinking water use
AI = agriculture and industrial use

Sources

AG = agriculture
SE = surface erosion
RE = resource extraction
SV = silviculture
UR = urban runoff
RC = road construction/maintenance
IP = industrial point source
MP = municipal point source
HP = hydropower
UN = unknown

Water Quality Monitoring

Y = USGS gauging station present
1 = data obtained 10/1/01 – 9/30/05
2 = data obtained 10/1/98 – 9/30/03
A = ambient network sampling station
R = roving network sampling station
S = special project sampling station
USNPS = U.S. National Park Service

STATUS = assessment status

1 = Attaining all designated uses;

2 = Attaining some designated uses, but there is insufficient data to determine if other uses are being attained;

3 = Insufficient data to determine if any designated use is attained;

4 = Impaired for one or more designated uses, but does not require the development of a TMDL because:

- a. A TMDL has been completed for the listed parameter(s);
- b. Other pollution control requirements are expected to result in attainment of water quality standards; and/or
- c. Impairment is not caused by a pollutant

5 = The waterbody may be impaired, or one or more designated uses may not be attained. Waterbodies in Category 5 are placed in one of the following subcategories:

- a. Truly impaired; develop a TMDL (or other corrective action(s)) for the listed parameter
- b. Waters currently not attaining standards, but may be de-listed with future Regulation No. 2 revisions
- c. Waters in which the data is questionable because of QA/QC procedures and which require confirmation before a TMDL is scheduled
- d. Waters which need data verification to confirm use impairment (additional sampling, biological assessment) before a TMDL (or other corrective action(s)) is scheduled

Appendix A Table of Contents

This appendix contains the following sections:

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SEGMENT 1A DORCHEAT BAYOU AND BODCAU BAYOU

This segment is located in the southwest corner of the State and includes most of Columbia County as well as parts of Nevada, Hempstead, and Lafayette counties. The drainage is generally southward into Louisiana and the major streams are Dorcheat Bayou and Bodcau Bayou. Lake Erling is a major impoundment on Bodcau Bayou.

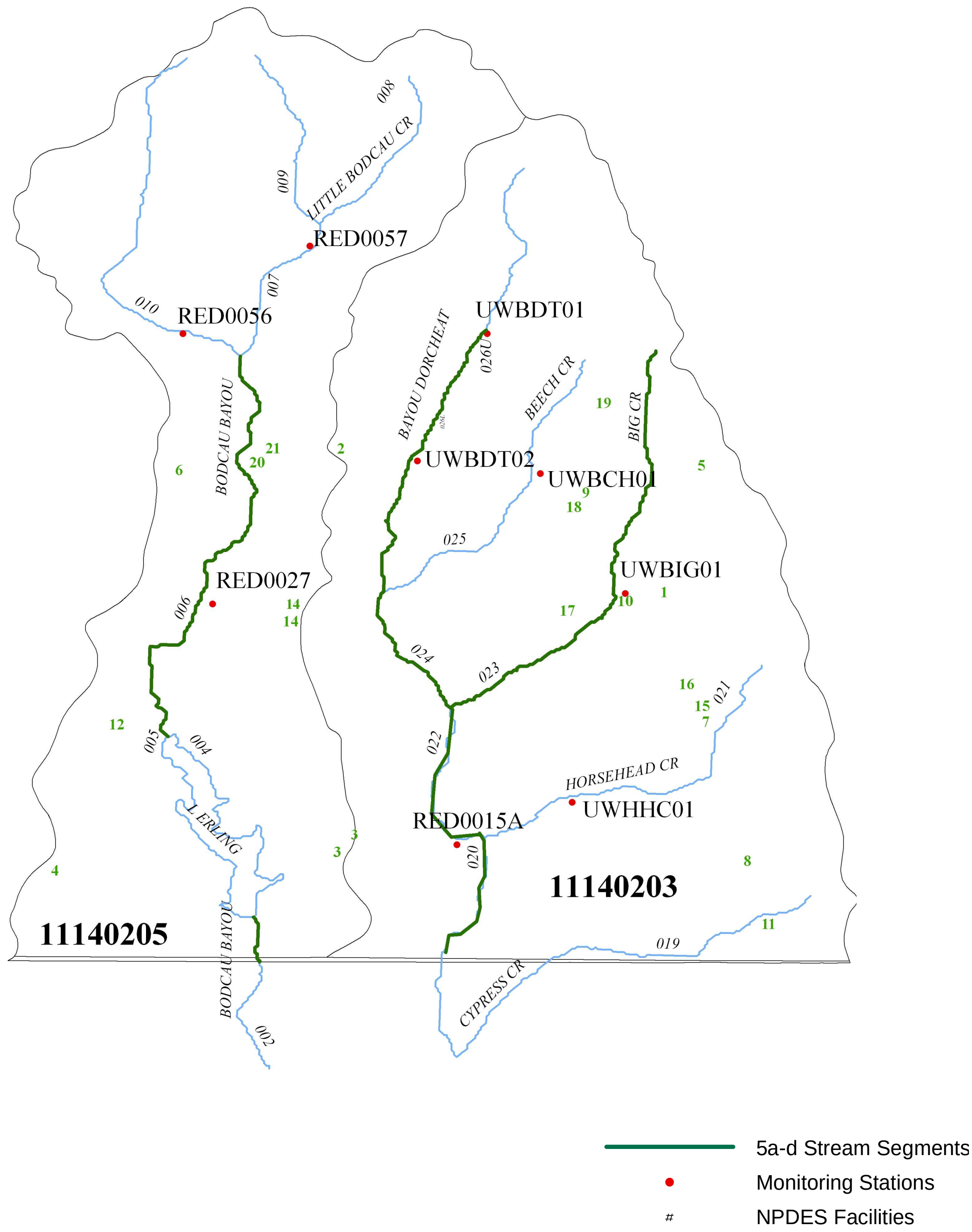
Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 116 miles of stream within this segment. An additional 81.5 miles were evaluated bring the total number of miles assessed with in this segment to 197.5 stream miles.

Dorcheat Bayou and Lake Columbia are not supporting the fish consumption use because of mercury contamination.

Five segments in the Bayou Dorcheat watershed were listed as not supporting either the aquatic life use or industrial/agriculture water supply use because of excessive silt, sulfates, total dissolved solids, lead and/or pH and low dissolved oxygen concentrations. The aquatic life use in Bodcau Creek was evaluated as impaired because of excessive silt, lead and zinc concentrations, and low pH values. Additional investigation in both of these watersheds is ongoing to determine the accuracy of the listings.

Figure A-1: Planning Segment 1A



(Segment 1A)

Table A-1: Planning Segment 1A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NON-SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-1A																										
Dorcheat Bayou	11140203	-026U	11.4	UWBDT01	M	S	S	S	S	S	S									1						
Dorcheat Bayou	11140203	-026L	11.7	UWBDT02	M	N	S	S	S	S	S	UN	UN			pH	DO			5e	5e			FISH CONSUMPTION	155.2	39.0
Dorcheat Bayou	11140203	-024	7.0		E	N	S	S	S	S	S	UN	UN			pH	DO			5e	5e			AQUATIC LIFE	127	67.2
Dorcheat Bayou	11140203	-022	8.4	RED0015A	M	N	N	S	S	S	S	UN	UN	SE	UN	pH	MN*	SI	Pb	5e	5d	5d	5d	PRIMARY CONTACT	194.2	0.0
Dorcheat Bayou	11140203	-020	11.9		E	N	N	S	S	S	S	UN	UN	SE	UN	pH	MN*	SI	Pb	5e	5d	5d	5d	SECONDARY CONTACT	194.2	0.0
Cypress Creek	11140203	-019	18.5		E	S	S	S	S	S	S									1				DRINKING SUPPLY	194.2	0.0
Horsehead Creek	11140203	-021	16.8	UWHHC01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	194.2	0.0
Big Creek	11140203	-023	18.5	UWBIG01	M	S	N	S	S	S	S	IP				Pb				5d						
Big Creek	11140203	-923			U															3						
Beech Creek	11140203	-025	15.7	UWBCH01	M	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-010	19.5	RED0056	E	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-009	9.5		E	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-008	9.1		E	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-007	7.8	RED0057	M	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-006	22.4	RED0027	M	S	N	S	S	S	S	UN	UN	UN	UN	SI	Pb	Zn	pH	5d	5d	5d	4c			
Bodcau Creek	11140205	-002	6.0		E	S	N	S	S	S	S	UN	UN	UN	UN	SI	Pb	Zn	pH	5d	5d	5d	4c			
TOTAL MILES	194.2																									
MILES UNASSESSED	15.7																									
MILES EVALUATED	81.5																									
MILES MONITORED	112.7																									

Bayou Dorcheat has fish consumption advisories for mercury

MN*= SO4, TDS

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWBDT01	Bayou Dorcheat at Highway 355		2	R
UWBDT02	Bayou Dorcheat at Highway 82, 6 miles west of Waldo		2	R
RED0015A	Bayou Dorcheat east of Taylor	Y	1	A
UWHHC01	Horsehead Creek at Highway 19, 2 miles north of Walkerville		2	R
UWBIG01	Big Creek at Highway 132 near Magnolia		2	R
UWBCH01	Beech Creek at Highway 82 near Waldo		2	R
RED0056	Little Bodcaw Creek at Highway 29 near Lewisville		2	R
RED0057	Bodcaw Creek at Highway 355 near Hempstead County Line		2	R
RED0027	Bodcaw Creek south of Lewisville	Y	1	A

Table A-2: Segment 1A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000434	American Fuel Cell & Coated FA	Trib, Big CR, Dorcheat Bayou, Red R	11140203	1
AR0000493	Entergy AR, Inc. – Harvey Couch	Lake June Trib, Bodcaw CR	11140205	2
AR0020044	Taylor, City of	Little Crooked CR	11140205	3
AR0020621	Bradley, City of	Ditch, Wheeler CR	11140205	4
AR0021555	McNeil, City of	O'rear CR, Big CR	11140203	5
AR0021920	Stamps, City of	Bodcau CR, Red R	11140205	21
AR0035696	Lewisville, City of	Steel CR, Bodcau Bayou	11140205	6
AR0038857	Albemarle Corp – South Plant	Horsehead CR, Dorcheat Bayou	11140203	7
AR0039594	Emerson, City of	Trib, Little Cypress CR, Dorcheat Bayou	11140203	8
AR0043508	Waldo, City of	Trib, Big CR	11140203	9
AR0043613	Magnolia, City of	Ditch, Big CR, Dorcheat Bayou, Red R	11140203	10
AR0043923	Willamette Industries – Emerson	South Cypress CR, Dorcheat Bayou, Lake Bistinea	11140203	11
AR0045535	Camp Canfield	Mill CR Trib	11140205	12
AR0046418	Longview Gas Co.	Trib, Crooked CR, Walker CR, Bayou Dorcheat	11140205	14
AR0046973	Magnolia Country Club	Trib, Horsehead CR, Dorcheat Bayou, Red R	11140203	15
AR0047627	SMI Steel – Arkansas	Ditch, Hurricane CR, Bayou Dorcheat	11140203	16
AR0047635	Albemarle Corp – West Plant	Dismukes Br, Big CR, Bayou Dorcheat	11140203	17
AR0047953	Deltic Farm & Timber – Waldo Mil	Trib, Beech CR, Lake Columbia	11140203	18
AR0048054	Quad Hardwood Products	Trib, Big CR, Dorcheat Bayou, Red R	11140203	19
AR0048305	Stamps, City of – South WTF	Ditch, Bodcau CR	11140205	20

Table A-3: RED0015A Dorcheat Bayou E of Taylor, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.82	4.11	17.38	2.42
BOD_5 (mg/L)	54	1.43	0.53	2.88	0.53
pH (standard units)	57	6.36	5.14	8.56	0.60
Total Organic Carbon (mg/L)	56	12.76	4.62	18.57	2.89
Ammonia as N (mg/L)	58	0.03	0.01	0.24	0.04
NO_2 + NO_3 as N (mg/L)	58	0.11	0.01	0.55	0.12
Orthophosphate as P (mg/L)	57	0.04	0.01	0.23	0.03
Total Phosphorus as P (mg/L)	56	0.12	0.02	0.29	0.06
Total Hardness (mg/L)	23	25.61	25.00	33.00	2.04
Chloride (mg/L)	58	23.60	7.07	51.50	12.15
Sulfate (mg/L)	58	25.30	3.09	172.00	36.85
Total Dissolved Solids (mg/L)	57	140.32	52.00	338.00	71.78
Total Suspended Solids (mg/L)	57	8.07	1.00	75.00	10.23
Turbidity (NTU)	57	16.65	3.40	72.70	13.18

Table A-4: RED0027 Bodcaw Cr. Near Lewisville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	7.00	3.50	15.30	2.20
BOD_5 (mg/L)	55	1.83	0.56	5.07	0.93
pH (standard units)	58	6.22	5.34	7.49	0.41
Total Organic Carbon (mg/L)	57	13.55	4.84	24.40	3.61
Ammonia as N (mg/L)	59	0.04	0.01	0.28	0.05
NO_2 + NO_3 as N (mg/L)	59	0.08	0.01	0.39	0.08
Orthophosphate as P (mg/L)	58	0.04	0.02	0.17	0.02
Total Phosphorus as P (mg/L)	58	0.15	0.02	0.32	0.07
Total Hardness (mg/L)	23	25.35	25.00	33.10	1.69
Chloride (mg/L)	59	17.31	5.90	98.00	12.54
Sulfate (mg/L)	59	5.70	1.33	117.00	14.91
Total Dissolved Solids (mg/L)	58	96.89	50.00	258.00	29.11
Total Suspended Solids (mg/L)	58	6.87	1.00	25.50	5.22
Turbidity (NTU)	58	17.88	3.30	61.80	13.36

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SEGMENT 1B RED RIVER, SULPHUR RIVER, AND McKINNEY BAYOU

Segment 1B is located in the southwest corner of the State. It includes all of Miller County and parts of Little River, Hempstead, and Lafayette Counties. Major streams within this segment are the Red River from its point of entrance into Arkansas to the Louisiana state line, the Sulphur River, and McKinney Bayou.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 187.6 miles of stream within the segment. An additional 152.5 miles of stream were evaluated bringing the total miles of assessed streams within this segment to 340.1.

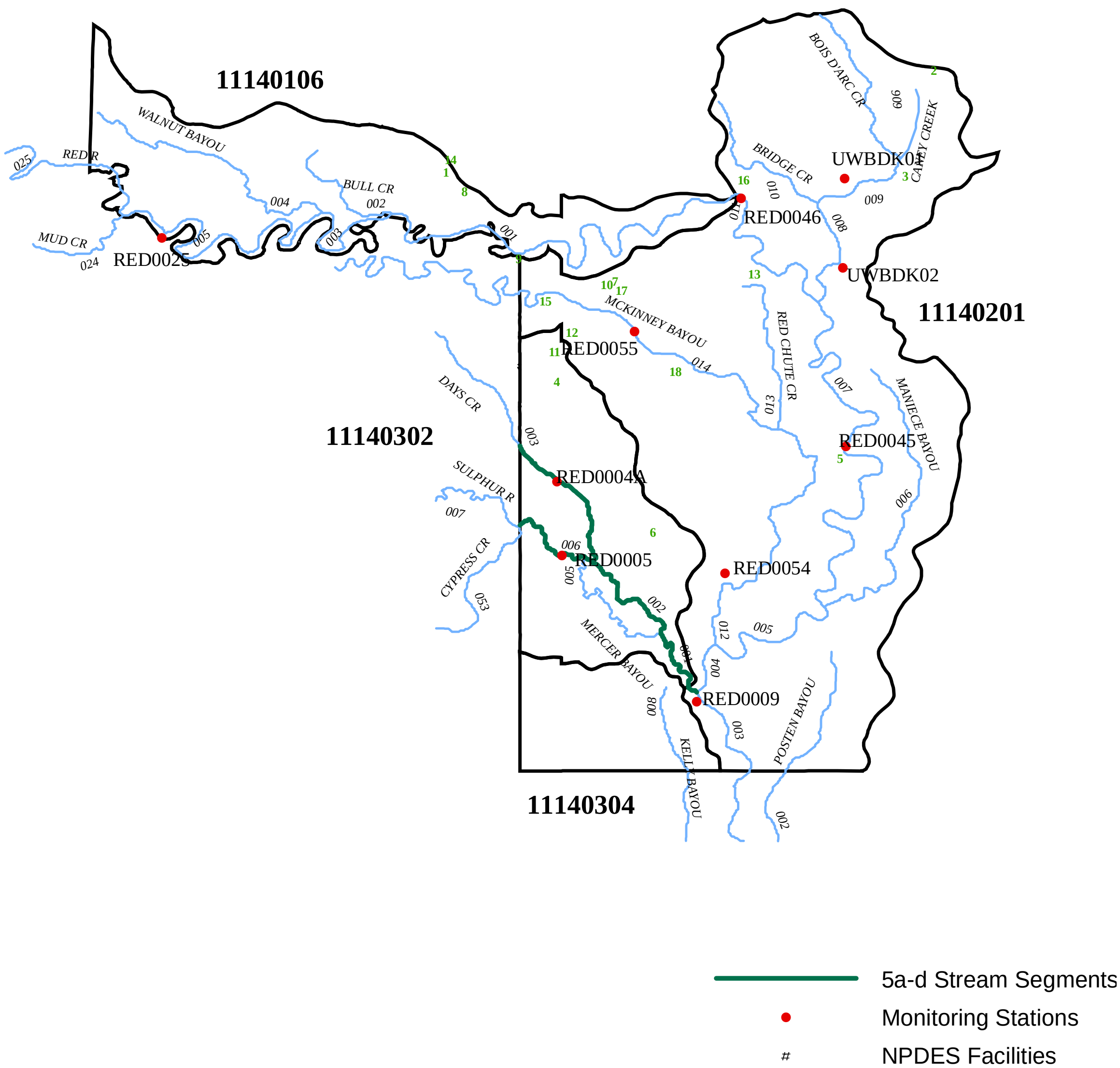
Monitored data on the Red River near its entrance into Arkansas clearly indicate that the total dissolved solids and chloride criteria protective of the public water supply use is not being maintained. However, the drinking water designated use has been removed from the Red River from its point of entrance into the State to its confluence with the Little River.

Total dissolved solids and sulfate concentrations exceed the drinking water and agricultural and industrial water supply standards for McKinney Bayou. This is a reflection of the natural background conditions of the streams in the area.

Data trends for Days Creek reveal major water quality improvements in the creek as a result of the City of Texarkana's improvement of its WWTF. Unfortunately, the creek is not meeting the drinking water designated use due to high nitrate levels. A TMDL to address this problem was completed in early 2006.

Turbidity trend analysis from the Sulphur River indicates an increasing trend over the past ten years from an average of about 20 NTU to almost 60 NTU (Figure A-3). There seems to be a significant increase in turbidity concentrations over the past five years. Turbidity concentrations the past five years have routinely been above the instream "storm flow" standard of 32 NTU. As a result, five stream segments of the Sulphur River in Arkansas have been assessed as not attaining the aquatic life use due to excessive instream turbidity. The source of the turbidity is from surface erosion.

Figure A-2: Planning Segment 1B



(Segment 1B)

Table A-5: Planning Segment 1B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-1B																							
Red River	11140201	-011	15.2	RED0046	M	S	S	S	S	S	S	UN				TDS				5e			
Red River	11140201	-007	40.1	RED0045	M	S	S	S	S	S	S	UN				TDS				5e			
Red River	11140201	-005	12.0		E	S	S	S	S	S	S	UN				TDS				5e			
Red River	11140201	-004	4.0		E	S	S	S	S	S	S	UN				TDS				5e			
Red River	11140201	-003	15.5	RED0009	M	S	S	S	S	S	S	UN				TDS				5e			
Posten Bayou	11140201	-002	18.7		E	S	S	S	S	S	S									1			
Maniece Bayou	11140201	-006	24.2		U															3			
Bois D'Arc Cr.	11140201	-008	8.9	UWBDK02	M	S	S	S	S	R	S									1			
Bois D'Arc Cr.	11140201	-009	20.4	UWBDK01	M	S	S	S	S	R	S									1			
Bridge Creek	11140201	-010	12.1		E	S	S	S	S	S	S									1			
McKinney Bayou	11140201	-012	23.1	RED0054	M	S	N	S	S	S	S	UN	UN			TDS	SO4			5e	5e		
McKinney Bayou	11140201	-014	21.6	RED0055	M	S	N	S	S	S	S	UN	UN			TDS	SO4			5e	5e		
Red Chute Creek	11140201	-013	12.5		U															3			
Sulphur River	11140302	-001	6.3		E	S	N	S	S	S	S	SE	UN			SI	Temp			5a	5e		
Sulphur River	11140302	-002	8.5		E	S	N	S	S	S	S	SE	UN			SI	Temp			5a	5e		
Sulphur River	11140302	-004	0.7		E	S	N	S	S	S	S	SE	UN			SI	Temp			5a	5e		
Sulphur River	11140302	-006	6.5	RED0005	M	S	N	S	S	S	S	SE	UN			SI	Temp			5a	5e		
Sulphur River	11140302	-008	0.8		E	S	N	S	S	S	S	SE	UN			SI	Temp			5a	5e		
Days Creek	11140302	-003	11.0	RED0004A	M	S	N	S	S	N	S	MP	SE	UN		NO3	SI	Pb		4a	5a	5d	
Mercer Bayou	11140302	-005	12.8		U															3			
Red River	11140106	-001	34.8		E	S	N	S	S	R	S	UN				CL				5e			
Red River	11140106	-003	9.8		E	S	N	S	S	R	S	UN				CL				5e			
Red River	11140106	-005	25.3	RED0025	M	S	N	S	S	R	S	UN				CL				5e			
Red River	11140106	-025	8.0		E	S	N	S	S	R	S	UN				CL				5e			
Bull Creek	11140106	-002	9.3		E	S	S	S	S	S	S									1			
Walnut Bayou	11140106	-004	20.3		E	S	S	S	S	S	S									1			
Kelley Bayou	11140304	-006	7.2		E	S	S	S	S	S	S									1			
TOTAL MILES	389.6																						
MILES UNASSESSED	49.5																						
MILES EVALUATED	152.5																						
MILES MONITORED	187.6																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	340.1	0.0
AQUATIC LIFE	183.7	156.4
SWIMMING	340.1	0.0
SECONDARY CONTACT	340.1	0.0
DRINKING SUPPLY	221.9	11.0
AGRI & INDUSTRY	340.1	0.0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
RED0046	Red River at Fulton railroad bridge		1	A
RED0045	Red River at Highway 82 near Garland		1	A
RED0009	Red River near Doddridge	Y	1	A
UWBDK02	Bois D' Arc Creek on county road northwest of Center Point		2	R
UWBDK01	Bois D' Arc Creek at Highway 67 near Hope		2	R
RED0054	McKinney Bayou at Highway 296, east of Mandeville		2	R
RED0055	McKinney Bayou at Highway 134, southeast of Fouke		2	R
RED0005	Sulphur river south of Texarkana	Y	1	A
RED0004A	Days Creek southeast of Texarkana	Y	1	A
RED0025	Red River south of Foreman	Y	1	A

Table A-6: Segment 1B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0002968	Domtar A W Corp – Ashdown Operations	Red R	11140106	1
AR0021326	Hudson Foods Inc. – Hope	Ditch, Caney CR, Bois D'arc CR	11140201	2
AR0038466	Hope, City of – Bois D'Arc WWTP	Black Br, Bois D'arc CR, Red R	11140201	3
AR0038822	Cooper Tire & Rubber Co. – TexArk	Ditch, Nix CR, Days CR	11140302	4
AR0041181	Garland, City of	Red R	11140201	5
AR0041548	Fouke, City of	Trib, Chicken CR, Boggy CR	11140302	6
AR0042897	Texarkana RV Park	Bois D'arc Trib, Finn Bayou	11140201	7
AR0042951	Ashdown, City of	G.P. Canal, Red R	11140106	8
AR0043346	AR Hwy Dept – Red RV Tourist Ctr	Red R	11140106	9
AR0044709	Flying J Travel Plaza #5021	Trib, Bois D'arc Bayou, Red R	11140201	10
AR0046345	Spring Hill School	Trib, Flat Bois D'arc C, Little Bodcaw CR	11140201	
AR0046671	Celotex Corp – Texarkana Plant	Trib;Oak,Nix,Days CRs	11140302	11
AR0046795	Electric Cowboy of Texarkana	Trib,Mckinney Bayou	11140201	12
AR0048348	Texarkana Timber Co.	Trib, Mill CR, Mckinney Bayou, Red R	11140201	18
AR0048356	RVAF – Texarkana	Red R	11140201	13
AR0048411	Domtar A W Corp – Woodlands Wet	Trib, Hudson CR, Little R	11140106	14
AR0048691	Texarkana, City of – North WWTP	Mckinney Bayou, Red R	11140302	15
AR0048810	Fulton, City of	Red R	11140201	16
AR0049905	Red Barn BBQ	Trib, Clear Lake	11140201	17

Table A-7: RED0004A Days Creek SE of Texarkana, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.49	4.50	18.74	2.39
BOD_5 (mg/L)	59	1.66	0.35	7.95	1.40
pH (standard units)	58	6.80	5.94	8.14	0.43
Total Organic Carbon (mg/L)	57	7.97	5.20	12.60	1.61
Ammonia as N (mg/L)	59	0.08	0.01	0.32	0.07
NO_2 + NO_3 as N (mg/L)	59	5.44	0.02	13.60	4.04
Orthophosphate as P (mg/L)	58	0.08	0.01	0.34	0.06
Total Phosphorus as P (mg/L)	58	0.17	0.02	0.52	0.10
Total Hardness (mg/L)	22	60.90	25.00	110.00	27.79
Chloride (mg/L)	59	35.65	6.47	134.00	21.86
Sulfate (mg/L)	59	33.34	7.61	84.70	18.24
Total Dissolved Solids (mg/L)	58	209.41	96.50	440.00	82.14
Total Suspended Solids (mg/L)	58	18.70	1.00	209.00	36.63
Turbidity (NTU)	59	29.31	3.13	174.00	40.13

Table A-8: RED0005 Sulphur River S of Texarkana, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.04	4.14	18.56	2.49
BOD_5 (mg/L)	55	3.07	0.57	6.00	1.44
pH (standard units)	58	7.35	5.98	8.60	0.52
Total Organic Carbon (mg/L)	57	10.00	6.20	26.90	3.32
Ammonia as N (mg/L)	59	0.08	0.01	0.86	0.16
NO_2 + NO_3 as N (mg/L)	59	0.11	0.01	0.28	0.07
Orthophosphate as P (mg/L)	58	0.04	0.01	0.11	0.02
Total Phosphorus as P (mg/L)	59	0.14	0.02	0.31	0.05
Total Hardness (mg/L)	23	68.21	42.00	102.00	14.45
Chloride (mg/L)	59	20.60	3.31	95.40	15.97
Sulfate (mg/L)	59	32.01	7.76	225.00	32.58
Total Dissolved Solids (mg/L)	58	193.90	96.00	731.00	100.82
Total Suspended Solids (mg/L)	58	44.19	2.20	102.00	25.96
Turbidity (NTU)	59	47.40	5.70	135.00	27.38

Table A-9: RED0009 Red River Near Doddridge, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.98	4.49	14.28	2.15
BOD_5 (mg/L)	55	2.71	0.66	5.36	1.20
pH (standard units)	58	7.48	6.08	8.58	0.59
Total Organic Carbon (mg/L)	57	8.08	5.62	13.00	1.89
Ammonia as N (mg/L)	59	0.04	0.01	0.21	0.05
NO_2 + NO_3 as N (mg/L)	59	0.18	0.01	0.82	0.14
Orthophosphate as P (mg/L)	54	0.03	0.01	0.12	0.02
Total Phosphorus as P (mg/L)	58	0.13	0.02	0.23	0.04
Total Hardness (mg/L)	23	140.22	45.00	279.00	79.83
Chloride (mg/L)	59	83.22	3.91	719.00	105.61
Sulfate (mg/L)	59	69.34	8.45	183.00	46.62
Total Dissolved Solids (mg/L)	58	359.49	104.00	783.00	193.59
Total Suspended Solids (mg/L)	58	56.43	16.80	173.00	34.51
Turbidity (NTU)	59	54.40	6.25	169.00	33.69

Table A-10: RED0025 Red River S of Foreman, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.30	5.53	17.35	2.17
BOD_5 (mg/L)	56	2.49	0.76	5.43	1.15
pH (standard units)	59	7.70	6.42	8.39	0.45
Total Organic Carbon (mg/L)	58	5.93	4.16	10.60	1.14
Ammonia as N (mg/L)	60	0.01	0.01	0.13	0.02
NO_2 + NO_3 as N (mg/L)	60	0.12	0.00	0.55	0.15
Orthophosphate as P (mg/L)	52	0.02	0.00	0.10	0.02
Total Phosphorus as P (mg/L)	60	0.12	0.020	0.26	0.05
Total Hardness (mg/L)	23	228.80	64.00	355.00	77.83
Chloride (mg/L)	59	193.88	15.93	2040.00	275.64
Sulfate (mg/L)	58	122.75	17.72	247.00	54.62
Total Dissolved Solids (mg/L)	59	570.69	104.00	1050.00	220.35
Total Suspended Solids (mg/L)	59	65.12	12.00	270.60	48.23
Turbidity (NTU)	60	58.29	8.20	265.00	49.25

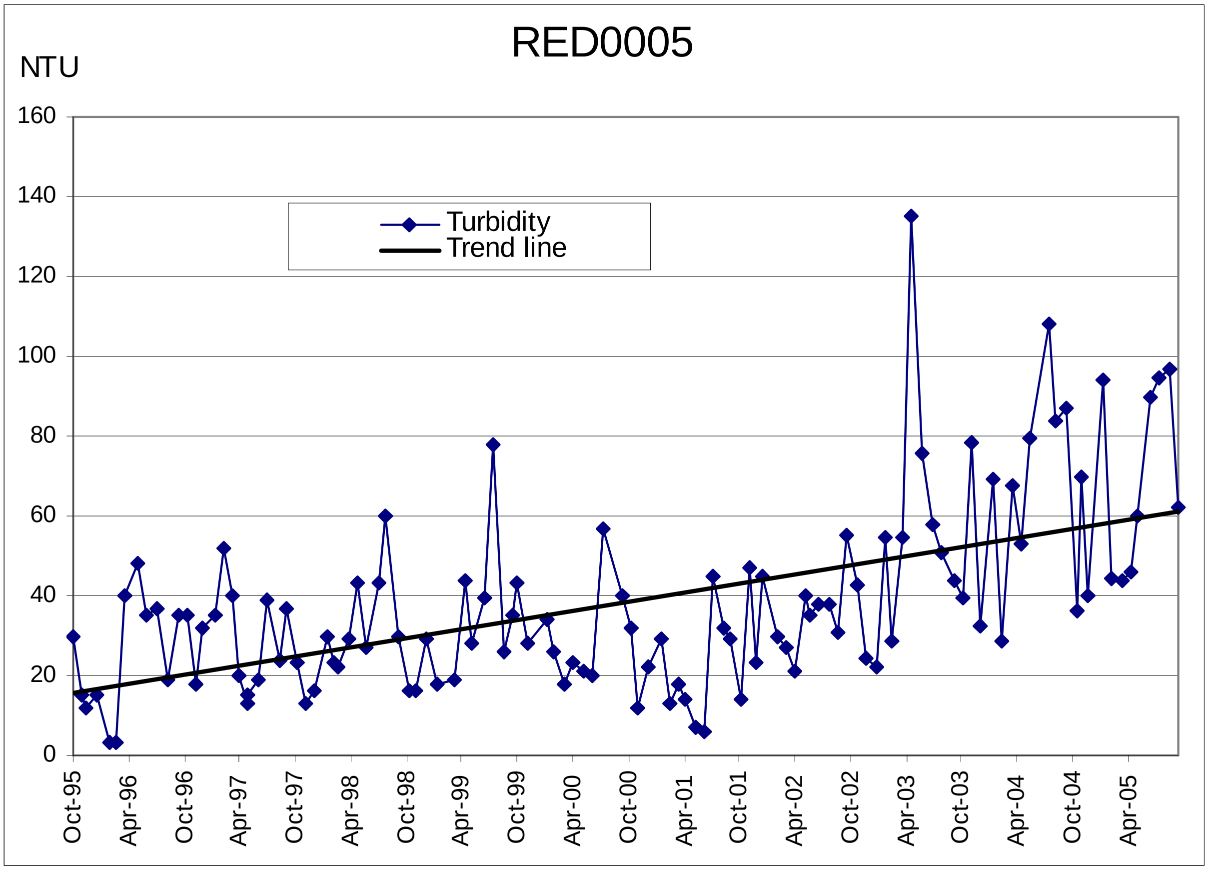
Table A-11: RED0045 Red River at Hwy 82 Bridge Near Garland, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.61	6.32	18.58	2.26
BOD_5 (mg/L)	56	2.57	0.66	6.12	1.35
pH (standard units)	59	7.64	6.25	8.85	0.59
Total Organic Carbon (mg/L)	58	7.09	4.45	13.00	1.52
Ammonia as N (mg/L)	60	0.02	0.01	0.20	0.04
$NO_2 + NO_3$ as N (mg/L)	60	0.11	0.00	0.50	0.12
Orthophosphate as P (mg/L)	54	0.03	0.01	0.10	0.02
Total Phosphorus as P (mg/L)	59	0.14	0.02	0.82	0.10
Total Hardness (mg/L)	1	151.00	151.00	151.00	0.00
Chloride (mg/L)	60	127.96	5.06	881.00	141.65
Sulfate (mg/L)	60	93.29	10.50	313.00	59.55
Total Dissolved Solids (mg/L)	59	435.41	104.00	930.00	214.11
Total Suspended Solids (mg/L)	59	73.86	14.00	1305.00	167.69
Turbidity (NTU)	59	56.60	10.00	400.00	60.65

Table A-12: RED0046 Red River at Fulton, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.05	5.33	17.36	2.24
BOD_5 (mg/L)	55	2.34	0.40	6.21	1.18
pH (standard units)	59	7.46	6.04	9.22	0.59
Total Organic Carbon (mg/L)	58	6.77	4.74	16.50	1.80
Ammonia as N (mg/L)	60	0.02	0.00	0.13	0.03
$NO_2 + NO_3$ as N (mg/L)	60	0.35	0.01	14.60	1.88
Orthophosphate as P (mg/L)	51	0.02	0.01	0.09	0.02
Total Phosphorus as P (mg/L)	60	0.12	0.02	0.76	0.09
Total Hardness (mg/L)	2	107.50	66.00	149.00	58.69
Chloride (mg/L)	59	110.40	8.30	263.00	83.75
Sulfate (mg/L)	59	88.48	8.18	226.00	58.46
Total Dissolved Solids (mg/L)	59	411.86	71.00	832.00	231.18
Total Suspended Solids (mg/L)	59	47.39	3.20	118.00	28.97
Turbidity (NTU)	60	47.44	5.19	167.00	32.48

Figure A-3: Sulphur River Turbidity Trend Analysis



SEGMENT 1C LITTLE RIVER AND TRIBUTARIES

Segment 1C is located in southwest Arkansas north of Texarkana and includes all of Sevier County and parts of Polk, Howard, Hempstead, and Little River counties. This includes the entire reach of the Little River in Arkansas from its point of entrance into the State to its confluence with the Red River. The major tributaries include Rolling Fork, Cossatot River, Saline River, and Mine Creek. The major reservoirs located in this segment include DeQueen, Gillham and Dierks Reservoirs, all of which drain into Millwood Reservoir.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, public, industrial and agricultural water supplies and contains ecologically sensitive waterbodies. Monitored data were used as the basis of assessing 180.3 miles of stream within this segment. An additional 150.5 miles were evaluated bring the total number of stream miles assessed 330.8 stream miles. Overall water quality is fair in the basin with the exception of several long-term problem areas.

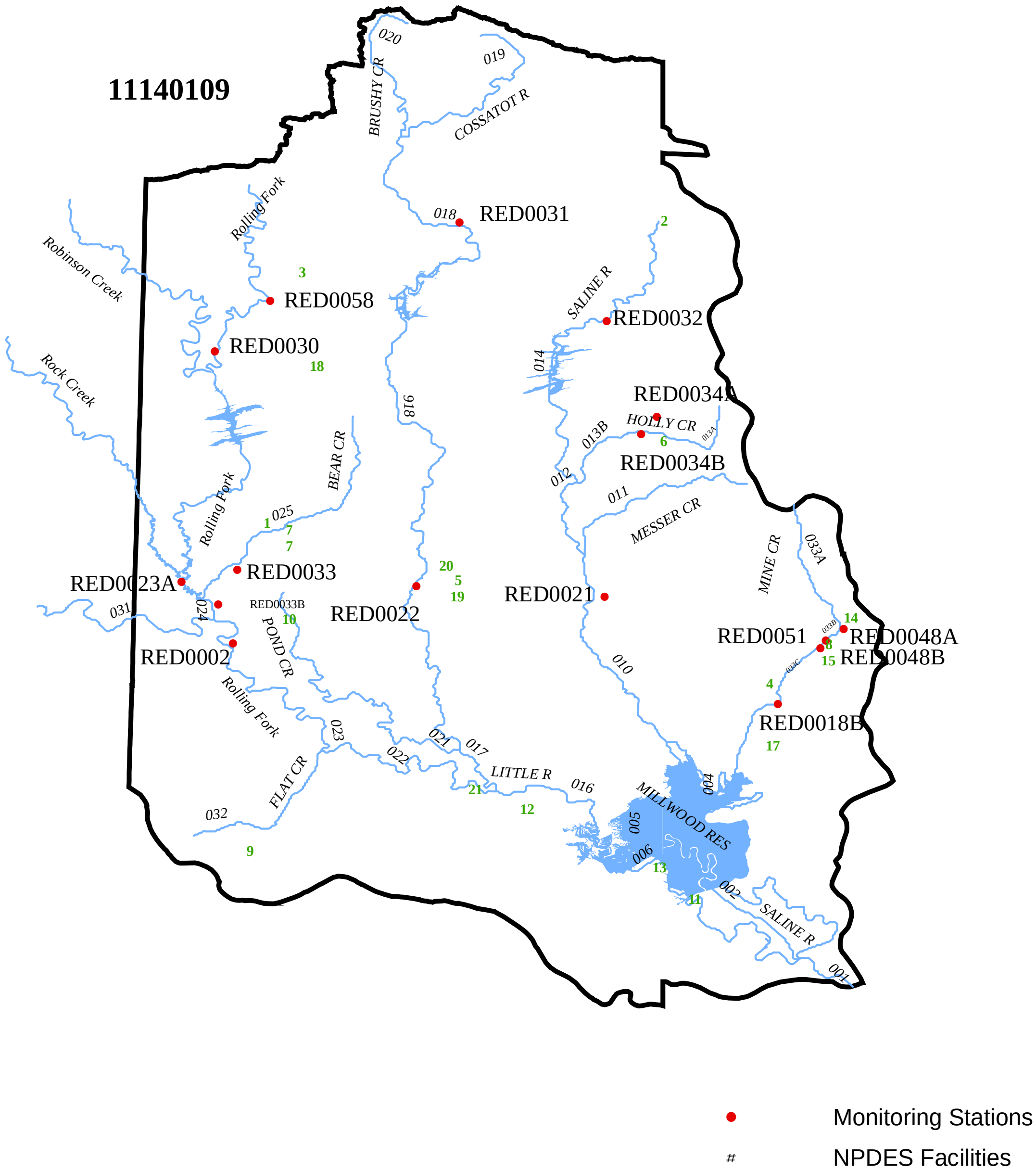
Holly Creek below Dierks is impacted by elevated levels of zinc originating from the city WWTF and/or Weyerhaeuser, Inc. discharges. Additional monitoring to accurately assess the stream segment, and/or additional point source controls are needed to address the problem.

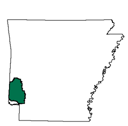
Bear Creek has shown major improvements over the last several years, but is still impacted by discharges from the City of DeQueen. The concern is elevated nutrients. The creek is currently listed as not attaining the drinking water use.

The Rolling Fork River above DeQueen Reservoir has significantly elevated nutrient concentrations (see charts RED0030 and RED0058) and copper concentrations. A TMDL addressing the nutrients was completed in 2006. Additional point source controls will be investigated to implement the TMDL and address the copper issue.

Mine Creek has elevated nutrients and metals (copper and zinc) discharged from the Tyson, Inc. plant at Nashville. Additional point source controls will be investigated to address these issues.

Figure A-4: Planning Segment 1C





(Segment 1C)

Table A-13: Planning Segment 1C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-1C																										
Saline River	11140109	-001	4.0		U															3				FISH CONSUMPTION	330.8	0
Saline River	11140109	-010	15.2	RED0021	M	S	S	S	S	S	S									1				AQUATIC LIFE	316.7	14.1
Saline River	11140109	-012	6.1		E	S	S	S	S	S	S									1				PRIMARY CONTACT	323.3	7.5
Messer Creek	11140109	-011	12.6		E	S	S	S	S	S	S									1				SECONDARY CONTACT	330.8	0
Holly Creek	11140109	-013A	6.7	RED0034A	M	S	S	S	S	S	S									1				DRINKING SUPPLY	291.7	17.3
Holly Creek	11140109	-013B	6.2	RED0034B	M	S	S	N	S	S	S	MP	IP			Zn				4b				AGRI & INDUSTRY	329.5	1.3
Saline River	11140109	-014	15.3	RED0032	M	S	S	S	S	S	S									1						
Saline River	11140109	-917	10.0		U															3						
Little River	11140109	-015	4.2		U															3						
Little River	11140109	-016	11.7		E	S	S	S	S	S	S									1						
Cossatot R.	11140109	-017	4.6		E	S	S	S	S	S	S									1						
Cossatot R.	11140109	-018	19.0	RED0031	M	S	S	S	S	S	S									1						
Cossatot R.	11140109	-918	37.2	RED0022	M	S	S	S	S	S	S									1						
Cossatot R.	11140109	-019	14.2		E	S	S	S	S	S	S									1						
Bushy Creek	11140109	-020	11.6		E	S	S	S	S	S	S									1						
Pond Creek	11140109	-021	23.5		E	S	S	S	S	S	S									1						
Little River	11140109	-022	15.8		E	S	S	S	S	S	S									1						
Little River	11140109	-023	17.8	RED0002	M	S	S	S	S	S	S									1						
Rolling Fork	11140109	-024	1.7		E	S	S	S	S	S	S									1						
Bear Creek	11140109	-025	17.3	RED0033	M	S	S	S	S	N	S	MP				NO3				4b						
Rolling Fork	11140109	-026	2.7	RED0023A	M	S	S	S	S	S	S									1						
Rolling Fork	11140109	-027	15.1		E	S	S	S	S	S	S									1						
Rolling Fork	11140109	-919	12.8	RED0030,58	M	S	N	S	S	S	S	IP	IP	IP		NO3	TP	Cu		4a	4a	4b				
Rolling Fork	11140109	-028	8.3		M	S	S	S	S	S	S									1						
Robinson Creek	11140109	-029	25.6		E	S	S	S	S	S	S									1						
Rock Creek	11140109	-030	10.0		U															3						
Little River	11140109	-031	8.0		E	S	S	S	S	S	S									1						
Flat Creek	11140109	-032	10.7		U															3						
Mine Creek	11140109	-033A	9.1	RED0048A	M	S	S	S	S	R	S									1						
Mine Creek	11140109	-033B	1.3	RED0048B	M	S	N	N	S	R	N	IP	IP	IP		Cu	Zn	DO		4b	4b	4b				
Mine Creek	11140109	-033C	11.4	RED0018B	M	S	S	S	S	R	S									1						
TOTAL MILES	369.7																									
MILES UNASSESSED	38.9																									
MILES EVALUATED	150.5																									
MILES MONITORED	180.3																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
RED0021	Saline River at Highway 24	Y	1	A
RED0034A	Holly Creek above Dierks		1	A
RED0034B	Holly Creek below Dierks		1	A
RED0032	Saline River at Highway 4 north of Dierks		1	A
SAL01	Saline River near Direks		2	S
SAL03	Saline River west		2	S
BLB01	Blue Bayou west of Mineral Springs		2	S
BRI01	Bridge Creek southwest of Lockesburg		2	S
CEG01	Cool Creek south of Walnut Springs		2	S
COS01	Cossatot River northwest of DeQueen		2	S
COS03	Cossatat River south of Lockesburg		2	S
RED0031	Cossatot River at Highway 4 near Wickes		1	A
RED0022	Cossatot River at Highway 24 bridge	Y	1	A
RED0002	Little River near Horatio	Y	1	A
RED0033	Bear Creek below Process City		1	A
RED0033B	Bear Creek at Highway 24 near Horatio		1	A
RED0023A	Rolling Fork River at county road north of Highway 24	Y	1	A
RED0030	Rolling Fork River above Dequeen Reservoir		1	A
RED0058	Rolling Fork River near Grannis		1	A
RED0018B	Mine Creek at Highway 355 above Tyson effluent		1	A
RED0048A	Mine Creek at Highway 27 bypass above Tyson effluent		2	A
RED0048B	Mine Creek near Nashville below Tyson effluent		1	A
RED0051	City of Nashville effluent		2	S
DIL0001	Dillard creek at Highway 27 south of Nashville		2	S
MIN0002	Mine Creek 1.4 miles west of Tollerre		2	S

Table A-14: Segment 1C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0002909	Weyerhaeuser Co – DeQueen Wood	Bear CR, Rolling Fork, Little Red R	11140109	1
AR0002917	Weyerhaeuser Co – Dierks	Holly CR	11140109	2
AR0003018	Tyson Foods Inc – Grannis	Trib-Rolling Fork R,1C-Red R Basin	11140109	3
AR0021261	Mineral Springs, City of	Mine CR, Little R	11140109	4
AR0021377	Lockesburg, City of	Little Cossatot R Trib	11140109	5
AR0021709	Dierks, City of	Holly CR	11140109	6
AR0021733	DeQueen, City of	Big Bear CR	11140109	7
AR0021776	Nashville, City of	Mine CR, Millwood Lake, Little R, Red R	11140109	8
AR0023817	Foreman, City of	East Flat CR	11140109	9
AR0035785	Horatio, City of	Trib, Pond CR, Cossatot R, Little R	11140109	10
AR0037079	AR Parks & Tourism – Millwood	Ditch, Buster CR	11140109	11
AR0040886	Wilton, City of	Lick CR	11140109	12
AR0041246	Millwood Water Corp.	Trib (Millwood Lake), Little R, Red R	11140109	13
AR0041734	Tyson Foods Inc. – Nashville	Mine CR, Millwood Lake	11140109	14
AR0041769	Dalton MHP	Trib, Mine CR, Millwood Lake	11140109	15
AR0042846	Ash Grove Cement Co	French CR, Walnut Bayou, Red R	11140109	
AR0045144	Tollette, City of	Mine CR, Little R	11140109	17
AR0047996	Gillham Regional WW Dist.	Bellah CR, Rolling Fork, Lake Dequeen	11140109	18
AR0048593	Bruce Kennedy Sand & Gravel	Mill Slough Br, Cossatot R	11140109	19
AR0049034	Sevier County Aggregates, Inc.	Slough, Hail CR, Cossatot R	11140109	20
AR0049379	Hanson Aggregates – Little River	Little R Trib	11140109	21

Table A-15: RED0002 Little River Near Horatio, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.04	6.17	12.53	1.74
BOD_5 (mg/L)	55	1.02	0.33	7.75	1.03
pH (standard units)	60	6.65	6.14	7.23	0.27
Total Organic Carbon (mg/L)	58	3.97	2.53	8.57	1.17
Ammonia as N (mg/L)	59	0.02	0.01	0.10	0.03
$NO_2 + NO_3$ as N (mg/L)	60	0.26	0.01	0.99	0.15
Orthophosphate as P (mg/L)	58	0.03	0.01	0.11	0.02
Total Phosphorus as P (mg/L)	59	0.07	0.02	0.19	0.04
Total Hardness (mg/L)	24	25.58	25.00	33.00	1.79
Chloride (mg/L)	60	7.99	2.01	16.40	4.16
Sulfate (mg/L)	60	5.26	3.45	17.70	2.01
Total Dissolved Solids (mg/L)	60	57.57	34.50	92.00	13.20
Total Suspended Solids (mg/L)	60	7.94	1.00	36.50	7.25
Turbidity (NTU)	60	13.98	2.40	45.00	10.75

Table A-16: RED0018B Mine Cr. Downstream of Nashville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.22	3.57	12.30	2.14
BOD_5 (mg/L)	57	1.06	0.32	3.61	0.63
pH (standard units)	58	6.79	6.06	7.45	0.36
Total Organic Carbon (mg/L)	56	4.39	1.69	9.03	1.62
Ammonia as N (mg/L)	57	0.08	0.00	0.28	0.06
$NO_2 + NO_3$ as N (mg/L)	58	2.08	0.18	8.85	1.77
Orthophosphate as P (mg/L)	57	0.77	0.03	3.07	0.89
Total Phosphorus as P (mg/L)	56	0.86	0.07	3.53	0.91
Total Hardness (mg/L)	24	25.78	25.00	30.00	1.44
Chloride (mg/L)	58	19.31	3.48	58.40	17.25
Sulfate (mg/L)	58	26.26	6.83	111.04	24.14
Total Dissolved Solids (mg/L)	58	146.28	56.50	407.00	105.27
Total Suspended Solids (mg/L)	58	8.48	2.00	55.00	8.43
Turbidity (NTU)	58	15.82	4.80	82.30	11.49

Table A-17: RED0021 Saline River Near Lockesburg, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	7.92	3.50	12.93	2.38
BOD_5 (mg/L)	57	0.98	0.18	5.04	0.76
pH (standard units)	62	6.59	6.11	7.80	0.30
Total Organic Carbon (mg/L)	60	5.97	3.23	17.90	2.21
Ammonia as N (mg/L)	61	0.04	0.01	0.37	0.06
$NO_2 + NO_3$ as N (mg/L)	62	0.39	0.00	2.55	0.37
Orthophosphate as P (mg/L)	58	0.03	0.01	0.11	0.02
Total Phosphorus as P (mg/L)	61	0.09	0.02	0.30	0.05
Total Hardness (mg/L)	26	25.31	25.00	32.00	1.38
Chloride (mg/L)	62	3.19	2.09	6.36	0.82
Sulfate (mg/L)	62	5.26	2.53	13.90	2.44
Total Dissolved Solids (mg/L)	62	59.62	32.50	114.00	14.99
Total Suspended Solids (mg/L)	62	9.11	1.00	101.30	16.69
Turbidity (NTU)	62	18.16	4.10	127.00	17.89

Table A-18: RED0022 Cossatot River W of Lockesburg, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.88	5.87	12.87	1.88
BOD_5 (mg/L)	56	0.74	0.21	2.30	0.45
pH (standard units)	61	6.59	6.17	7.13	0.27
Total Organic Carbon (mg/L)	59	3.43	2.14	12.50	1.42
Ammonia as N (mg/L)	60	0.01	0.01	0.18	0.03
$NO_2 + NO_3$ as N (mg/L)	61	0.18	0.01	0.78	0.16
Orthophosphate as P (mg/L)	55	0.01	0.01	0.08	0.01
Total Phosphorus as P (mg/L)	60	0.04	0.02	0.18	0.03
Total Hardness (mg/L)	25	25.12	25.00	28.00	0.60
Chloride (mg/L)	61	2.16	1.53	2.87	0.31
Sulfate (mg/L)	61	3.75	2.61	5.67	0.45
Total Dissolved Solids (mg/L)	61	40.53	27.00	74.50	7.71
Total Suspended Solids (mg/L)	61	5.19	1.00	22.00	4.35
Turbidity (NTU)	61	10.99	2.60	49.80	7.97

Table A-19: RED0023A Rolling Fork River at County Road Bridge 1 ½ Mi N. Hwy 24

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.55	6.04	12.49	1.85
BOD_5 (mg/L)	55	0.91	0.13	7.81	1.06
pH (standard units)	60	6.62	6.04	7.14	0.25
Total Organic Carbon (mg/L)	58	4.02	2.95	9.08	0.94
Ammonia as N (mg/L)	59	0.02	0.01	0.26	0.04
NO_2 + NO_3 as N (mg/L)	60	0.23	0.01	1.05	0.20
Orthophosphate as P (mg/L)	59	0.03	0.01	0.09	0.01
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.31	0.05
Total Hardness (mg/L)	24	25.00	25.00	25.00	0.00
Chloride (mg/L)	60	5.90	2.09	15.30	2.98
Sulfate (mg/L)	60	4.15	2.49	5.72	0.66
Total Dissolved Solids (mg/L)	60	47.95	33.50	76.00	8.23
Total Suspended Solids (mg/L)	60	4.65	0.70	57.80	8.08
Turbidity (NTU)	60	9.40	1.80	56.00	9.16

Table A-20: RED0030 Rolling Fork River W of Gillham, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	10.31	7.48	15.59	1.91
BOD_5 (mg/L)	53	0.98	0.04	5.17	0.96
pH (standard units)	59	7.20	6.14	9.82	0.72
Total Organic Carbon (mg/L)	57	4.14	1.81	10.50	2.08
Ammonia as N (mg/L)	59	0.01	0.01	0.08	0.01
NO_2 + NO_3 as N (mg/L)	60	0.91	0.01	10.52	1.64
Orthophosphate as P (mg/L)	59	2.62	0.02	9.38	2.93
Total Phosphorus as P (mg/L)	59	2.74	0.04	11.53	3.19
Total Hardness (mg/L)	25	29.36	25.00	52.00	7.70
Chloride (mg/L)	60	12.48	2.13	49.40	12.24
Sulfate (mg/L)	60	11.20	3.86	63.30	9.65
Total Dissolved Solids (mg/L)	60	94.90	37.00	334.00	63.43
Total Suspended Solids (mg/L)	60	6.63	1.00	199.00	25.43
Turbidity (NTU)	60	9.91	1.70	214.00	27.02

Table A-21: RED0031 Cossatot River at Hwy 4 E of Wickes

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.37	5.80	16.12	2.34
BOD_5 (mg/L)	49	0.39	0.00	1.57	0.28
pH (standard units)	60	6.82	6.11	7.70	0.32
Total Organic Carbon (mg/L)	55	1.73	1.04	3.85	0.53
Ammonia as N (mg/L)	58	0.01	0.00	0.02	0.00
NO_2 + NO_3 as N (mg/L)	60	0.06	0.01	0.44	0.07
Orthophosphate as P (mg/L)	41	0.01	0.01	0.02	0.00
Total Phosphorus as P (mg/L)	58	0.03	0.01	0.15	0.02
Total Hardness (mg/L)	24	25.75	25.00	31.00	1.85
Chloride (mg/L)	60	1.73	1.15	2.22	0.22
Sulfate (mg/L)	60	4.94	1.93	8.17	1.04
Total Dissolved Solids (mg/L)	60	39.69	23.50	55.50	8.10
Total Suspended Solids (mg/L)	60	1.75	0.70	35.00	4.39
Turbidity (NTU)	60	4.00	0.60	50.40	6.43

Table A-22: RED0032 Saline River at Hwy 4 N of Dierks, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	8.01	5.30	12.30	1.30
BOD_5 (mg/L)	55	0.88	0.16	5.70	0.77
pH (standard units)	56	6.88	6.34	7.24	0.19
Total Organic Carbon (mg/L)	53	3.32	1.64	5.44	0.89
Ammonia as N (mg/L)	59	0.02	0.01	0.27	0.04
NO_2 + NO_3 as N (mg/L)	59	0.53	0.01	2.19	0.52
Orthophosphate as P (mg/L)	48	0.02	0.01	0.09	0.02
Total Phosphorus as P (mg/L)	58	0.05	0.02	0.13	0.03
Total Hardness (mg/L)	22	25.00	25.00	25.00	0.00
Chloride (mg/L)	59	2.90	1.89	4.19	0.51
Sulfate (mg/L)	59	3.03	1.09	5.00	0.81
Total Dissolved Solids (mg/L)	59	44.81	33.00	61.00	6.60
Total Suspended Solids (mg/L)	59	3.80	1.00	37.00	5.48
Turbidity (NTU)	59	8.41	1.20	25.00	6.21

Table A-23: RED0033 Bear Cr. Downst. Of Weyerhauser NPDES Discharge, Process City, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	7.89	4.36	13.85	2.13
BOD_5 (mg/L)	55	1.16	0.11	5.87	1.13
pH (standard units)	56	6.88	6.12	7.57	0.39
Total Organic Carbon (mg/L)	54	6.08	2.20	15.70	1.81
Ammonia as N (mg/L)	56	0.34	0.01	3.19	0.64
NO_2 + NO_3 as N (mg/L)	56	6.32	0.50	22.10	5.64
Orthophosphate as P (mg/L)	55	0.05	0.01	0.252	0.05
Total Phosphorus as P (mg/L)	54	0.09	0.02	0.35	0.06
Total Hardness (mg/L)	22	85.23	25.00	222.00	64.56
Chloride (mg/L)	55	27.44	2.74	78.30	22.45
Sulfate (mg/L)	56	40.26	5.30	124.00	33.02
Total Dissolved Solids (mg/L)	56	221.75	49.50	536.00	151.55
Total Suspended Solids (mg/L)	56	5.06	1.00	81.00	11.01
Turbidity (NTU)	56	12.13	2.40	114.00	15.59

Table A-24: RED0034A Holly Creek Upstream of Dierks, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	7.26	3.26	12.30	1.56
BOD_5 (mg/L)	51	0.86	0.26	2.62	0.49
pH (standard units)	52	7.00	6.24	7.31	0.25
Total Organic Carbon (mg/L)	50	5.05	2.84	9.53	1.52
Ammonia as N (mg/L)	53	0.04	0.01	0.19	0.04
NO_2 + NO_3 as N (mg/L)	53	0.29	0.03	1.12	0.23
Orthophosphate as P (mg/L)	36	0.02	0.01	0.21	0.04
Total Phosphorus as P (mg/L)	52	0.05	0.02	0.44	0.07
Total Hardness (mg/L)	18	25.00	25.00	25.00	0.00
Chloride (mg/L)	53	3.30	1.61	17.20	2.02
Sulfate (mg/L)	53	3.93	2.36	5.54	0.88
Total Dissolved Solids (mg/L)	53	47.76	9.00	116.00	12.93
Total Suspended Solids (mg/L)	53	3.42	1.00	14.50	2.70
Turbidity (NTU)	53	12.51	2.20	32.20	7.50

Table A-25: RED0034B Holly Creek Downstream of Dierks, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	6.91	2.74	11.80	1.61
BOD_5 (mg/L)	54	1.67	0.22	5.34	1.05
pH (standard units)	53	7.00	6.25	7.49	0.20
Total Organic Carbon (mg/L)	50	7.17	3.03	12.93	2.32
Ammonia as N (mg/L)	55	0.18	0.01	1.13	0.21
$NO_2 + NO_3$ as N (mg/L)	55	0.43	0.07	1.32	0.24
Orthophosphate as P (mg/L)	53	0.07	0.01	0.32	0.08
Total Phosphorus as P (mg/L)	54	0.15	0.02	0.49	0.14
Total Hardness (mg/L)	20	29.05	25.00	62.00	8.34
Chloride (mg/L)	55	8.64	2.00	31.70	7.12
Sulfate (mg/L)	55	5.09	2.68	12.06	1.58
Total Dissolved Solids (mg/L)	55	85.38	42.00	169.50	30.90
Total Suspended Solids (mg/L)	55	4.35	1.00	22.30	3.64
Turbidity (NTU)	55	13.69	3.60	42.00	7.90

Table A-26: RED0048B Mine Creek Southeast of Nashville (MNC01B)

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	64	7.25	2.99	12.00	2.67
BOD_5 (mg/L)	64	1.31	0.42	4.21	0.75
pH (standard units)	66	6.88	5.90	7.59	0.34
Total Organic Carbon (mg/L)	64	5.12	1.98	40.40	4.73
Ammonia as N (mg/L)	64	0.09	0.01	0.35	0.07
$NO_2 + NO_3$ as N (mg/L)	65	4.37	0.26	21.70	4.54
Orthophosphate as P (mg/L)	64	2.62	0.07	9.970	2.53
Total Phosphorus as P (mg/L)	65	2.84	0.10	10.00	2.72
Total Hardness (mg/L)	30	27.59	25.00	37.00	3.78
Chloride (mg/L)	65	30.73	3.42	76.40	22.05
Sulfate (mg/L)	66	33.40	5.70	86.37	20.17
Total Dissolved Solids (mg/L)	66	217.33	55.50	544.00	134.71
Total Suspended Solids (mg/L)	66	7.48	1.00	65.30	8.96
Turbidity (NTU)	66	12.44	3.00	62.00	9.59

Table A-27: RED0058 Rolling Fork W of Grannis, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	10.44	7.78	16.04	1.61
BOD_5 (mg/L)	60	0.79	0.11	6.15	0.83
pH (standard units)	62	7.18	6.22	8.24	0.51
Total Organic Carbon (mg/L)	59	4.14	1.60	9.72	2.15
Ammonia as N (mg/L)	61	0.02	0.01	0.08	0.02
NO_2 + NO_3 as N (mg/L)	62	4.14	0.23	24.57	5.29
Orthophosphate as P (mg/L)	61	5.70	0.02	27.52	7.01
Total Phosphorus as P (mg/L)	61	5.65	0.04	22.72	6.81
Total Hardness (mg/L)	26	35.65	25.00	84.00	17.12
Chloride (mg/L)	61	17.32	1.36	87.90	18.88
Sulfate (mg/L)	62	14.45	2.99	42.10	10.09
Total Dissolved Solids (mg/L)	62	134.71	37.50	449.00	110.22
Total Suspended Solids (mg/L)	62	8.85	1.00	347.30	43.95
Turbidity (NTU)	62	11.81	1.60	280.00	37.10

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SEGMENT 1D MOUNTAIN FORK AND TRIBUTARIES

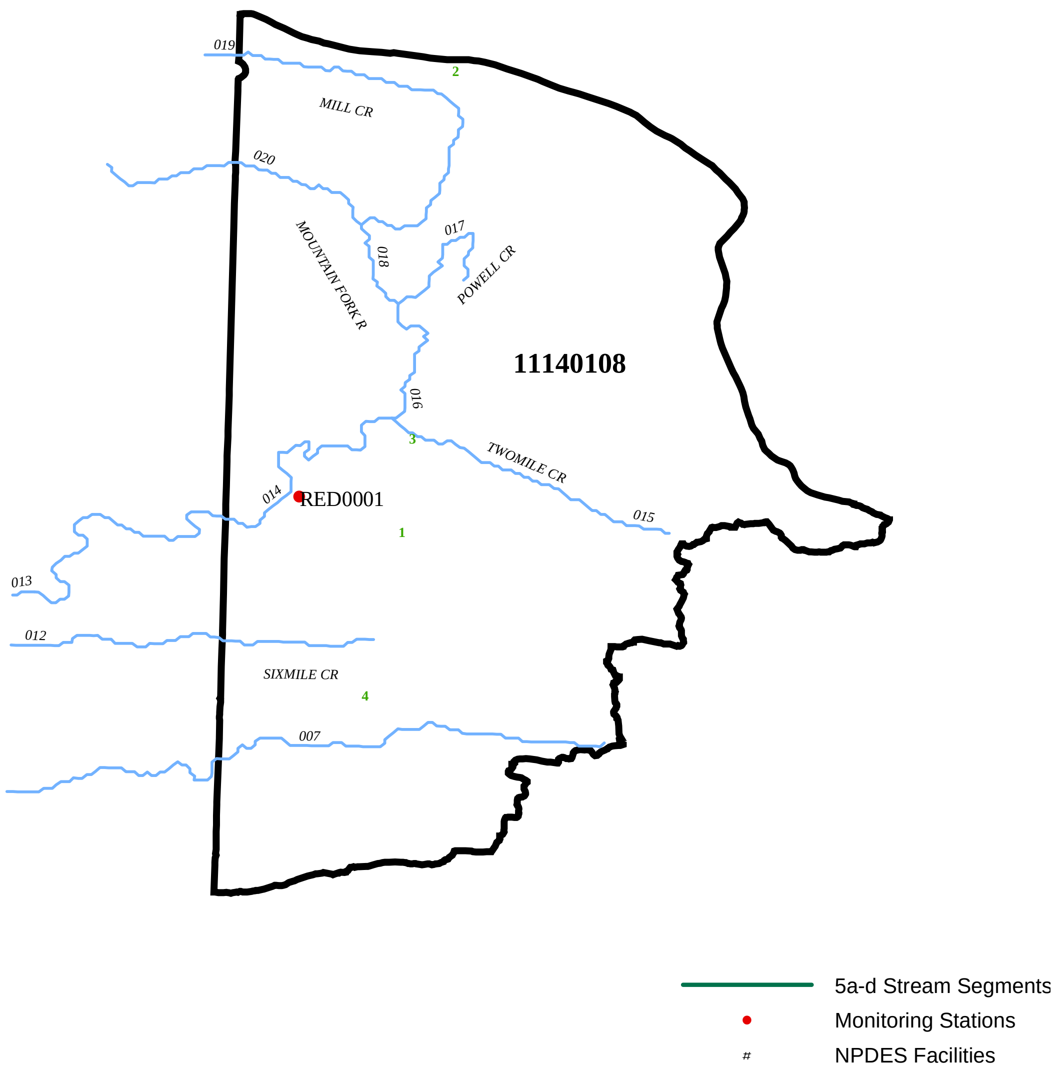
This segment is located on the western edge of Arkansas and covers a portion of Polk County. It encompasses a 20-mile reach of the Mountain Fork of Little River from its headwaters to the Arkansas-Oklahoma state line.

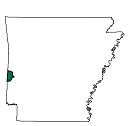
Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. The Mountain Fork River also is designated as an extraordinary resource water and an ecologically sensitive waterbody because of the occurrence of the leopard darter in this basin. Monitored data were used for assessing 11 miles of stream within this segment and an additional 36.3 stream miles were evaluated.

The temperature standard in the Mountain Fork is routinely exceeded during the low-flow season. This usually occurs when the ambient day-time air temperatures reach into the upper nineties for several weeks. The stream is reduced to a step-pool habitat dominated by bedrock. The clear water of the Mountain Fork allows for light penetration of one hundred percent of the water column optimizing maximum heating potential.

Figure A-5: Planning Segment 1D





(Segment 1D)

Table A-28: Planning Segment 1D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-1D																										
Buffalo Creek	11140108	-007	9.5		U															3				FISH CONSUMPTION	47.3	0
Sixmile Creek	11140108	-012	4.1		U															3				AQUATIC LIFE	36.3	11
Mountain Fork	11140108	-014	11.0	RED0001	M	S	N	S	S	S	S	UN				TEMP				5e				PRIMARY CONTACT	47.3	0
Twomile Creek	11140108	-015	8.1		E	S	S	S	S	S	S									1				SECONDARY CONTACT	47.3	0
Mountain Fork	11140108	-016	4.5		E	S	S	S	S	S	S									1				DRINKING SUPPLY	47.3	0
Mountain Fork	11140108	-018	2.8		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	47.3	0
Powell Creek	11140108	-017	4.7		E	S	S	S	S	S	S									1						
Mill Creek	11140108	-019	12.2		E	S	S	S	S	S	S									1						
Mountain Fork	11140108	-020	4.0		E	S	S	S	S	S	S									1						
TOTAL MILES	60.9																									
MILES UNASSESSED	13.6																									
MILES EVALUATED	36.3																									
MILES MONITORED	11																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
RED0001	Mountain Fork near Hatfield	Y	1	A

Table A-29: Segment 1D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0035483	Hatfield, City of	Joshling CR., Mountain Fork R	11140108	1
AR0037605	AR Parks & Tourism – Queen Whilhe	Mill CR. Trib, Mountain Fork R.	11140108	2
AR0046787	Boy Scouts of America – Caddo PIO	2-Mi. CR., Mountain Fork R	11140108	3
AR0049247	Cove, City of	Buffalo CR., Mountain Fork R	11140108	4

Table A-30: RED0001 Mt. Fork Near Hatfield, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	10.18	7.02	13.54	1.57
BOD_5 (mg/L)	53	0.95	0.12	4.74	0.99
pH (standard units)	60	6.94	6.19	7.82	0.37
Total Organic Carbon (mg/L)	57	3.20	1.61	12.60	1.64
Ammonia as N (mg/L)	58	0.01	0.01	0.23	0.03
NO_2 + NO_3 as N (mg/L)	59	0.15	0.01	1.17	0.20
Orthophosphate as P (mg/L)	52	0.03	0.01	0.46	0.06
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.53	0.09
Total Hardness (mg/L)	24	25.00	25.00	25.00	0.00
Chloride (mg/L)	60	2.44	1.09	4.83	0.56
Sulfate (mg/L)	60	3.16	1.60	5.06	0.67
Total Dissolved Solids (mg/L)	60	37.26	25.00	70.00	7.93
Total Suspended Solids (mg/L)	60	4.73	1.00	99.50	12.82
Turbidity (NTU)	60	11.36	2.10	136.00	17.81

Ouachita River Basin

SEGMENT 2A BOEUF RIVER AND TRIBUTARIES

This segment is located in the extreme southeastern corner of Arkansas. It includes most of Chicot and Desha Counties, the northeastern part of Lincoln County, and small areas of Drew, Ashley, and Jefferson Counties. Major streams within this segment include the Boeuf River and its tributaries - Macon Bayou, Cypress Creek, Big Bayou, Oakwood Bayou and others. The flows are generally southward into Louisiana.

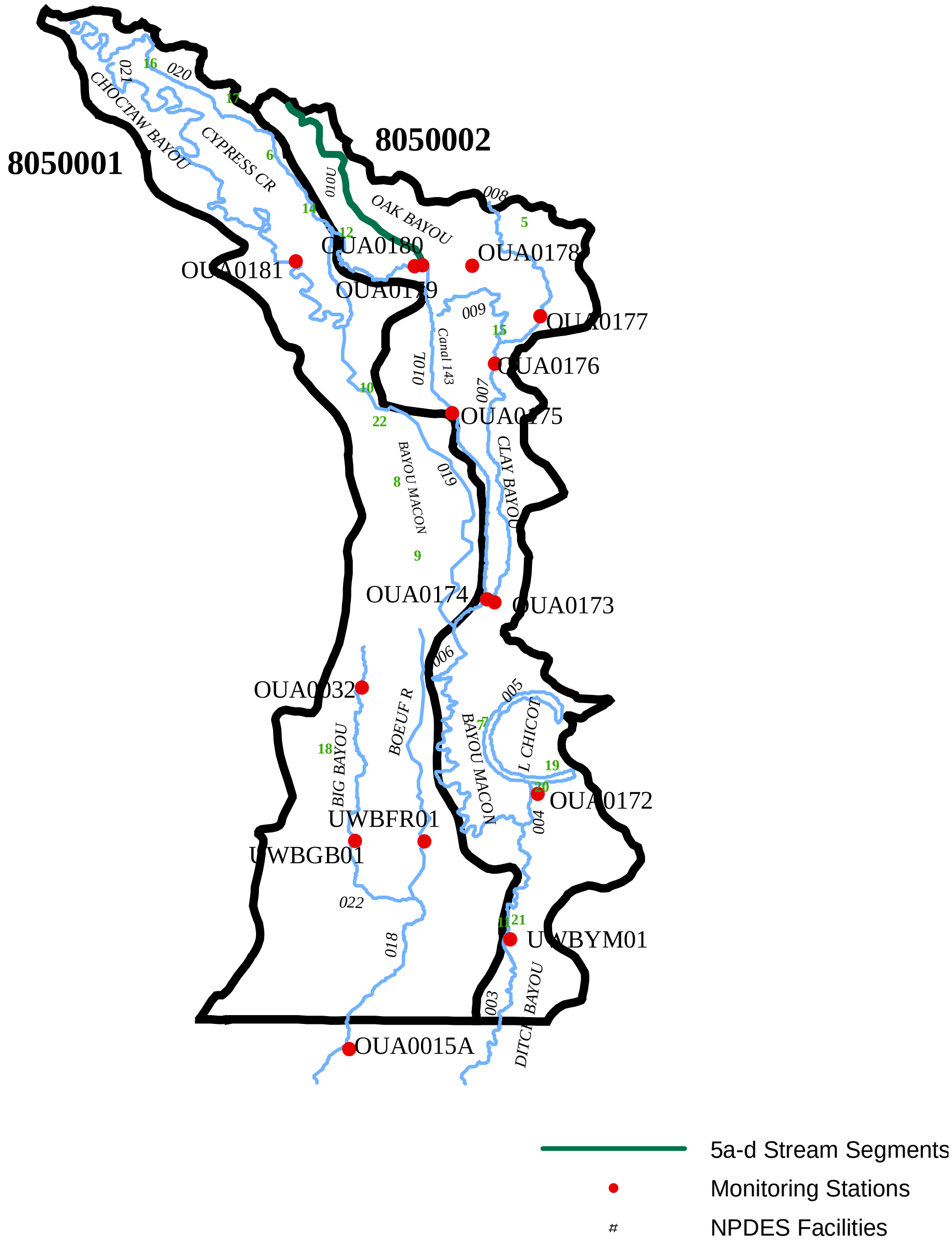
Summary of Water Quality Conditions

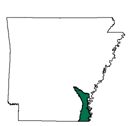
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. The majority of the waters in this segment have been severely altered by channelization, ditching, and rerouting the drainage patterns. Monitored data were used as the basis of assessing 413.6 miles of stream within this segment. An additional 50.6 miles were evaluated bring the total number of miles assessed with in this segment to 464.2 stream miles.

Water quality data from the lower Beouf River indicates impairment because of elevated levels of turbidity and sulfates. Extensive row crop agriculture is the dominant land use in this basin. A TMDL to address each of these was completed in 2005.

The water quality data in Oak Bayou, a tributary to Macon Bayou, indicated elevated levels of chlorides and sulfates. Row crop agriculture is also the dominant land use in this watershed. A TMDL to address the chlorides was completed in 2005. Additional monitoring to better assess the sulfates is needed.

Figure A-6: Planning Segment 2A





(Segment 2A)

Table A-31: Planning Segment 2A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-2A																										
Boeuf River	8050001	-018	49.4	OUA0015A	M	S	N	S	S	S	S	AG	AG			SI	SO4			4a	4a			FISH CONSUMPTION	464.2	0
Boeuf River	8050001	-019	58.1	UWBFR01	M	S	S	S	S	S	S									1				AQUATIC LIFE	414.8	49.4
Big Bayou	8050001	-022	27.1	UWBGB01,+	M	S	S	S	S	S	S									1				PRIMARY CONTACT	464.2	0
Cypress Creek	8050001	-020	47.5	OUA0180	M	S	S	S	S	S	S									1				SECONDARY CONTACT	464.2	0
Choctaw Bayou	8050001	-021	58.9	OUA0181	M	S	S	S	S	S	S									1				DRINKING SUPPLY	445.9	18.3
Macon Bayou	8050002	-003	80.5	UWBYM01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	445.9	18.3
Ditch Bayou	8050002	-004	4.0	OUA0172	M	S	S	S	S	S	S									1						
Macon Bayou	8050002	-006	38.6		E	S	S	S	S	S	S									1						
Clay Ditch	8050002	-007	24.3	OUA0173	M	S	S	S	S	S	S									1						
Boggy Creek	8050002	-009	12.0		E	S	S	S	S	S	S									1						
Oak Bayou	8050002	-010U	18.3	OUA0179+	M	S	S	S	S	N	N	AG	AG			CL	SO4			4a	5a					
Canal No. 43	8050002	-010L	28.5	OUA0174	M	S	S	S	S	S	S									1						
Red Fork Creek	8050002	-008	17.0	OUA0177	M	S	S	S	S	S	S									1						
TOTAL MILES	464.2																									
MILES UNASSESSED	0																									
MILES EVALUATED	50.6																									
MILES MONITORED	413.6																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0015A	Boeuf River near Arkansas-Louisiana State line	Y	1	A
UWBFR01	Boeuf River at Highway 278, 4 miles west of Chicot		1	R
OUA0032	Big Bayou at Highway 144 near Jerome		1	A
UWBGB01	Big Bayou at Highway 278, 5 miles east of Portland		1	R
OUA0180	Cypress Creek on county road off Highway 277 southwest of Dumas		1	R
OUA0181	Choctaw Bayou at county road southwest of Dumas		1	R
UWBYM01	Macon Bayou at Highway 65 near Eudora		1	R
OUA0172	Ditch Bayou at AGFC access off US 82 near Lake Village		1	R
OUA0173	Clay Bayou at Highway 35		1	R
OUA0175	Macon Bayou at Highway 1 near McArthur		1	R
OUA0176	Amos Bayou off Highway 1 near Rohwer		1	R
OUA0174	Canal No. 43, Amos Bayou, at Highway 35		1	R
OUA0179	Oak Bayou at Highway 277 southeast of Dumas		1	R
OUA0177	Red Fork Bayou on county road northeast of Kelso		1	R
OUA0178	Oak Log Bayou at county road off Highway 277 southeast of Dumas		1	R
			1	R

Table A-32: Segment 2A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021610	Watson, City of	Reb Fork Bayou	8050002	5
AR0021679	Gould, City of	Trib, Kerch Can, Cypress CR	8050001	6
AR0021849	Lake Village, City of	Little Lake Bayou, Bayou Macon, Boeuf R	8050002	7
AR0022071	McGehee, City of	Bayou Bartholomew	8050001	8
AR0022250	Dermott, City of – South Pond	Bayou Bartholomew, Ouachita R	8050001	9
AR0033707	Tillar, City of	Can #18, Macon Bayou, Boeuff R	8050001	10
AR0033839	Eudora, City of	Ditch, Bayou Macon	8050002	11
AR0033987	Dumas, City of	Can #19, Bayou Macon	8050001	12
AR0034371	Portland, City of	Trib, Bayou Bartholomew, Ouachita R	8050001	
AR0037125	Mitchellville, City of	Can #19, Cypress CR, Amos Bayou, Boggy Bayou	8050002	14
AR0039039	Delta Special School District	Ditch, Boggy Bayou, Clay Bayou	8050002	15
AR0039381	Grady, City of	Can #19, Bayou Macon	8050001	16
AR0040827	AR Dept of Corrections – Cummins	Can #19	8050002	17
AR0041297	Montrose, City of	Ward Bayou Trib	8050001	18
AR0042838	Farmland Ind, Inc – Southern	Bayou Macon	8050001	21
AR0046507	AR Hwy Dept – McGehee HQ	Ditch, Can#18,Macon Bayou, Macon L, Caneybayou	8050001	22
AR0050008	Chicot County Park	Lake Chicot, Ditch Bayou, Macon Bayou	8050002	19
AR0050091	Chicot County-Ditch Bayou Boat	Ditch Bayou, Macon Bayou	8050002	20

Table A-33: OUA0015A Boeuf River Near AR-LA State Line

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.82	4.80	11.20	1.35
BOD_5 (mg/L)	52	3.47	1.25	7.30	1.51
pH (standard units)	56	7.49	6.84	8.47	0.34
Total Organic Carbon (mg/L)	53	7.88	4.54	14.10	2.40
Ammonia as N (mg/L)	57	0.12	0.01	0.58	0.13
NO_2 + NO_3 as N (mg/L)	57	0.42	0.01	1.56	0.36
Orthophosphate as P (mg/L)	56	0.17	0.03	0.65	0.11
Total Phosphorus as P (mg/L)	55	0.36	0.09	1.27	0.22
Total Hardness (mg/L)	20	99.00	25.00	267.00	70.12
Chloride (mg/L)	57	43.59	0.07	160.00	34.88
Sulfate (mg/L)	57	21.35	4.10	108.40	19.36
Total Dissolved Solids (mg/L)	55	268.18	111.00	540.00	103.69
Total Suspended Solids (mg/L)	56	105.98	6.80	675.00	135.69
Turbidity (NTU)	57	158.54	5.00	1010.00	187.80

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SEGMENT 2B BAYOU BARTHOLOMEW AND TRIBUTARIES

Segment 2B, located in the southeastern part of Arkansas, covers parts of Jefferson, Lincoln, Drew and Ashley Counties. The major streams in this segment are Bayou Bartholomew, Ables Creek, Cutoff Creek, Deep Bayou, and their tributaries.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. This segment contains a total of 453.5 stream miles, all of which are being assessed using monitoring data.

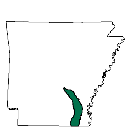
Water quality is impacted in much of this segment by nonpoint pollution generated by row crop agriculture. Silt loads and turbidity are consistently very high, thus causing degradation to the aquatic life contained in many of these streams. The entire stretch of Bayou Bartholomew has been assessed as not meeting the aquatic life uses because of siltation and turbidity. This includes Deep Bayou and its tributaries. A TMDL for siltation/turbidity was completed for the entire basin in October 2002. The TMDL stated that total suspended solids in the Bayou must be reduced by 29 percent to 37 percent in order for the water quality in the Bayou to be able to meet the in stream water quality standard for turbidity.

More recently, elevated levels of chlorides and total dissolved solids were detected in Bayou Bartholomew, impairing the agriculture and industrial water supply use. Metals contamination from lead, copper, zinc, and beryllium is suspected of impairing the aquatic life use in the Bayou and several tributaries. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the Bayou. Additional investigation is needed to more accurately assess this problem.

Pathogens are listed as impairing the primary contact recreation use on several waterbodies in this watershed. Fecal coliform data collected during the Bayou Bartholomew survey in the late 1990s was used to make these assessments. Since that time, ADEQ has adopted *Escherichia coli* as the assessment parameter for primary contact recreation. Additional data is to be developed to better assess the primary contact recreation use in the watershed.

Mercury contamination of fish tissue of Bayou Bartholomew and Cutoff Creek is limiting fish consumption in this basin. A TMDL for mercury was completed in September 2002 for this basin.

Figure A-7: Planning Segment 2B



(Segment 2B)

Table A-34: Planning Segment 2B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-2B																										
B. Bartholomew	8040205	-001	60.1	OUA0013	M	S	N	S	S	S	N	AG	AG			SI	Pb			4a	5d			FISH CONSUMPTION	418.8	34.7
B. Bartholomew	8040205	-002	17.9	OUA0154	M	N	N	S	S	S	N	UN	AG	UN		HG	CL	DO		4a	5d	5e		AQUATIC LIFE	47.1	406.4
Bearhouse Creek	8040205	-901	24.4	OUA0155	M	S	S	N	S	S	S	UN	UN	UN	UN	PA	DO	Pb		5d	5e	5d		PRIMARY CONTACT	390.2	63.3
B. Bartholomew	8040205	-006	82.3	OUA0033	M	S	N	S	S	S	S	AG	UN	AG		DO	Pb	SI		5e	5d	4a		SECONDARY CONTACT	448.9	4.6
Main Street Ditch	8040205	-909	2.0	OUA0146	M	S	N	S	S	S	S	UR	UR	UR		Cu	Pb	DO		5d	5d	5e		DRINKING SUPPLY	453.5	0
Harding Creek	8040205	-902	4.6	OUA0145	M	S	N	S	N	S	S	UR	UR	UR	UR	PA	Cu	Pb	Zn	5d	5d	5d	5d	AGRI & INDUSTRY	258.9	194.6
Nevins Creek	8040205	-906	8.5	OUA0144	M	S	S	S	S	S	S									1						
Bayou Imbeau	8040205	-910	7.5	OUA0147	M	S	N	S	S	S	S	UR	UR			Pb	DO			5d	5e					
Melton's Creek	8040205	-903	8.7	OUA0148	M	S	N	S	S	S	S	UN	UN			PA	DO			5d	5e					
Deep Bayou	8040205	-005	28.9	OUA0151	M	S	N	S	S	S	S	AG	UN			SI	PA			4a	5d					
Jacks Bayou	8040205	-904	6.0	OUA0150	M	S	N	N	S	S	S	UN	AG			PA	DO			5d	5e					
Cross Bayou	8040205	-905	2.4	OUA0152	M	S	S	N	S	S	S	UN				PA				5d						
Wolf Creek	8040205			OUA0156	M	S	S	S	S	S	S	UN				DO				5e						
Able's Creek	8040205	-911	14.6	OUA0158	M	S	N	S	S	S	S	UN	UN			SI	Be			5d	5d					
B. Bartholomew	8040205	-012	82.7	UWBYB02	M	S	N	S	S	S	N	AG	AG	AG		SI	MN*	DO		4a	5d	5e				
B. Bartholomew	8040205	-013	33.9	UWBYB03	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	MN*	DO	PA	4a	5d	5e	5d			
Cutoff Creek	8040205	-007	16.8	UWCOC01	M	N	N	S	S	S	S	UN	UN	UN		HG	SI	DO		4a	5d	5e				
Cutoff Creek	8040205	-011	11.8	UWCOC02	M	S	S	S	S	S	S									1						
Chemin-A-Haut Creek	8040205	-907	30.5	OUA0012	M	S	N	N	S	S	S	UN	UN			PA	DO			5d	5e					
Overflow Creek	8040205	-908	9.9	OUA0012A	M	S	N	S	S	S	S	UN	UN			SI	Cu			5d	5d					
TOTAL MILES	453.5															MN* =		CL, TDS								
MILES UNASSESSED	0																									
MILES EVALUATED	0																									
MILES MONITORED	453.5																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0013	Bayou Bartholomew near Jones Louisiana	Y	1	A
OUA0154	Bayou Bartholomew at Highway 278 west of Portland		2	S
OUA0155	Bearhouse Creek at county road 75, north of Snyder		2	S
OUA0033	Bayou Bartholomew near Ladd	Y	1	A
OUA0145	Harding Creek on Oak Wood road in Pine Bluff		2	S
OUA0148	Melton's Creek on county road 2 miles south of Tarry		2	S
OUA0151	Deep Bayou at Highway 11, 3 miles south of Grady		2	S
OUA0152	Cross Bayou on county road 2 miles south of Highway 114 near Fresno		2	S
UWBYB02	Bayou Bartholomew at Highway 4 near McGehee		2	R
UWBYB01	Bayou Bartholomew at Highway 82 near Thebes		2	R
UWBYB03	Bayou Bartholomew at Highway 54 at Garrett Bridge		2	R
OUA0144	Nevins Creek on Good Faith road in Pine Bluff		2	S
UWCOC01	Cut-Off Creek near Boydell		2	R
UWCOC02	Cut-Off Creek at Highway 4 east of Monticello		2	R
OUA0012	Overflow Creek at Louisiana Highway 590 in Morehouse Parish		2	R
OUA0012A	Chemin-A-Haut Creek at Louisiana Highway 834 in Morehouse Parish		2	R

Table A-35: Segment 2B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021831	Monticello, City of – East Plant	Godfrey CR	8040205	1
AR0022144	Wilmot, City of	Bayou Bartholomew	8040205	2
AR0034029	Hamburg, City of	Chemin-A-Haut CR	8040205	3
AR0037141	Parkdale, City of	Bayou Bartholomew	8040205	4
AR0037885	Boggy Bayou SID	Boggy Bayou, Bayou Bartholomew	8040205	5
AR0039144	Pinewood SID #1	Trib, Nevins CR	8040205	6
AR0041602	Suburbia SID #1	Nevin CR, Bayou Bartholomew	8040205	7
AR0045888	AR Parks & Tourism – Cane Creek	Cane CR	8040205	8
AR0046477	Star City, City of	Cane CR, Bayou Bartholomew, Ouachita R	8040205	9
AR0047350	Pine Haven Mobile Lodge	Godfrey CR Trib, Cutoff CR, Bayou Bartholomew	8040205	10
AR0047872	Robert Floyd Sawmill, Inc.	Trib, Cane CR, Bayou Bartholomew	8040205	11
AR0050016	Selma Tie & Lumber, Inc.	Trib, Cutoff CR	8040205	12

Table A-36: OUA0013 Bayou Bartholomew Near Jones, LA

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.07	4.00	9.90	1.18
BOD_5 (mg/L)	55	1.41	0.60	2.87	0.46
pH (standard units)	59	7.11	6.47	7.88	0.33
Total Organic Carbon (mg/L)	56	8.73	4.61	13.00	2.14
Ammonia as N (mg/L)	60	0.04	0.01	0.10	0.03
NO_2 + NO_3 as N (mg/L)	60	0.24	0.01	0.75	0.17
Orthophosphate as P (mg/L)	59	0.11	0.01	0.201	0.04
Total Phosphorus as P (mg/L)	58	0.24	0.04	0.391	0.08
Total Hardness (mg/L)	22	41.55	25.00	103.00	23.12
Chloride (mg/L)	60	10.00	1.73	35.53	9.08
Sulfate (mg/L)	60	5.73	2.71	10.60	1.93
Total Dissolved Solids (mg/L)	58	122.76	30.00	277.00	40.14
Total Suspended Solids (mg/L)	59	19.73	1.00	67.50	11.55
Turbidity (NTU)	60	54.40	14.00	138.00	25.97

Table A-37: OUA0033 Bayou Bartholomew Near Ladd, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	6.43	1.86	10.60	2.18
BOD_5 (mg/L)	53	1.95	0.56	4.97	0.97
pH (standard units)	53	6.54	5.76	7.26	0.33
Total Organic Carbon (mg/L)	51	11.13	5.95	19.70	2.81
Ammonia as N (mg/L)	53	0.08	0.01	1.30	0.19
NO_2 + NO_3 as N (mg/L)	53	0.16	0.01	1.51	0.24
Orthophosphate as P (mg/L)	53	0.12	0.02	0.34	0.08
Total Phosphorus as P (mg/L)	52	0.25	0.07	0.69	0.10
Total Hardness (mg/L)	22	35.18	25.00	90.00	16.83
Chloride (mg/L)	53	4.38	1.46	10.80	2.21
Sulfate (mg/L)	53	5.54	1.84	11.40	2.31
Total Dissolved Solids (mg/L)	53	96.14	52.00	484.00	58.58
Total Suspended Solids (mg/L)	53	34.01	3.50	1170.00	159.24
Turbidity (NTU)	53	56.08	5.80	1600.00	216.56

Table A-38: OUA0151 Deep Bayou South of Grady

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	13	6.94	2.40	15.80	3.11
BOD_5 (mg/L)	12	3.00	0.98	6.96	1.77
pH (standard units)	13	7.58	6.81	8.17	0.44
Total Organic Carbon (mg/L)	13	10.89	5.70	15.20	2.83
Ammonia as N (mg/L)	13	0.15	0.01	0.79	0.22
NO_2 + NO_3 as N (mg/L)	13	0.31	0.01	1.66	0.45
Orthophosphate as P (mg/L)	13	0.16	0.07	0.27	0.06
Total Phosphorus as P (mg/L)	12	0.29	0.13	0.45	0.12
Total Hardness (mg/L)	13	114.31	26.00	262.00	73.64
Chloride (mg/L)	13	28.88	2.75	68.50	22.41
Sulfate (mg/L)	12	12.60	2.75	25.62	7.39
Total Dissolved Solids (mg/L)	13	261.00	146.00	414.00	83.52
Total Suspended Solids (mg/L)	13	56.12	1.00	293.00	77.06
Turbidity (NTU)	13	99.96	3.00	260.00	94.58

SEGMENT 2C SALINE RIVER AND TRIBUTARIES

Segment 2C is located in south central Arkansas and covers parts of Saline, Garland, Hot Spring, Grant, Jefferson, Cleveland, Lincoln, Drew, Bradley, and Ashley Counties. This segment contains the Saline River drainage system from its headwaters in the Ouachita Mountains to its confluence with the Ouachita River. The principal tributaries are Hurricane Creek, Hudgins Creek, L'Aigle Creek, Derrieusseaux Creek and the four forks of the upper Saline River.

Summary of Water Quality Conditions

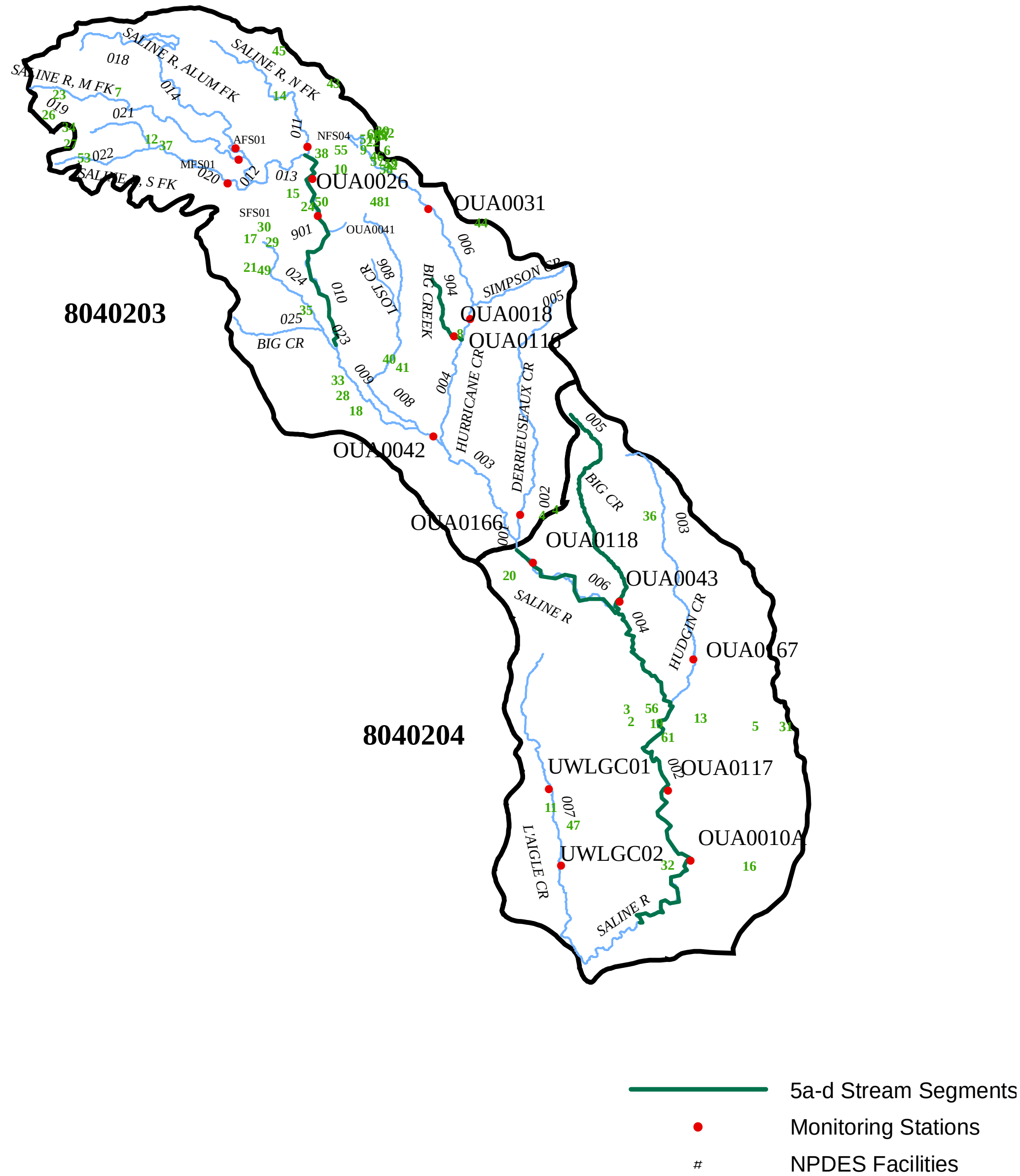
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. Slightly over one-half of the total stream miles within this segment are designated as extraordinary resource waters. This includes the Saline River and its primary headwater tributaries. Monitored data were used to assess 367.8 miles of stream and another 208.5 miles were evaluated

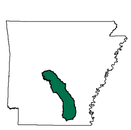
The domestic water supply use has been removed from 83.8 miles in the Hurricane Creek sub-watershed because of excessive mineral content. Mineral content (chlorides, sulfates, and other dissolved minerals) originates in this basin from open pit bauxite mining activities. A major reclamation project is underway in this area.

Big Creek below the City of Sheridan discharge has improved somewhat, but still displays dissolved oxygen violations and elevated BOD and TOC. This stream is classified as a seasonal fishery and the critical season dissolved oxygen standard is 2.0 mg/L to prevent nuisance conditions. Many small seasonal streams in the Gulf Coastal Plains ecoregion have dissolved oxygen levels below 2.0 mg/L during the critical season.

A fish consumption advisory has been placed on much of the lower Saline River because of mercury contamination. A TMDL was completed in September 2002 for these waters.

Figure A-8: Planning Segment 2C





(Segment 2C)

Table A-39: Planning Segment 2C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-2C																										
Saline River	8040203	-001	0.2		E	N	S	S	S	S	S	UN				HG				4a				FISH CONSUMPTION	486.4	89.9
Derrieusseaux	8040203	-002	34.3	OUA0167	E	S	S	S	S	S	S									1				AQUATIC LIFE	507.6	68.7
Saline River	8040203	-003	17.2		E	S	S	S	S	S	S									1				PRIMARY CONTACT	576.3	0
Hurricane Cr.	8040203	-004	19.5	OUA0116	M	S	S	S	S	R	S									1				SECONDARY CONTACT	576.3	0
Simpson Creek	8040203	-005	12.3		E	S	S	S	S	S	S									1				DRINKING SUPPLY	488.7	3.8
Hurricane Cr.	8040203	-006	30.8	OUA0031	M	S	S	S	S	R	S									1				AGRI & INDUSTRY	558.8	17.5
Saline River	8040203	-007	3.8	OUA0042	M	S	S	S	S	N	S	UN				Be				5d						
Lost Creek	8040203	-008	33.5		E	S	S	S	S	R	S									1						
Saline River	8040203	-009	15.6		E	S	S	S	S	S	S									1						
Saline River	8040203	-010	29.8	OUA0026,41	M	S	N	S	S	S	S	SE	UN	UN		SI	SO4	TDS		5a	5d	5d				
N. Fork Saline	8040203	-011	23.2	NFS01	M	S	S	S	S	S	S									1						
Saline River	8040203	-012	10.2		E	S	S	S	S	S	S									1						
Saline River	8040203	-013	4.0		E	S	S	S	S	S	S									1						
Alum Fork	8040203	-014	24.6	AFS01	M	S	S	S	S	S	S									1						
Alum Fork	8040203	-015	3.2		E	S	S	S	S	S	S									1						
Alum Fork	8040203	-018	10.0		E	S	S	S	S	S	S									1						
M. Fork Saline	8040203	-019	30.9	MFS01	M	S	S	S	S	S	S									1						
S. Fork Saline	8040203	-020	14.9	SFS01	M	S	S	S	S	S	S									1						
Cedar Creek	8040203	-021	9.1		E	S	S	S	S	S	S									1						
S. Fork Saline	8040203	-022	10.9		E	S	S	S	S	S	S									1						
Francois Cr.	8040203	-023	2.9		E	S	S	S	S	S	S									1						
Francois Cr.	8040203	-024	14.9		E	S	S	S	S	S	S									3						
Huskey Creek	8040203	-025	11.0		E	S	S	S	S	S	S									3						
Big Creek	8040203	-904	10.0	OUA0018	M	S	N	S	S	S	S	MP	UN	MP	MP	OE	SI	ME*	DO	4b	5a	5c	5c			
Saline River	8040204	-001	2.8		E	N	S	S	S	S	S	UN	UN			HG	Zn	Cu	Be	4a	5d	5d	5d			
Saline River	8040204	-002	53.0	OUA0010A,117	M	N	S	S	S	S	S	UN	UN			HG	Zn	Cu	Be	4a	5d	5d	5d			
Saline River	8040204	-004	16.4		E	N	S	S	S	S	S	UN	UN	UN		HG	Zn	Cu	Be	4a	5d	5d	5d			
Saline River	8040204	-006	17.5	OUA0118	M	N	S	S	S	S	N	UN	UN			HG	TDS			4a	5d					
Hudgens Creek	8040204	-003	36.7	OUA0166	M	S	S	S	S	S	S									1						
Big Creek	8040204	-005	28.9	OUA0043	M	S	N	S	S	S	S	UN	UN	UN		SI	Be	pH		5d	5d	5d				
L'Aigle Creek	8040204	-007	44.2	UWLGC01,02	M	S	S	S	S	S	S									1						
TOTAL MILES	576.3																									
MILES UNASSESSED	0																									
MILES EVALUATED	208.5																									
MILES MONITORED	367.8																									

ME* - Pb, Be

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0167	Derrieusseaux Creek at Highway 35 northwest of Rison		2	R
OUA0116	Hurricane Creek at Highway 270 bridge	Y	1	A
OUA0031	Hurricane Creek near Sardis	Y	1	A
OUA0042	Saline River at Highway 167 near Sheridan	Y	1	A
OUA0026	Saline River near Benton	Y	1	A
OUA0041	Saline River at Shaw Bridge south of Benton	Y	1	A
NFS01	North Ford Saline River at Highway 5 near Benton		2	R
AFS01	Alum Fork Saline River at Highway 5 east of Crows		1	R
MFS01	Middle Fork Saline River at county road south of Crows		1	R
SFS01	South fork Saline River on county road north of Nance off US 70		2	R
OUA0018	Big Creek below Sheridan		1	A
OUA0010A	Saline Rive near Fountain Hill	Y	1	A
OUA0117	Saline River at Ozment Bluff	Y	1	A
OUA0118	Saline River at Highway 79 bridge	Y	1	A
OUA0166	Hudgens Creek at Highway 35 east of Rye		2	R
OUA0043	Big Creek at Highway 35 northwest of Sheridan		1	A
UWLGC01	L'Aigle Creek at Farmville Road, 2 miles southeast of Farmville		2	R
UWLGC02	L'Aigle Creek at county road, 2.5 miles west of Ingalls		2	R

Table A-40: Segment 2C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000582	Alcoa Co. – Bauxite	Hurricane CR, Holly CR, Dry Lost CR	8040203	1
AR0000876	Potlatch Corp – Bradley Unit	Trib, Saline R (1,2) & Brushy Fork (3)	8040204	2
AR0000914	Potlatch Corp – Southern Unit	Franklin CR, Saline R, Ouachita R	8040204	3
AR0001112	Reynolds Metals Co – Hurricane	Trib, Hurricane CR	8040203	48
AR0001236	Borden Chemical, Inc	Big CR, Francis CR, Saline R	8040203	49
AR0021695	Rison, City of	Trib, Harrison CR, Saline R	8040204	4
AR0021822	Monticello, City of – West Plant	Ten Mile CR, Saline R, Ouachita R	8040204	5
AR0034002	Bryant, City of	Trib, Hurricane CR, Saline R, Ouachita	8040203	6
AR0034291	Hot Springs Village POA	Mill CR, Middle Fork, Alum Fork, Saline R	8040203	7
AR0034347	Sheridan, City of – South WWTP	Big CR, Hurricane CR, Saline R	8040203	8
AR0035955	Bryant Pub School – Salem Elem	Trib, Hurricane CR	8040203	9
AR0036358	Wabash Alloys	Dodson CR Trib	8040203	50
AR0036498	Benton, City of	Trib, Depot CR, Saline R	8040203	10
AR0037559	Cedar Hill Investments, LLC	Hurricane CR Trib	8040203	51
AR0038989	Hermitage, Town of	Big Town CR, L'Aigle CR, Saline R	8040204	11
AR0039284	Hot Springs Village – Cedar CR	Cedar CR, South Fork, Saline R	8040203	12
AR0040096	Wilmar, City of	Flat Branch CR, Ten Mile CR	8040204	13
AR0041416	Timber Ridge Neuro Rehab Center	Henderson CR, North Fork/Saline R	8040203	14
AR0042129	A.C. Paxton – Collegeville Height	Owen CR, Fourche CR	8040203	52
AR0042277	Pawnee Village POA	Trace CR Trib, Saline R	8040203	15
AR0042421	Fountain Hill, City of	Flat CR Trib, Saline R	8040204	16
AR0042889	JJ'S Truck Stop, Inc	Brushy CR Trib, Francois CR, Saline R	8040203	17
AR0043257	Farm Fresh Catfish Co	Trib, Saline R	8040203	18
AR0043427	Warren, City of – Wtr & Swr Comm	Saline R	8040204	19
AR0043672	Kingsland, City of	Panther CR, Saline R, Ouachita R	8040204	20
AR0044075	Fountain Lake School Dist 18	Trib, South Fork, Saline R	8040203	53
AR0044105	Willamette Industries – Malvern	Trib, Big CR, Saline R	8040203	21
AR0044156	Alcoa Road MHP	Trib, Hurricane CR	8040203	22
AR0044423	Jessieville Public School	Trib, Coleman CR, Saline R	8040203	23
AR0044547	Haskell, City of	Trace CR, Saline R	8040203	24
AR0044652	Hurricane Lake MHP	Hurricane CR, Saline R	8040203	25
AR0044482	Branch Hollow Mobile Home Park	Hurricane CR	8040203	54
AR0045047	Village Square Shopping Ctr	Trib, Mill CR, Saline R	8040203	26
AR0046141	Mountain Valley Retreat Center	Trib, South Fork Saline R	8040203	27
AR0046698	International Paper Co – Leola	Trib, Saline R	8040203	28
AR0046817	Glen Rose School Dist	Trib, Ten Mile CR	8040203	29

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0047210	Salem SID #10	Trib, Hurricane CR, Saline R	8040203	55
AR0047431	Pathway Campground – AR Church	Trib, Brushy CR, Saline R	8040203	30
AR0047732	J.P. Price Lumber Co	Trib, Clear CR, Saline R	8040204	31
AR0047767	Robbins Sykes Flooring	Trib, Saline R	8040204	56
AR0047830	Johnsville Sand & Gravel Co	Hunt Br, Saline R	8040204	32
AR0047902	H.G. Toler & Son Lumber Co, Inc	Trib, Saline R	8040203	33
AR0048003	Alumina & Ceramics Lab – Malakof	Ditch, Saline R	8040203	57
AR0048135	Bauxite School Dist 14 – Plant 1	Trib, Holly CR, Saline R	8040203	58
AR0048194	N Garland Co Youth Ctr	Trib, Coleman CR, Middle Fork Saline R	8040203	34
AR0048259	Bauxite School Dist 14 – Plant 2	Hurricane CR Trib, Saline R	8040203	59
AR0048445	Poyen, City of – WWTP	Trib, Big CR, Francois CR, Saline R	8040203	35
AR0048569	Woodlawn School District #6	Trib, Hudgin CR, Saline R	8040204	36
AR0049018	Benton, City of – Hurricane Lake	Hurricane CR, Saline R	8040203	60
AR0049328	Saline County P.O.I. Dist. #37	Trib, S Fork Saline R	8040203	37
AR0049506	Benton Packing Company	Trib, Saline River, Ouachita R	8040203	38
AR0049522	Fred’s Store Commercial Park	Pond, Hurricane CR Trib, Saline R	8040203	39
AR0049751	M & H, Inc-D/B/A Sheridan Whit	Lost CR, Saline R	8040203	40
AR0049727	Martin Marietta Materials-Warr	Ditch, Ten Mile CR, Saline R	8040204	61
AR0049778	Arkansas Decorative Stone, LLC	Flat CR	8040203	41
AR0049786	Bauxite, City of	Trib, Hurrican CR, Saline R	8040203	42
AR0049816	Convenient Store	Hurricane CR Trib, Hurrican Lake	8040203	43
AR0049883	Fieldstone Property Owner IMP	Trib, Hurricane CR, Saline R	8040204	62
AR0050113	Gene Graves Enterprises, LLC D	Trib, Hurricane CR, Saline R	8040203	44
AR0050202	Destined to Win/Family Outreach	Trib, N Fork Saline R, Saline R	8040203	45
AR0050270	Almatis, Inc.	Hurricane CR, Saline R, Ouachita R	8040203	46
AR0050300	Bradley Lumber Company-Hermitage	Trib, L’Aigle CR, Saline R, Ouachita R	8040204	47

Table A-41: OUA0010A Saline River Near Fountain Hill, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.10	6.80	10.70	0.67
BOD_5 (mg/L)	55	1.62	0.32	5.13	0.90
pH (standard units)	59	6.99	6.41	8.01	0.34
Total Organic Carbon (mg/L)	56	7.49	3.01	16.39	3.29
Ammonia as N (mg/L)	60	0.02	0.01	0.10	0.03
NO_2 + NO_3 as N (mg/L)	60	0.09	0.01	0.45	0.09
Orthophosphate as P (mg/L)	52	0.02	0.01	0.121	0.02
Total Phosphorus as P (mg/L)	59	0.07	0.02	0.211	0.04
Total Hardness (mg/L)	22	33.23	25.00	65.00	10.17
Chloride (mg/L)	59	5.16	0.19	36.20	5.08
Sulfate (mg/L)	59	17.34	6.49	62.40	10.31
Total Dissolved Solids (mg/L)	58	91.35	58.00	148.00	19.77
Total Suspended Solids (mg/L)	58	10.22	2.00	28.00	6.52
Turbidity (NTU)	60	18.33	2.80	39.60	10.28

Table A-42: OUA0018 Big Creek Downstream of Sheridan, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	44	6.79	0.79	12.02	3.38
BOD_5 (mg/L)	44	3.42	0.44	11.37	2.70
pH (standard units)	45	6.53	5.45	7.60	0.35
Total Organic Carbon (mg/L)	43	8.92	3.57	16.36	2.93
Ammonia as N (mg/L)	45	0.46	0.01	2.07	0.56
NO_2 + NO_3 as N (mg/L)	45	0.19	0.02	0.77	0.13
Orthophosphate as P (mg/L)	45	0.22	0.02	1.66	0.29
Total Phosphorus as P (mg/L)	45	0.42	0.07	1.70	0.37
Total Hardness (mg/L)	19	36.14	25.00	77.70	18.04
Chloride (mg/L)	45	9.82	3.04	31.90	7.68
Sulfate (mg/L)	45	13.33	3.39	52.50	11.51
Total Dissolved Solids (mg/L)	45	112.06	58.00	269.00	53.48
Total Suspended Solids (mg/L)	45	20.22	3.20	61.00	13.10
Turbidity (NTU)	45	34.56	1.20	143.00	23.27

Table A-43: OUA0026 Saline River Near Benton, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.07	5.43	13.40	1.86
BOD_5 (mg/L)	57	0.73	0.10	1.96	0.40
pH (standard units)	58	7.05	6.44	7.69	0.25
Total Organic Carbon (mg/L)	58	3.44	1.55	10.40	2.01
Ammonia as N (mg/L)	59	0.01	0.01	0.04	0.01
NO_2 + NO_3 as N (mg/L)	60	0.11	0.01	0.39	0.09
Orthophosphate as P (mg/L)	40	0.01	0.01	0.03	0.01
Total Phosphorus as P (mg/L)	56	0.04	0.01	0.37	0.05
Total Hardness (mg/L)	24	54.54	30.00	74.00	11.91
Chloride (mg/L)	60	2.74	1.53	6.20	0.85
Sulfate (mg/L)	60	6.21	3.73	18.00	2.01
Total Dissolved Solids (mg/L)	59	76.33	51.50	101.00	12.47
Total Suspended Solids (mg/L)	59	10.08	1.00	88.20	16.86
Turbidity (NTU)	60	15.01	1.90	116.00	22.60

Table A-44: OUA0031 Hurricane Creek Near Sardis, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	8.79	4.65	13.30	1.76
BOD_5 (mg/L)	51	0.87	0.18	2.12	0.42
pH (standard units)	54	7.05	6.24	8.04	0.39
Total Organic Carbon (mg/L)	52	5.33	2.31	8.52	1.44
Ammonia as N (mg/L)	54	0.04	0.01	0.32	0.07
NO_2 + NO_3 as N (mg/L)	55	0.26	0.01	0.73	0.17
Orthophosphate as P (mg/L)	41	0.01	0.006	0.04	0.01
Total Phosphorus as P (mg/L)	51	0.06	0.015	0.30	0.05
Total Hardness (mg/L)	23	111.57	43.00	400.00	99.68
Chloride (mg/L)	55	7.47	3.00	20.10	4.04
Sulfate (mg/L)	54	76.34	0.04	510.00	78.68
Total Dissolved Solids (mg/L)	54	221.54	75.50	933.00	168.72
Total Suspended Solids (mg/L)	54	13.14	1.00	68.50	16.64
Turbidity (NTU)	55	16.90	0.55	81.10	18.89

Table A-45: OUA0041 Saline River Downstream of Benton, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	8.86	5.40	13.1	1.97
BOD_5 (mg/L)	51	0.72	0.12	1.45	0.29
pH (standard units)	54	7.07	6.26	7.87	0.28
Total Organic Carbon (mg/L)	53	3.63	1.97	8.52	1.49
Ammonia as N (mg/L)	55	0.02	0.01	0.07	0.02
NO_2 + NO_3 as N (mg/L)	56	0.45	0.09	2.38	0.45
Orthophosphate as P (mg/L)	53	0.05	0.01	0.20	0.04
Total Phosphorus as P (mg/L)	52	0.09	0.02	0.43	0.08
Total Hardness (mg/L)	24	52.38	31.00	69.00	10.61
Chloride (mg/L)	56	5.01	1.79	16.00	3.07
Sulfate (mg/L)	56	26.69	6.11	76.70	13.65
Total Dissolved Solids (mg/L)	55	117.03	60.50	203.00	25.03
Total Suspended Solids (mg/L)	55	10.18	2.00	54.70	11.03
Turbidity (NTU)	56	13.05	2.30	79.00	14.00

Table A-46:OUA0042 Saline River at Hwy 167

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.33	5.74	12.00	1.85
BOD_5 (mg/L)	57	0.92	0.36	3.75	0.58
pH (standard units)	60	6.80	6.01	7.69	0.42
Total Organic Carbon (mg/L)	57	6.69	3.51	15.50	2.96
Ammonia as N (mg/L)	60	0.02	0.00	0.11	0.02
NO_2 + NO_3 as N (mg/L)	60	0.18	0.01	2.01	0.28
Orthophosphate as P (mg/L)	58	0.09	0.01	1.78	0.23
Total Phosphorus as P (mg/L)	59	0.13	0.02	1.66	0.21
Total Hardness (mg/L)	25	37.86	25.00	61.00	9.85
Chloride (mg/L)	60	4.63	1.33	40.50	4.96
Sulfate (mg/L)	60	17.22	4.26	41.30	9.40
Total Dissolved Solids (mg/L)	60	94.35	48.50	205.00	23.51
Total Suspended Solids (mg/L)	60	9.26	1.00	66.00	9.40
Turbidity (NTU)	60	15.69	4.52	72.50	10.91

Table A-47:OUA0043 Big Creek at Hwy 35

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	42	7.82	2.75	12.75	2.49
BOD_5 (mg/L)	0	0.00	0.00	0.00	0.00
pH (standard units)	44	6.07	5.38	6.81	0.35
Total Organic Carbon (mg/L)	0	0.00	0.00	0.00	0.00
Ammonia as N (mg/L)	44	0.07	0.01	1.19	0.21
NO_2 + NO_3 as N (mg/L)	44	0.16	0.01	1.60	0.28
Orthophosphate as P (mg/L)	0	0.00	0.00	0.00	0.00
Total Phosphorus as P (mg/L)	44	0.14	0.02	0.54	0.10
Total Hardness (mg/L)	18	29.28	25.00	78.00	12.47
Chloride (mg/L)	44	4.72	1.40	19.40	2.76
Sulfate (mg/L)	44	20.51	4.43	82.50	13.18
Total Dissolved Solids (mg/L)	44	96.06	60.5	201.00	22.86
Total Suspended Solids (mg/L)	44	18.60	1.00	414.00	61.56
Turbidity (NTU)	44	26.31	7.29	252.00	36.06

Table A-48:OUA0116 Hurricane Cr. at Hwy 270 Bridge 3 Mi East of Sheridan, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.50	1.79	12.38	2.48
BOD_5 (mg/L)	56	1.11	0.29	5.04	0.73
pH (standard units)	59	6.64	5.71	7.71	0.42
Total Organic Carbon (mg/L)	56	7.63	2.95	15.00	2.42
Ammonia as N (mg/L)	59	0.02	0.01	0.19	0.04
NO_2 + NO_3 as N (mg/L)	59	0.18	0.01	0.95	0.17
Orthophosphate as P (mg/L)	52	0.03	0.01	0.13	0.03
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.32	0.05
Total Hardness (mg/L)	24	69.63	25.00	344.00	66.99
Chloride (mg/L)	59	5.56	1.69	11.50	2.17
Sulfate (mg/L)	59	52.09	6.20	392.00	55.18
Total Dissolved Solids (mg/L)	59	165.78	59.50	708.00	116.22
Total Suspended Solids (mg/L)	59	6.82	1.00	19.30	4.26
Turbidity (NTU)	59	13.77	2.40	29.90	7.07

Table A-49:OUA0117 Saline River at Hwy 172 in Drew County, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.12	6.90	11.20	0.71
BOD_5 (mg/L)	55	1.57	0.32	5.41	0.88
pH (standard units)	59	6.97	6.27	7.93	0.30
Total Organic Carbon (mg/L)	56	7.91	3.23	14.86	3.37
Ammonia as N (mg/L)	60	0.03	0.01	0.66	0.09
$NO_2 + NO_3$ as N (mg/L)	60	0.11	0.01	0.66	0.11
Orthophosphate as P (mg/L)	54	0.02	0.01	0.21	0.03
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.16	0.03
Total Hardness (mg/L)	22	36.68	25.00	150.00	26.20
Chloride (mg/L)	60	4.35	0.20	9.40	1.55
Sulfate (mg/L)	60	17.68	6.34	61.30	10.77
Total Dissolved Solids (mg/L)	58	89.12	18.80	146.00	20.26
Total Suspended Solids (mg/L)	59	10.87	1.80	46.80	8.15
Turbidity (NTU)	60	19.51	2.90	55.60	11.75

Table A-50:OUA0118 Saline River at Hwy 79 Bridge South of Rison, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.20	5.27	12.80	1.78
BOD_5 (mg/L)	56	0.94	0.25	3.45	0.55
pH (standard units)	59	6.74	5.86	7.57	0.44
Total Organic Carbon (mg/L)	56	8.04	3.20	18.80	4.05
Ammonia as N (mg/L)	59	0.01	0.01	0.10	0.02
$NO_2 + NO_3$ as N (mg/L)	59	0.11	0.01	0.75	0.12
Orthophosphate as P (mg/L)	58	0.07	0.01	0.21	0.06
Total Phosphorus as P (mg/L)	58	0.13	0.02	1.01	0.14
Total Hardness (mg/L)	25	38.18	25.00	80.00	13.08
Chloride (mg/L)	59	3.92	1.17	7.94	1.38
Sulfate (mg/L)	59	19.61	4.95	83.00	14.80
Total Dissolved Solids (mg/L)	59	95.21	52.50	213.00	25.08
Total Suspended Solids (mg/L)	59	7.86	1.00	47.50	7.93
Turbidity (NTU)	59	15.97	3.85	60.20	11.03

SEGMENT 2D LOWER OUACHITA RIVER AND TRIBUTARIES

Segment 2D occupies the south central part of Arkansas, covering all of Calhoun County, large portions of Bradley, Dallas, Ouachita, and Union Counties and smaller areas of Ashley, Cleveland, Columbia and Nevada Counties. Segment 2D encompasses the lower Ouachita River and its tributaries from the confluence of the Little Missouri and Ouachita Rivers to the Louisiana state line. The major tributaries are Moro Creek, Lapile Creek, Champagnolle Creek and Smackover Creek.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish/wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 220.2 miles of stream. An additional 125.4 miles were evaluated bringing the total number of miles assessed within this segment to 345.6 stream miles.

Topping the list of water quality problems in this basin is the fish consumption advisory on the lower Ouachita River. The Ouachita River in this segment has fish consumption advisories because of mercury contamination. In addition, Champagnolle and Moro Creeks have similar advisories. A consumption advisory has been placed on 66.3 miles of the Ouachita River, 20.0 miles of Champagnolle Creek and 12 miles of Moro Creek. A TMDL has been completed, September 2002, for mercury in the lower Ouachita River Basin in Arkansas and Louisiana.

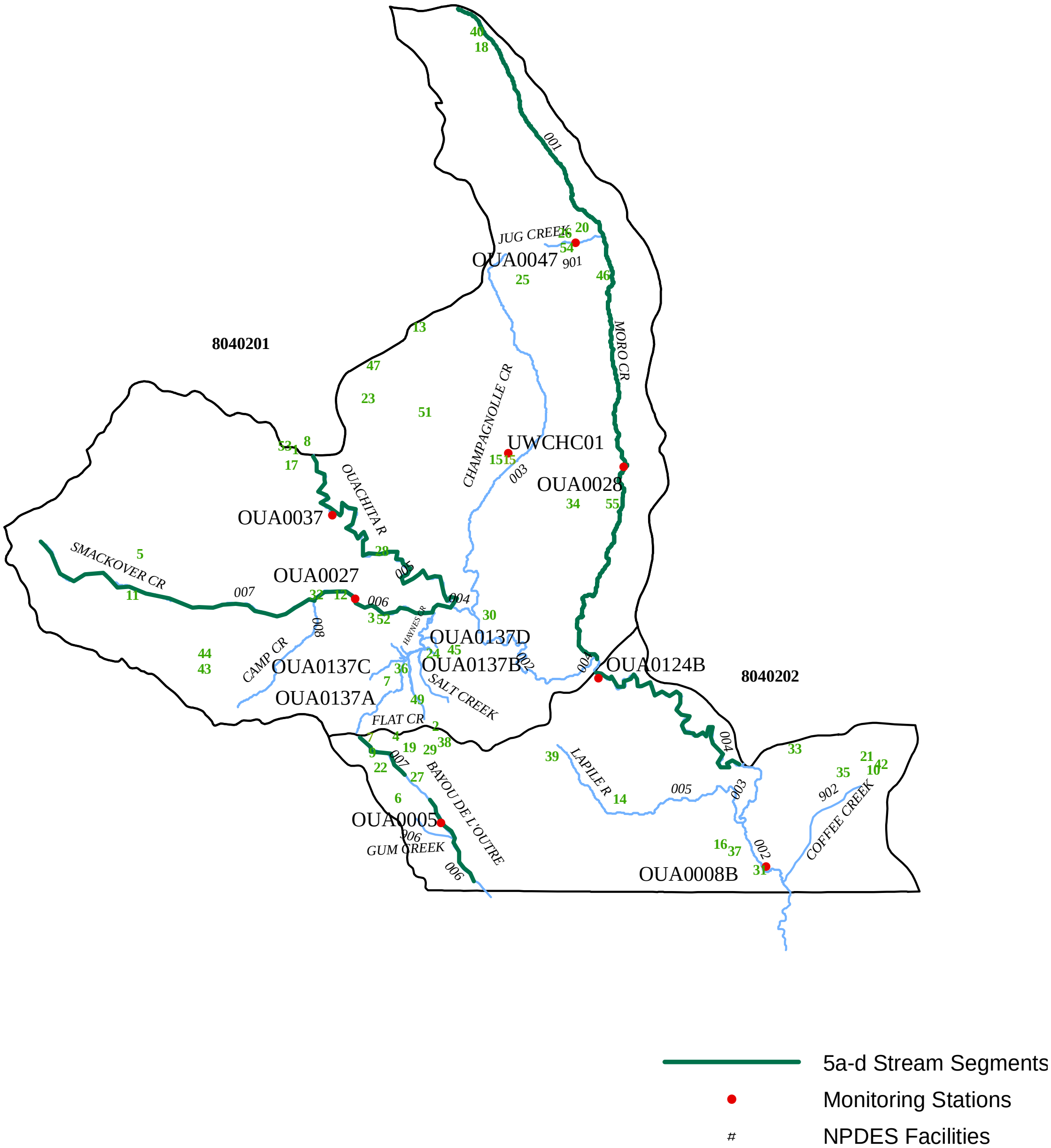
Bayou De L'Outre has been listed as not attaining the aquatic life use and agriculture and industrial water supply uses because of elevated levels of total dissolved solids, sulfates, lead, and zinc. A combination of nonpoint source pollution runoff, and discharges from industrial and municipal point sources are the suspected sources. Additional monitoring is needed to better assess the impairments and delineate the sources.

There has been significant improvement over the last five to ten years in the level of chlorides and total dissolved solids in Smackover Creek. With one exception, both chlorides and total dissolved solids have been well below the water quality standard for these constituents in Smackover Creek since 1995.

Numerous water bodies have been listed for metals contamination. Quality assurance of sampling and analysis is needed to more accurately assess these waters.

Some of the most severe water quality problems exist in the unnamed tributary from El Dorado Chemical Company (ELCC), in Flat Creek and Salt Creek. The ELCC tributary contains toxic ammonia levels, very high nitrates, high minerals (SO_4/ TDS), and metals (copper and zinc); the source is from the El Dorado Chemical Company discharge. Flat Creek and Salt Creek have very high minerals (CL/ SO_4/TDS) and metals (copper and zinc). The exact source is unknown, but these drainage basins are from the northern edge of El Dorado where numerous oil and brine processing and storage facilities exist along with numerous abandoned pumping facilities. These streams enter Smackover Creek below the ambient monitoring station. TMDLs were completed in October 2002 and in October 2003. Additional point source controls are also needed to address these issues.

Figure A-9: Planning Segment 2D



(Segment 2D)

Table A-51: Planning Segment 2D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-2D																										
Ouachita River	8040202	-002	4.0	OUA0008B	M	N	N	S	S	S	S	UN	UN			HG	Zn			4a	5d			FISH CONSUMPTION	247.3	98.3
Ouachita River	8040202	-003	8.4		M	N	S	S	S	S	S	UN				HG				4a				AQUATIC LIFE	82.3	263.3
Ouachita River	8040202	-004	28.9	OUA0124B	M	N	N	S	S	S	S	UN	UN			HG	Zn			4a	5d			PRIMARY CONTACT	345.6	0.0
Lapile Creek	8040202	-005	25.3		U															3				SECONDARY CONTACT	345.6	0.0
B. De L'Outre	8040202	-006	32.4	OUA0005	M	S	N	S	S	R	N	RE/IP/MP				TDS	SO4	Pb	Zn	5d	5d	5d	5d	DRINKING SUPPLY	280.7	32.5
B. De L'Outre	8040202	-007	6.9		E	S	N	S	S	S	N	RE/IP/MP				TDS	SO4	Pb	Zn	5d	5d	5d	5d	AGRI & INDUSTRY	295.7	49.9
B. De L'Outre	8040202	-008	10.6		E	S	N	S	S	S	N	RE/IP/MP				TDS	SO4	Pb	Zn	5d	5d	5d	5d			
Moro Creek	8040201	-001U	57.9		E	S	N	S	S	S	S	UN	UN	UN		SI	Pb	Zn		5a	5c	5c				
Moro Creek	8040201	-001L	12.0	OUA0028	M	N	N	S	S	S	S	UN	UN	UN	UN	HG	SI	Pb	Zn	4a	5a	5c	5c			
Ouachita River	8040201	-002	22.5		M	N	S	S	S	S	S	UN				HG				4a						
Ouachita River	8040201	-004	2.5		M	N	S	S	S	S	S	UN				HG				4a						
Ouachita River	8040201	-005	34.2	OUA0037	M	S	N	S	S	S	S	UN	UN			Zn	Cu			5d	5d					
Champagnolle	8040201	003U	20.9		E	S	S	S	S	S	S									1						
Champagnolle	8040201	003L	20.0	UWCHC01	M	N	S	S	S	S	S	UN				HG				4a						
Smackover Cr.	8040201	-006	14.8	OUA0027	M	S	N	S	S	S	S	IP	IP	SE	UN	Zn	Pb	SI	DO	5d	5d	5a	5a			
Smackover Cr.	8040201	-007	29.1		E	S	N	S	S	S	S	IP	IP	SE	UN	Zn	Pb	SI	DO	5d	5d	5a	5a			
Camp Creek	8040201	-008	13.3		U															3						
Elcc Trib.	8040201	-606	8.5	OUA0137A+	M	S	N	S	S	N	S	IP	IP	IP	IP	AM	NO3	Cu	Zn	4a	4b	4b	4b			
Flat Cr.	8040201	-706	16.0	OUA0137C	M	S	N	S	S	N	S	IP	IP	IP		MN	Cu	Zn		4a	4b	4b				
Salt Cr.	8040201	-806	8.0	OUA0137D	M	S	N	S	S	N	S	IP	IP			MN	Cu			4a	4b					
Haynes Cr.	8040201	-906	10.0		U															3						
Jug Creek	8040201	-901	8.0	OUA0047	M	S	S	S	S	S	S									1						
TOTAL MILES	394.2															MN = CL, TDS										
MILES UNASSESSED	48.6																									
MILES EVALUATED	125.4																									
MILES MONITORED	220.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0008B	Ouachita River at Felsenthal Dam		1	A
OUA0124B	Ouachita River at Pigeon Hill		1	A
OUA0005	Bayou L'Outre near Junction City	Y	1	A
OUA0028	Moro Creek east of Hampton	Y	1	A
OUA0037	Ouachita River below Camden	Y	1	A
UWCHC01	Champagnolle Creek at Highway 4 near Hampton		2	R
OUA0027	Smackover Creek near Smackover	Y	1	A
OUA0137A	Flat Creek tributary at Highway 7 spur near El Dorado		2	R
OUA0137B	Flat Creek tributary south of Norphlet on O'Rear Road		2	R
OUA0137C	Flat Creek south of Norphlet on O'Rear Road		2	R
OUA0137D	Salt Creek west of Norphlet on O'Rear Road		2	R
OUA0047	Jug Creek below Fordyce		2	R
			1	A

Table A-52: Segment 2D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000558	International Paper Co – Camden	Ouachita R (001) & W Two Bayou (002)	8040201	1
AR0000574	Cooper Tire & Rubber Co	DITCH, Boggy CR, Bayou De Loutre	8040202	2
AR0000591	Cross Oil refining & Marketing	Smackover CR (103) & Holmes CR (4)	8040201	3
AR0000647	Lion Oil Co – El Dorado Refinery	Loutre CR, Bayou De Loutre, Ouachita R	8040202	4
AR0000663	Berry Petroleum Co – Stephens	Trib, Smackover CR, Ouachita R	8040201	5
AR0000680	Great Lakes Chemical Corp – South	Gum CR – 2D (1) & Walker CR – 2E (2,3)	8040201	6
AR0000752	El Dorado Chemical Co, Inc	Trib, Flat CR, Haynes CR, Ouachita R	8040202	7
AR0000841	Arkansas Electric Coop – McClellan	Ouachita R	8040201	
AR0001171	Great Lakes Chemical Corp – Central	Bayou De Loutre (1,2,4) & Little Cornie Bayou	8040202	9
AR0001210	Georgia Pacific – Crossett	Coffee CR, Ouachita R	8040202	10
AR0020168	Stephens, City of	Smackover CR, Ouachita R	8040201	11
AR0021440	Smackover, City of	Smackover CR, Ouachita R	8040201	12
AR0021474	Bearden, City of	East Two Bayou, Ouachita R	8040201	13
AR0021687	Strong, City of	Lapile CR, Ouachita R	8040202	14
AR0021873	Hampton, City of	Champagnolle CR	8040201	15
AR0022268	Huttig, City of	Ouachita R	8040202	16
AR0022365	Camden, City of	West Two Bayou (1) & Ouachita R (2)	8040201	17
AR0033715	Carthage, City of	Trib, Moro CR	8040201	18
AR0033723	El Dorado, City of – South WWTP	Bayou De Loutre	8040202	19
AR0033758	Fordyce, City of	Jug CR, Moro CR, Ouachita R	8040201	20
AR0033812	North Crossett Utilities	Trib, Brushy CR, Ouachita R	8040202	21
AR0033936	El Dorado, City of – North WWTP	Mill CR, Haynes CR, Smackover CR, Ouachita	8040201	22
AR0034363	Shumaker Public Service Corp	Two Bayou CR	8040201	23
AR0035653	Norphlet, City of	Trib, Flat CR, Haynes CR, Smackover CR	8040201	24
AR0035661	Thornton, City of	Turners CR, Champagnolle CR, Ouachita	8040201	25
AR0036064	Georgia Pacific – Fordyce Plywood	Jug CR, Moro CR	8040201	26
AR0036072	Georgia Pacific – El Dorado Sawmill	Trib, Bayou De Loutre	8040202	27
AR0037761	Liberty Baptist Assn – DBA Beech	Trib, Ouachita R	8040201	28
AR0037800	Teris, LLC	Boggy CR	8040202	29
AR0038211	Calion, City of	Chappelle Slough, Ouachita R & Rb	8040201	30
AR0039659	Felsenthal, Town of	Wolf Slough	8040202	31
AR0040517	Louann, City of	Brushy CR, Smackover CR, Ouachita R	8040201	32
AR0042315	Crossett Harbor Port Authority	Ouachita R	8040202	33
AR0042609	Harrell, City of	Spring Br, Blann CR, Lloyd CR, Moro CR	8040201	34

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0044431	Jordan Town MHP	Trib, Bell Branch	8040202	35
AR0044733	Wildwood Trailer Park	Trib, Flat CR, Haynes CR, Smackover CR	8040201	36
AR0045233	Lockheed Martin Missiles & Fir	Trib, Locust Bayou, Ouachita R	8040201	51
AR0045659	Welsco, Inc	DITCH, Holmes CR	8040201	52
AR0045926	International Paper Co-Collend	Trib, Two Bayou	8040202	53
AR0046116	West Fraser (South), Inc	Dollar Slough(1, 2), Buckhorn Slough (4)	8040202	37
AR0046451	Anthony Timberlands Inc – Fordyce	DITCH, Jug CR	8040201	54
AR0047368	Columbian Chemicals Co	Trib, Boggy CR	8040201	38
AR0047384	Anthony Forest Products Co	Cattail Marsh, North Lapile CR	8040202	39
AR0047503	Idaho Timber Corp of Carthage	Trib, Moro CR, Ouachita R	8040201	40
AR0048046	Rogers Lumber Co of Camden, Inc	Trib, Ouachita R	8040201	
AR0048097	Georgia Pacific – North Log Yard	Trib, Little Brushy CR, Big Brushy CR	8040202	42
AR0048381	Watson Sawmill & Ltm Chips, Inc	Trib, Beech CR, Smackover CR, Ouachita R	8040201	43
AR0049123	Mt Holly School Wastewater Sys	Trib, Dry CR, Beech CR, Smackover CR	8040201	44
AR0049140	Union Power Partners, LP – Union	Ouachita R	8040202	45
AR0049204	Georgia Pacific – Fordyce OSB FA	Trib, Moro CR, Ouachita R	8040201	46
AR0049387	Hanson Aggregates – Eagle Mills	Mizzel CR, Ouachita R	8040201	47
AR0049492	Meridian Aggregates Co – Harrell	Trib, Dunn CR, Ouachita R	8040201	55
AR0049646	Standard Gravel Company, Inc	Mill CR, Freeco Bayou, Ouachita R	8040201	
AR0049743	El Dorado Water Utilities	Ouachita R	8040201	49
AR0049891	Stone Woodyard, Inc.	Mizzell CR, Ouachita R	8040201	50

Table A-53: OUA0005 Bayou De Loutre Near Junction City, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	6.52	3.50	10.00	1.40
BOD_5 (mg/L)	55	1.78	0.41	7.49	1.27
pH (standard units)	59	6.83	5.91	7.66	0.37
Total Organic Carbon (mg/L)	55	13.51	7.88	25.30	3.34
Ammonia as N (mg/L)	59	0.16	0.01	2.00	0.32
$NO_2 + NO_3$ as N (mg/L)	59	0.89	0.02	6.60	1.17
Orthophosphate as P (mg/L)	59	0.08	0.010	0.49	0.09
Total Phosphorus as P (mg/L)	57	0.18	0.03	0.69	0.13
Total Hardness (mg/L)	22	53.27	25.00	72.00	14.22
Chloride (mg/L)	59	141.47	21.80	740.00	106.99
Sulfate (mg/L)	58	132.87	3.46	686.00	125.13
Total Dissolved Solids (mg/L)	57	506.01	22.80	1530.00	299.57
Total Suspended Solids (mg/L)	58	7.88	1.00	28.00	6.19
Turbidity (NTU)	59	14.90	3.40	35.00	7.83

Table A-54: OUA0008B Ouachita River at Felsenthal Lock & Dam

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.11	6.80	10.60	0.74
BOD_5 (mg/L)	52	1.63	0.46	7.78	1.12
pH (standard units)	56	7.01	6.23	8.14	0.40
Total Organic Carbon (mg/L)	53	7.25	3.18	14.60	3.23
Ammonia as N (mg/L)	57	0.03	0.01	0.11	0.03
$NO_2 + NO_3$ as N (mg/L)	57	0.14	0.01	0.52	0.11
Orthophosphate as P (mg/L)	49	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	55	0.06	0.02	0.23	0.04
Total Hardness (mg/L)	21	36.62	25.00	262.00	51.65
Chloride (mg/L)	57	11.93	2.75	57.70	8.62
Sulfate (mg/L)	57	9.78	4.19	115.00	14.36
Total Dissolved Solids (mg/L)	55	78.21	52.50	164.00	18.00
Total Suspended Solids (mg/L)	56	10.86	2.50	89.30	12.89
Turbidity (NTU)	57	18.00	5.00	63.60	10.99

Table A-55: OUA0027 Smackover Creek Near Smackover, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	6.77	3.70	9.40	1.44
BOD_5 (mg/L)	55	1.35	0.16	4.07	0.75
pH (standard units)	59	6.59	5.69	7.17	0.31
Total Organic Carbon (mg/L)	56	9.30	3.41	17.24	2.94
Ammonia as N (mg/L)	60	0.04	0.01	0.171	0.03
$NO_2 + NO_3$ as N (mg/L)	60	0.13	0.00	0.88	0.19
Orthophosphate as P (mg/L)	57	0.03	0.01	0.38	0.05
Total Phosphorus as P (mg/L)	58	0.08	0.02	0.53	0.07
Total Hardness (mg/L)	22	36.77	25.00	90.00	16.06
Chloride (mg/L)	60	80.99	5.60	1130.00	147.08
Sulfate (mg/L)	60	13.62	2.45	144.00	29.12
Total Dissolved Solids (mg/L)	59	193.09	71.00	511.00	104.52
Total Suspended Solids (mg/L)	59	10.26	2.20	24.00	4.87
Turbidity (NTU)	60	19.53	3.90	44.70	9.06

Table A-56: OUA0028 Moro Creek East of Hampton, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	46	7.43	5.20	11.00	1.11
BOD_5 (mg/L)	45	1.56	0.52	7.53	1.07
pH (standard units)	45	6.60	6.09	7.05	0.30
Total Organic Carbon (mg/L)	43	12.25	6.34	19.82	3.01
Ammonia as N (mg/L)	47	0.03	0.01	0.12	0.03
$NO_2 + NO_3$ as N (mg/L)	47	0.10	0.01	0.36	0.10
Orthophosphate as P (mg/L)	42	0.02	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	46	0.08	0.02	0.33	0.05
Total Hardness (mg/L)	17	25.00	25.00	25.00	0.00
Chloride (mg/L)	47	4.87	1.72	28.90	3.97
Sulfate (mg/L)	47	5.08	2.36	18.00	2.58
Total Dissolved Solids (mg/L)	45	75.84	13.20	174.00	22.65
Total Suspended Solids (mg/L)	46	9.88	2.00	28.80	6.07
Turbidity (NTU)	47	24.81	7.60	50.00	11.18

Table A-57: OUA0037 Ouachita River Downstream of Camden, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.17	6.80	10.00	0.62
BOD_5 (mg/L)	53	1.22	0.16	4.89	0.94
pH (standard units)	58	6.96	6.22	7.52	0.28
Total Organic Carbon (mg/L)	55	5.70	2.75	13.80	2.75
Ammonia as N (mg/L)	59	0.03	0.01	0.121	0.03
NO_2 + NO_3 as N (mg/L)	59	0.16	0.01	0.59	0.10
Orthophosphate as P (mg/L)	53	0.02	0.01	0.13	0.02
Total Phosphorus as P (mg/L)	58	0.05	0.02	0.18	0.03
Total Hardness (mg/L)	21	25.43	25.00	30.00	1.16
Chloride (mg/L)	59	8.53	2.30	88.40	13.66
Sulfate (mg/L)	59	9.97	4.85	48.10	7.81
Total Dissolved Solids (mg/L)	58	73.69	44.00	208.00	35.00
Total Suspended Solids (mg/L)	58	11.73	3.00	41.50	7.98
Turbidity (NTU)	59	18.04	5.20	43.50	8.98

Table A-58: OUA0047 Jug Creek Downstream of Fordyce, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.54	3.30	11.27	2.09
BOD_5 (mg/L)	58	1.52	0.10	5.93	1.16
pH (standard units)	58	6.89	6.14	7.80	0.37
Total Organic Carbon (mg/L)	55	10.84	6.45	15.60	2.17
Ammonia as N (mg/L)	58	0.65	0.01	9.60	1.43
NO_2 + NO_3 as N (mg/L)	58	1.84	0.09	13.50	2.06
Orthophosphate as P (mg/L)	58	0.76	0.04	2.47	0.58
Total Phosphorus as P (mg/L)	56	0.86	0.15	2.37	0.56
Total Hardness (mg/L)	25	56.28	34.00	80.00	12.58
Chloride (mg/L)	58	41.07	3.71	294.50	36.52
Sulfate (mg/L)	58	16.31	5.74	28.80	5.33
Total Dissolved Solids (mg/L)	58	231.21	99.00	691.00	73.88
Total Suspended Solids (mg/L)	58	6.39	1.00	70.00	9.45
Turbidity (NTU)	58	14.12	3.20	82.60	13.92

Table A-59: OUA0124B Ouachita River Downstream of AR Game & Fish Pigeon Hill Access

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	8.06	6.80	10.10	0.62
BOD_5 (mg/L)	47	1.24	0.20	5.01	0.84
pH (standard units)	51	6.93	6.31	7.67	0.26
Total Organic Carbon (mg/L)	48	6.86	2.73	13.86	3.08
Ammonia as N (mg/L)	52	0.05	0.01	0.23	0.05
NO_2 + NO_3 as N (mg/L)	52	0.19	0.01	1.45	0.20
Orthophosphate as P (mg/L)	48	0.01	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	51	0.06	0.02	0.16	0.03
Total Hardness (mg/L)	16	26.38	25.00	35.00	2.96
Chloride (mg/L)	52	14.21	2.80	45.90	9.51
Sulfate (mg/L)	52	7.71	3.79	16.40	2.67
Total Dissolved Solids (mg/L)	51	79.27	46.50	144.00	19.88
Total Suspended Solids (mg/L)	51	12.56	2.50	49.00	9.50
Turbidity (NTU)	52	19.14	6.90	47.90	10.52

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SEGMENT 2E UPPER CORNIE BAYOU AND TRIBUTARIES

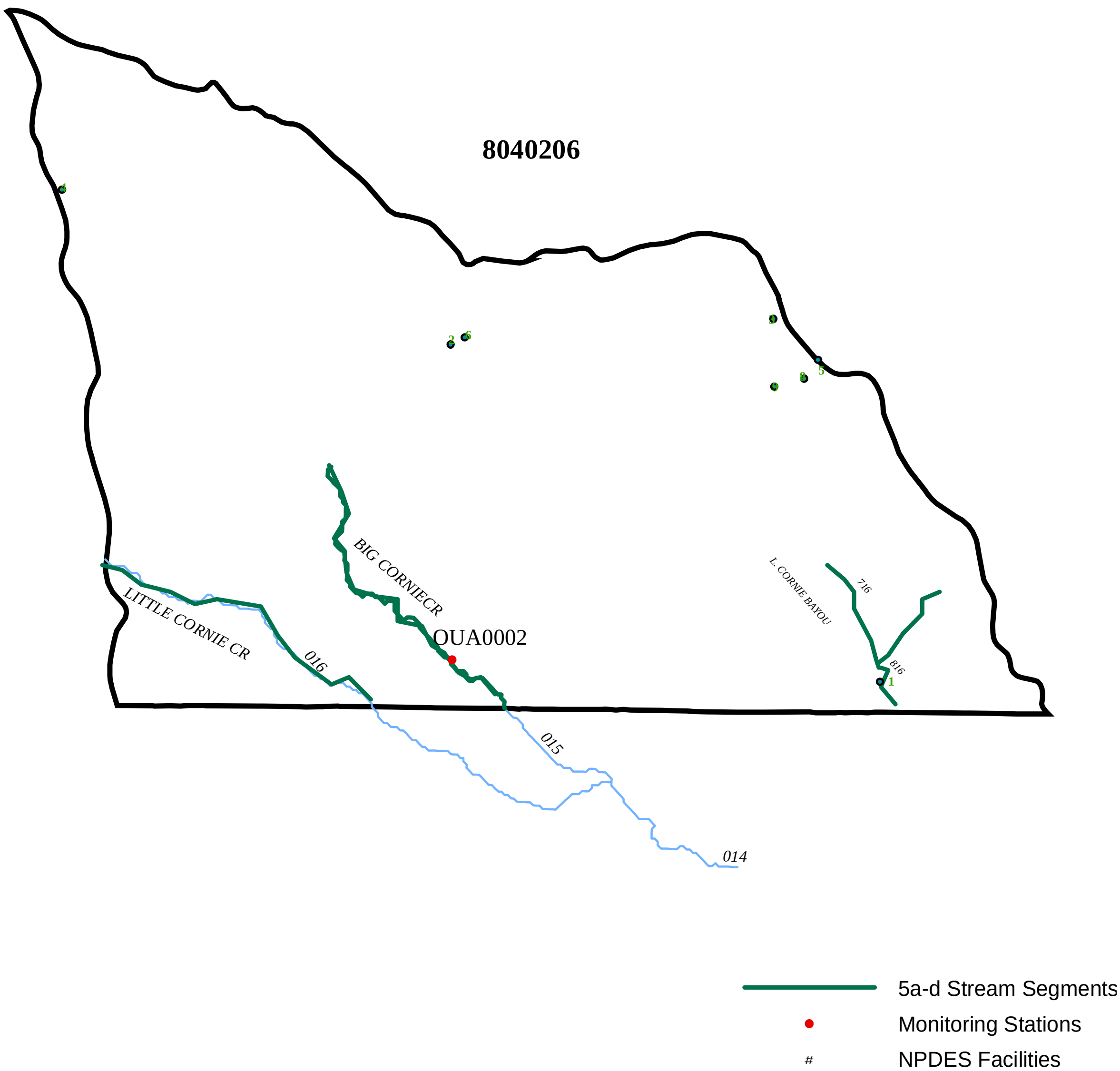
Segment 2E is located in south central Arkansas and covers parts of Columbia and Union Counties. This segment includes the upper portions of Cornie Bayou and Little Cornie Bayou, which eventually flow into the Ouachita River in northern Louisiana. The two major tributaries are Beech Creek and Three Creeks.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. From a total of 44.0 miles of stream within this segment, 15.0 stream miles were assessed using monitored data and 29.0 stream miles were evaluated.

In general, water quality within this basin has been improving. The oil industry has ceased discharging salt water almost entirely in this basin and chloride values have declined noticeably within the last several years. Sulfates and zinc are impairing all of the waters within this basin. Beryllium is also listed for one stream segment. Additional assessment and reclamation activities are needed to address these issues.

Figure A-10: Planning Segment 2E



(Segment 2E)

Table A-60: Planning Segment 2E—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-2E																							
Big Cornie Cr.	8040206	-015	15.0	OUA0002	M	S	N	S	S	N	N	RE	RE	UN		SO4	Zn	Be		5d	5c	5d	
Little Cornie Cr.	8040206	-016	18.0		E	S	N	S	S	S	N	RE	RE			SO4	Zn			5d	5c		
Little Cornie Bayou	8040206	-716	5.0		E	S	N	S	S	S	N	RE	RE			SO4	Zn			5d	5c		
Little Cornie Bayou	8040206	-816	3.0		E	S	N	S	S	R	N	RE	RE			SO4	Zn			5d	5c		
Walker Branch	8040206	-916	3.0		E	S	N	S	S	R	N	RE	RE			SO4	Zn			5d	5c		

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	44.0	0.0
AQUATIC LIFE	0.0	44.0
PRIMARY CONTACT	44.0	0.0
SECONDARY CONTACT	44.0	0.0
DRINKING SUPPLY	23.0	15.0
AGRI & INDUSTRY	0.0	44.0

TOTAL MILES	44.0
MILES UNASSESSED	0.0
MILES EVALUATED	29.0
MILES MONITORED	15.0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0002	Cornie Bayou near Three Creeks	Y	1	A

Table A-61: Segment 2E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000981	Great Lakes Chemical Corp – Newell	Trib, Little Cornie Bayou	8040206	8
AR0022179	Junction City, City of	Little Cornie Bayou	8040206	1
AR0043516	Great Lakes Chemical Corp – West	Sewell CR	8040206	2
AR0047813	Oak Manor Water & Wastewater P	Jay Dison Spring Branch, Cornie Bayou	8040206	3
AR0047945	Gunnels Mill, Inc	Trib, Cornie CR, Ouachita R	8040206	4
AR0048461	Del-Tin Fiber LLC	Trib, Cornie CR, Ouachita R	8040206	5
AR0049000	Albemarle Corp – East Plant	Sewell CR, Three CRs, Ouachita R	8040206	6
AR0049182	Gaunt, William R	Stock Pond, Flat CR, Haynes CR	8040206	
AR0049336	Mac’s General Inv, LLC-DBA TIN	Trib, Dry CR, Little Cornie Bayou	8040206	9

Table A-62: OUA0002 Cornie Bayou Near Three Creeks, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	6.81	4.10	10.30	1.47
BOD_5 (mg/L)	50	1.51	0.31	5.96	0.89
pH (standard units)	53	6.57	5.77	7.12	0.36
Total Organic Carbon (mg/L)	49	10.88	5.00	19.70	3.04
Ammonia as N (mg/L)	53	0.03	0.01	0.40	0.06
NO_2 + NO_3 as N (mg/L)	53	0.22	0.01	3.00	0.53
Orthophosphate as P (mg/L)	49	0.02	0.01	0.17	0.02
Total Phosphorus as P (mg/L)	51	0.08	0.02	0.45	0.07
Total Hardness (mg/L)	19	35.21	25.00	64.00	11.52
Chloride (mg/L)	53	54.52	13.10	199.16	36.91
Sulfate (mg/L)	53	26.71	1.50	261.60	55.72
Total Dissolved Solids (mg/L)	52	202.29	11.00	767.50	147.28
Total Suspended Solids (mg/L)	52	9.71	1.00	46.30	7.34
Turbidity (NTU)	53	16.98	2.50	45.20	8.66

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SEGMENT 2F OUACHITA RIVER AND TRIBUTARIES: HEADWATERS TO CONFLUENCE WITH LITTLE MISSOURI RIVER

Segment 2F, located in west central Arkansas, covers most of Hot Spring, Garland and Montgomery Counties, portions of Clark, Dallas, Pike, Polk, Yell, and Ouachita Counties. This segment consists of a 220-mile reach of the upper Ouachita River and a 70-mile reach of the Caddo River. Principal tributaries include the South Fork of the Ouachita River, Mazarn Creek, L'Eau Frais Creek and Irons Fork Creek. Segment 2F contains three major impoundments of the Ouachita River: Lake Ouachita, Lake Hamilton and Lake Catherine. DeGray Reservoir, an impoundment of the Caddo River, is also located in Segment 2F.

Summary of Water Quality Conditions

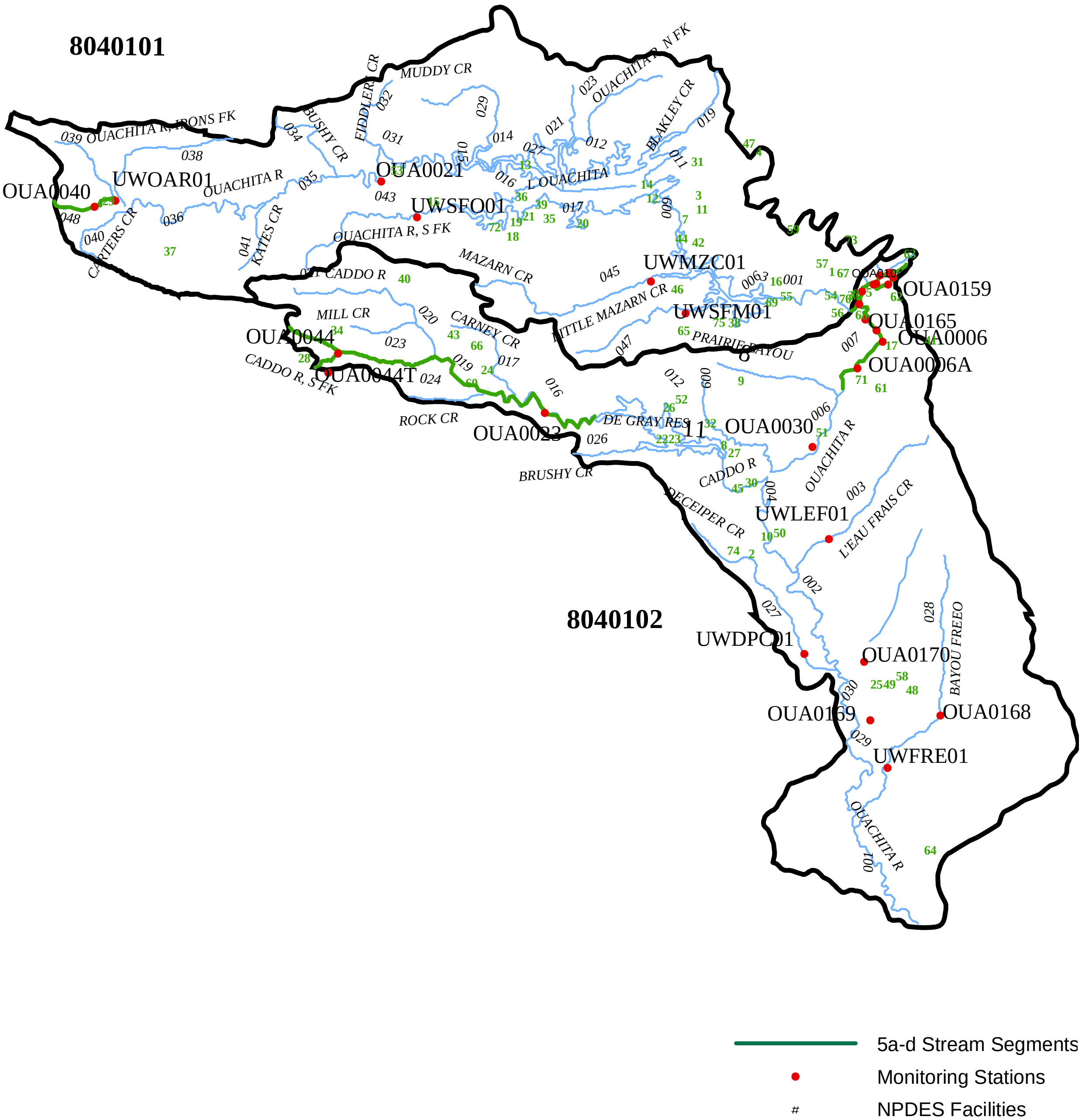
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 344 miles of stream within this segment. An additional 232 miles were evaluated bringing the total number of miles assessed with in this segment to 576 stream miles. Approximately 36 percent of the waters within this segment are designated as extraordinary resource waters. Water quality in Segment 2F is generally good and trends seem to indicate it is improving.

The South Fork of the Caddo River and the Caddo River downstream of the South Fork are not attaining the aquatic life use because of excessive metals (beryllium, copper, zinc) concentrations. The source is thought to be from abandoned open pit mining.

Chamberlain Creek and its tributaries receive drainage from a pit mine and were listed as not attaining the aquatic life use, domestic water supply use, and the industrial and agriculture water supply uses. Low pH values, elevated minerals (total dissolved solids, sulfates, chlorides), and elevated metals (beryllium, cadmium, copper, zinc), are all causes of the impairments. Additional point source and nonpoint source controls are needed to address the problem.

Prairie Creek below the City of Mena was assessed as not attaining the aquatic life use because of elevated turbidity. The source is unknown at this time.

Figure A-11: Planning Segment 2F



(Segment 2F)

Table A-63: Planning Segment 2F—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS			
												1	2	3	4	1	2	3	4	1	2	3	4
SEG-2F																							
Ouachita River	8040102	-001	15.6	OUA0165	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-002	16.9		E	S	S	S	S	S	S									1			
L'Eau Frais C.	8040102	-003	21.5	UWLEF01	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-004	15.8		E	S	S	S	S	S	S									1			
Ouachita River	8040102	-005	0.6		E	S	S	S	S	S	S									1			
Ouachita River	8040102	-006	12.1	OUA0030	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-007	14.5	OUA0006A+	M	S	S	S	S	N	S	UN				Be				5d			
Prairie Bayou	8040102	-008	13.5		E	S	S	S	S	S	S									1			
DeRoche Cr.	8040102	-009	16.5		U															3			
Caddo River	8040102	-010	8.1		E	S	S	S	S	S	S									1			
Caddo River	8040102	-016	13.5	OUA0023	M	S	N	S	S	N	S	RE	RE			Zn	Be			5c	5d		
Caney Creek	8040102	-017	12.5		U															3			
Caddo River	8040102	-018	4.1		E	S	N	S	S	S	S	RE				Zn				5c			
Caddo River	8040102	-019	7.7		E	S	N	S	S	S	S	RE				Zn				5c			
Caddo River	8040102	-020	4.1		U															3			
Caddo River	8040102	-021	15.9		U															3			
Mill Creek	8040102	-022	7.3		E	S	S	S	S	S	S									1			
S. Fork Caddo	8040102	-023	16.6	OUA0044	M	S	N	S	S	S	S	RE	RE			Zn	Cu			5a	5a		
D.C. Creek	8040102	-923	5.0	OUA0044T	M	S	S	S	S	S	S									1			
Rock Creek	8040102	-024	8.1		E	S	S	S	S	S	S									1			
Brushy Creek	8040102	-026	6.9		E	S	S	S	S	S	S									3			
Deceiper Cr.	8040102	-027	24.4	UWDPC01	M	S	S	S	S	S	S									1			
Bayou Freeo	8040102	-028	33.9	UWFRE01	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-029	13.3		E	S	S	S	S	S	S									1			
Tulip Creek	8040102	-901	20.0	OUA0169+	M	S	S	S	S	S	S									1			
Cypress Creek	8040102	-801	30.0	OUA0170	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-030	12.0		E	S	S	S	S	S	S									1			
Cove Creek	8040101	902A	3.6	OUA0171A	M	S	S	S	S	S	S									1			
Lucinda Creek	8040102	500	2.2	OUA0171B	M	S	N	S	S	S	N	RE	RE	RE	RE	pH	SO4	Zn	Be	5a	5a	5a	5a
Basin Creek	8040102	505	1.4	OUA0171D	M	S	S	S	S	S	S									1			
Chamberlain Creek	8040102	501	2.5	OUA0104	M	S	N	S	S	N	N	RE	RE	RE		pH	MN	ME		5a	5a	5a	
Cove Creek	8040101	902B	9.6	OUA0159	M	S	N	S	S	N	N	RE	RE	RE	RE	pH	SO4	TDS	ML	5a	5a	5a	5a
Ouachita River	8040101	-001	10.4		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-009	2.7		E	S	S	S	S	S	S									1			
Blakely Creek	8040101	-019	8.3		E	S	S	S	S	S	S									1			
N. Fork Ouachita	8040101	-023	10.9		E	S	S	S	S	S	S									1			
Irons Fork	8040101	-025	4.8		E	S	S	S	S	S	S									1			
Muddy Creek	8040101	-029	15.3		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-031	14.4		E	S	S	S	S	S	S									1			
Fiddlers Cr.	8040101	-032	10.6		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-033	11.9	OUA0021	M	S	S	S	S	S	S									1			
Ouachita River	8040101	-035	10.2		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-036	24.1	UWOAR01	M	S	S	S	S	S	S									1			
Bushy Creek	8040101	-034	12.1		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-037	0.7		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-039	11.0	UWOAR01	M	S	S	S	S	S	S									1			
Iron Fork	8040101	-038	17.3		E	S	S	S	S	S	S									1			
Carters Creek	8040101	-040	9.0		U															3			
Kates Creek	8040101	-041	8.2		U															3			
S.Fork Ouachita	8040101	-043	22.5	UWSFO01	M	S	S	S	S	S	S									1			
Mazarn Creek	8040101	-045	23.3	UWMZC01	M	S	S	S	S	S	S									1			
Little Mazarn	8040101	-047	14.8	UWSFM01	M	S	S	S	S	S	S									1			
Prairie Creek	8040101	-048	10.0	OUA0040	M	S	N	S	S	S	S	UN				SI				5d			

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	576.0	0.0
AQUATIC LIFE	509.8	66.2
PRIMARY CONTACT	576.0	0.0
SECONDARY CONTACT	576.0	0.0
DRINKING SUPPLY	535.9	40.1
AGRI & INDUSTRY	561.7	14.3

TOTAL MILES	642.2
MILES UNASSESSED	66.2
MILES EVALUATED	232.0
MILES MONITORED	344.0

MN = CL, SO4, TDS
ME = Cd, Cu, Zn, Be
ML =Be, Zn

Table A-63: Planning Segment 2F continued—Designated Use Attainment Status and Water Quality Monitoring

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWLEF01	L'Eua Frais Creek at Highway 128 near Joan		2	R
OUA0165	Ouachita River off Highway 270 above Stone Quarry Creek		2	R
OUA0030	Ouachita River near Donaldson		1	A
OUA0006A	Ouachita River near Malvern		1	A
OUA0006	Ouachita River at Rock Port	Y	1	A
OUA0023	Caddo River near Amity	Y	1	A
OUA0044	South Fork of Caddo River at Fancy Hill		1	A
OUA0044T	N.L. Baroid tributary to South Fork Caddo River		1	A
UWDPC01	Deceiper Creek at county road, 8 miles southeast of Gurdon		2	R
UWFRE01	Freeo Creek at Highway 9, 5 miles west of Bearden		2	R
OUA0168	White Oak Creek at Highway 128 northwest of Holly Springs		2	R
OUA0169	Tulip Creek at Highway 128 northwest of Holly Springs		2	R
OUA0170	Cypress Creek at Highway 7 north of Sparkman		2	R
OUA0100	Cove Creek above Highway 51		1	S
OUA0171D	Basin Creek on county road above confluence of Cove Creek		1	S
OUA0171C	Cove Creek on Baroid Road above confluence of Chamberlain Creek		1	S
OUA0171B	Lucinda Creek on Baroid Road above confluence of Chamberlain Creek		1	S
OUA0171A	Chamberlain Creek at Baroid Road near Magnet Cove		1	S
OUA0104	Chamberlain Creek above confluence of Cove Creek		1	S
OUA0159	Cove Creek at Highway 51 near Magnet Cove		1	A
OUA0021	Ouachita River near Pencil Bluff	Y	1	A
UWOAR01	Ouachita River at county road off Highway 88 near Boardcamp		2	R
UWSFO01	South Fork Ouachita River at Highway 270 at Mount Ida		2	R
UWMZC01	Mazarn Creek at Highway 227 near Sunshine		2	R
UWSFM01	Little Mazarn Creek at county road, 1.5 miles north of Pettyview		2	R
OUA0040	Prairie Creek below Mena		1	A

Table A-64: Segment 2F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000523	US Vanadium Corp-Stratcor	Lake Catherine (1,2,3)/Wilson CR (5)	8040101	1
AR0000531	Reynolds Metals Co-Gum Springs	Ouachita R	8040102	2
AR0000698	Alumnitec, Inc	Lake Catherine Trib	8040101	67
AR0000833	Weyerhaeuser Co-Mountain Pine	Glazypeau CR	8040101	3
AR0000850	Mountain Valley Spring Co	Trib, Glazypeau CR, Ouachita R	8040101	4
AR0000868	Hot Spring Co-Jones Mill WWTF	Cove CR	8040102	5
AR0001147	Entergy AR, Inc-Lake Catherine	Lake Catherine, Ouachita R	8040101	6
AR0001201	BICC General Cable Ind, Inc	Trib, Cove CR	8040102	68
AR0020109	USDAFS-Ouachita CCC	Ouachita R	8040101	7
AR0020222	USA-COE Iron Mountain Rec Area-DeGray	DeGray Lake	8040102	8
AR0020231	USA-COE Shouse Ford Rec Area	DeGray Lake	8040102	9
AR0020605	Arkadelphia, City of	Ouachita R	8040102	10
AR0021539	Mountain Pine, City of	Glazypeau CR, Ouachita R	8040101	11
AR0022781	USA-COE Spillway Rec Area-Ouac	Lake Ouachita	8040101	12
AR0022799	USA-COE Little Fir Rec Area-	Lake Ouachita	8040101	13
AR0022802	USA-COE Brady Mountain Rec Area-Oua	Lake Ouachita	8040101	14
AR0033855	Mount Ida, City of	S Fork Ouachita R, Ouachita R	8040101	15
AR0033880	Hot Springs, City of (Hot Spgs	Lake Catherine	8040101	16
AR0034126	Malvern, City of	Ouachita R	8040102	17
AR0035394	USA-COE Denby Point Rec Area	Lake Ouachita	8040101	18
AR0035408	USA-COE Tompkins Bend Rec Area	Lake Ouachita	8040101	19
AR0035416	USA-COE Crystal Springs Rec Ar	Lake Ouachita	8040101	20
AR0035424	USA-COE Joplin Recreation Area	Lake Ouachita	8040101	21
AR0035432	USA-COE Caddo Drive Rec Area-	DeGray Lake	8040102	22
AR0035459	USA-COE Alpine Ridge Rec Area-	DeGray Lake, Caddo R	8040102	23
AR0035645	Glenwood, City of	Caddo R	8040102	24
AR0035939	Sparkman, City of	Trib, Cypress CR, Ouachita R	8040102	25
Ar0036013	USA-COE Arlie Moore Rec Area-	DeGray Lake, Caddo R, Ouachita R	8040102	26
Ar0036021	USA-COE Spillway Rec Area-Degr	DeGray Lake	8040102	27
Ar0036609	Tremont Corp - Formerly Nl Ind	Blacr Valley CR Trib, S FK Caddo R	8040102	28
Ar0036692	Mena, City of	Trib, Prairie CR, Ouachita R	8040101	29
Ar0036749	Arkadelphia Human Dev Ctr	Caddo R Trib	8040102	30
Ar0037061	AR Parks & Tourism-Lake DeGray	DeGray Lake	8040102	32
Ar0036811	AR Parks & Tourism-Lake Ouachita	Lake Ouachita	8040101	31
Ar0038121	AR Parks & Tourism-Lake Catherine	Lake Catherine, Ouachita R	8040101	33

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
Ar0038270	Baker-Hughes Inteq	South Fork Caddo R	8040102	34
Ar0039403	Harbor East POA	Ditch, Lake Ouachita	8040101	35
AR0040801	Shangri-La Resort	Lake Ouachita	8040101	36
AR0041050	Church of Nazarene-Heath Valle	Macks CR	8040101	37
AR0041271	Farr Shores Horizontal Property	Ditch, Lake Hamilton	8040101	69
AR0041319	Mill Pond Village-Garland Co	Sorrells CR, Lake Hamilton	8040101	38
AR0042293	Harbor South Development POA	Lake Ouachita Trib	8040101	39
AR0043125	Norman, City of	Caddo R	8040102	40
AR0043354	Acme Brick Company-Perla Facil	Town CR, Ouachita R	8040102	41
AR0044172	Westwood Village POA	Lake Hamilton	8040101	42
AR0044814	GS Roofing Products Co-Slate	Five Mile CR	8040102	43
AR0045128	McClard Shopping Ctr	Trib, Lost CR, Lake Hamilton	8040102	44
AR0045411	Caddo Valley, City of	Caddo R	8040102	45
AR0045501	AR Hwy Dept-Social Hill Rest A	Trib, Ouachita R, 2F-Ouachita RB	8040102	71
AR0045438	Riviera Utilities of AR, Inc	Ouachita R	8040101	70
AR0045594	Mount Ida Retirement Ctr	Trib, Twin CR, Lake Ouachita	8040101	72
AR0045624	Lake Hamilton School Dist #5	Lost CR Trib	8040101	46
AR0045829	O’Brien’s Pizza Pub	Glazypeau CR Trib	8040101	47
AR0046612	Brazeale Lumber Co	Trib, Brushy CR, Ouachita R	8040102	48
AR0047139	Ray White Lumber Co	Trib, Cyprus CR, Ouachita R	8040102	49
AR0047228	Malvern Minerals-Hot Springs	Trib, E Gulpha CR, Lake Catherine	8040101	73
AR0047821	GS Roofing Products Co-Fine	Trib, Five Mile CR, Caddo R	8040101	66
AR0047856	Shields Wood Products, Inc	Trib, Ouachita R	8040102	50
AR0047881	Wells RBS Travel Center	Trib, Deceiper CR, Ouachita R	8040102	74
AR0048020	Donaldson, Town of	Ouachita R, 2F-Ouachita RB	8040102	51
AR0048241	Lake Center Grocery	Big Hill CR, DeGray Lake	8040102	52
AR0048275	Camp Ozark	Trib/Ouachita R	8040101	53
AR0048615	Diamondhead Resort-Riviera Uti	Trib, Lake Catherine	8040101	54
AR0048755	Entergy AR, Inc-Carpenter Dam	Ouachita R	8040101	55
AR0048763	Entergy AR, Inc-Remmel Dam	Ouachita R	8040101	56
AR0048950	UMETCO Minerals Corp-Wilson Mi	Wilson CR, Lake Cath	8040101	57
AR0049026	Garland Gaston Lumber Co	Brushy CR, Ouachita R	8040102	58
AR0049115	Magic Springs Development Co	Trib, Gulpha CR, Lake Catherine	8040101	59
AR0049263	Bean Lumber Company	Caddo R Trib	8040102	60
AR0049417	Duke Energy Hot Springs, LLC	Ouachita R	8040102	61
AR0049611	Hot Spring Power Company, LLC	Ouachita R	8040102	62
AR0049760	Ridges of Hot Springs POA	Sorrells CR, Fourche Loupe CR	8040201	75

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0049794	Halliburton/Tre-Dresser Industries	Chamberlain CR, Cove CR, Ouachita R	8040102	63
AR0050105	Harmony Grove Public School	Mizzell CR, Palmer Bayou, Ouachita R	8040102	64
AR0050148	Hot Springs, City of-West Waste	Little Mazarn CR, Lake Hamilton	8040101	65

Table A-65: OUA0006A Ouachita River Near Malvern, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	29	8.30	6.90	9.30	0.60
BOD_5 (mg/L)	29	0.78	0.09	2.30	0.45
pH (standard units)	28	7.25	6.99	7.80	0.14
Total Organic Carbon (mg/L)	30	3.51	2.62	5.50	0.67
Ammonia as N (mg/L)	32	0.02	0.01	0.06	0.02
$NO_2 + NO_3$ as N (mg/L)	32	0.24	0.09	0.49	0.09
Orthophosphate as P (mg/L)	27	0.02	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	32	0.04	0.02	0.09	0.02
Total Hardness (mg/L)	12	26.42	25.00	33.00	2.47
Chloride (mg/L)	32	3.30	2.00	10.80	1.54
Sulfate (mg/L)	32	11.93	5.00	29.10	5.48
Total Dissolved Solids (mg/L)	32	59.88	42.00	87.00	11.44
Total Suspended Solids (mg/L)	32	4.53	1.00	27.00	4.68
Turbidity (NTU)	32	6.12	1.60	30.00	5.02

Table A-66: OUA0021 Ouachita River Near Pencil Bluff, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.91	5.10	14.17	1.99
BOD_5 (mg/L)	52	0.61	-0.02	3.33	0.53
pH (standard units)	59	6.88	6.11	7.70	0.36
Total Organic Carbon (mg/L)	55	2.71	1.36	10.00	1.43
Ammonia as N (mg/L)	58	0.01	0.01	0.02	0.00
$NO_2 + NO_3$ as N (mg/L)	59	0.17	0.01	1.39	0.23
Orthophosphate as P (mg/L)	52	0.02	0.01	0.08	0.01
Total Phosphorus as P (mg/L)	57	0.04	0.01	0.21	0.04
Total Hardness (mg/L)	24	27.46	25.00	41.00	4.10
Chloride (mg/L)	59	2.39	1.35	3.82	0.47
Sulfate (mg/L)	59	4.17	2.76	6.53	0.69
Total Dissolved Solids (mg/L)	59	48.86	32.00	73.00	9.08
Total Suspended Solids (mg/L)	59	4.25	1.00	52.00	6.91
Turbidity (NTU)	59	8.98	1.60	83.10	11.82

Table A-67: OUA0023 Caddo River Near Amity, AR Upstream o f Hwy 84 Bridge

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	8.02	6.80	9.70	0.65
BOD_5 (mg/L)	55	0.71	0.12	2.35	0.47
pH (standard units)	55	7.42	7.12	7.71	0.12
Total Organic Carbon (mg/L)	54	2.36	1.03	6.58	1.12
Ammonia as N (mg/L)	59	0.02	0.01	0.14	0.03
$NO_2 + NO_3$ as N (mg/L)	59	0.18	0.01	0.95	0.17
Orthophosphate as P (mg/L)	55	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	58	0.05	0.01	0.23	0.03
Total Hardness (mg/L)	22	56.09	25.00	400.00	77.62
Chloride (mg/L)	59	3.14	1.44	21.30	3.42
Sulfate (mg/L)	59	13.53	3.73	458.00	58.96
Total Dissolved Solids (mg/L)	59	75.18	40.00	712.00	85.59
Total Suspended Solids (mg/L)	59	8.44	1.00	60.20	11.58
Turbidity (NTU)	59	10.05	1.29	80.00	11.91

Table A-68: OUA0030 Ouachita River Near Donaldson, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	8.11	6.70	9.00	0.51
BOD_5 (mg/L)	56	0.94	0.03	2.46	0.50
pH (standard units)	54	7.26	6.99	7.70	0.15
Total Organic Carbon (mg/L)	53	3.63	2.63	5.21	0.67
Ammonia as N (mg/L)	59	0.03	0.01	0.09	0.02
$NO_2 + NO_3$ as N (mg/L)	59	0.23	0.02	0.48	0.09
Orthophosphate as P (mg/L)	52	0.02	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	58	0.04	0.02	0.12	0.02
Total Hardness (mg/L)	21	26.19	25.00	33.00	1.89
Chloride (mg/L)	59	3.13	1.97	13.40	1.51
Sulfate (mg/L)	59	11.73	4.94	29.10	5.33
Total Dissolved Solids (mg/L)	59	58.74	40.00	102.00	11.67
Total Suspended Solids (mg/L)	59	4.79	1.00	26.50	3.83
Turbidity (NTU)	59	7.50	1.70	30.00	6.18

Table A-69: OUA0040 Prairie Creek Downstream of Mena, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.99	5.30	13.60	2.10
BOD_5 (mg/L)	60	2.01	0.29	8.20	1.71
pH (standard units)	61	6.67	6.09	7.71	0.28
Total Organic Carbon (mg/L)	57	4.75	1.55	11.00	2.06
Ammonia as N (mg/L)	60	0.20	0.01	1.35	0.25
$NO_2 + NO_3$ as N (mg/L)	61	0.59	0.01	3.80	0.55
Orthophosphate as P (mg/L)	56	0.03	0.01	0.15	0.03
Total Phosphorus as P (mg/L)	59	0.11	0.02	0.49	0.10
Total Hardness (mg/L)	24	25.96	25.00	33.00	2.14
Chloride (mg/L)	61	10.38	2.39	28.30	7.34
Sulfate (mg/L)	61	17.51	4.15	56.50	13.93
Total Dissolved Solids (mg/L)	61	82.66	40.50	183.00	34.09
Total Suspended Solids (mg/L)	61	10.24	1.00	39.67	8.64
Turbidity (NTU)	61	17.30	3.76	68.00	13.53

Table A-70: OUA0044 South Fork Caddo River at Fancy Hill, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	8.89	7.25	10.60	0.64
BOD_5 (mg/L)	49	0.86	0.01	2.61	0.56
pH (standard units)	53	7.15	6.31	7.48	0.20
Total Organic Carbon (mg/L)	43	1.61	0.57	3.37	0.59
Ammonia as N (mg/L)	57	0.01	0.01	0.10	0.02
$NO_2 + NO_3$ as N (mg/L)	57	0.07	0.01	0.23	0.05
Orthophosphate as P (mg/L)	37	0.01	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	56	0.02	0.01	0.11	0.02
Total Hardness (mg/L)	20	25.15	25.00	27.00	0.49
Chloride (mg/L)	57	2.00	1.27	11.80	1.87
Sulfate (mg/L)	57	12.07	6.03	18.69	2.89
Total Dissolved Solids (mg/L)	57	47.09	30.50	76.00	8.78
Total Suspended Solids (mg/L)	57	2.01	1.00	8.00	1.53
Turbidity (NTU)	57	4.53	1.00	19.20	4.04

Table A-71: OUA0044T Unnamed Tributary of South Fork Caddo River Near Fancy Hill

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	46	9.09	7.09	10.40	0.56
BOD_5 (mg/L)	42	0.57	0.06	7.04	1.24
pH (standard units)	49	7.21	6.78	7.76	0.15
Total Organic Carbon (mg/L)	31	1.34	0.46	2.35	0.39
Ammonia as N (mg/L)	52	0.01	0.01	0.31	0.04
NO_2 + NO_3 as N (mg/L)	52	0.07	0.01	0.30	0.07
Orthophosphate as P (mg/L)	36	0.01	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	51	0.03	0.01	0.10	0.02
Total Hardness (mg/L)	19	31.26	25.00	42.00	5.40
Chloride (mg/L)	52	1.77	1.31	4.42	0.57
Sulfate (mg/L)	52	15.12	8.37	25.00	4.38
Total Dissolved Solids (mg/L)	52	56.89	30.50	83.00	12.10
Total Suspended Solids (mg/L)	52	2.24	1.00	9.50	1.73
Turbidity (NTU)	52	3.97	1.00	16.60	2.99

Table A-72: OUA0159 Cove Creek Near Magnet Cove at Hwy 51

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	8.89	6.90	13.50	1.07
BOD_5 (mg/L)	47	0.42	-0.18	1.53	0.35
pH (standard units)	64	6.39	4.26	7.70	0.65
Total Organic Carbon (mg/L)	45	1.52	1.00	3.62	0.62
Ammonia as N (mg/L)	67	0.01	0.00	0.10	0.01
NO_2 + NO_3 as N (mg/L)	67	0.11	0.01	0.89	0.14
Orthophosphate as P (mg/L)	48	0.01	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	65	0.03	0.01	0.22	0.03
Total Hardness (mg/L)	34	109.21	25.00	400.00	102.20
Chloride (mg/L)	67	6.99	1.76	70.60	9.92
Sulfate (mg/L)	66	139.67	5.13	1050.00	178.65
Total Dissolved Solids (mg/L)	68	219.91	42.00	1070.00	198.42
Total Suspended Solids (mg/L)	68	6.28	1.00	35.00	5.57
Turbidity (NTU)	67	5.77	0.40	57.60	7.52

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SEGMENT 2G LITTLE MISSOURI RIVER AND ANTOINE RIVER

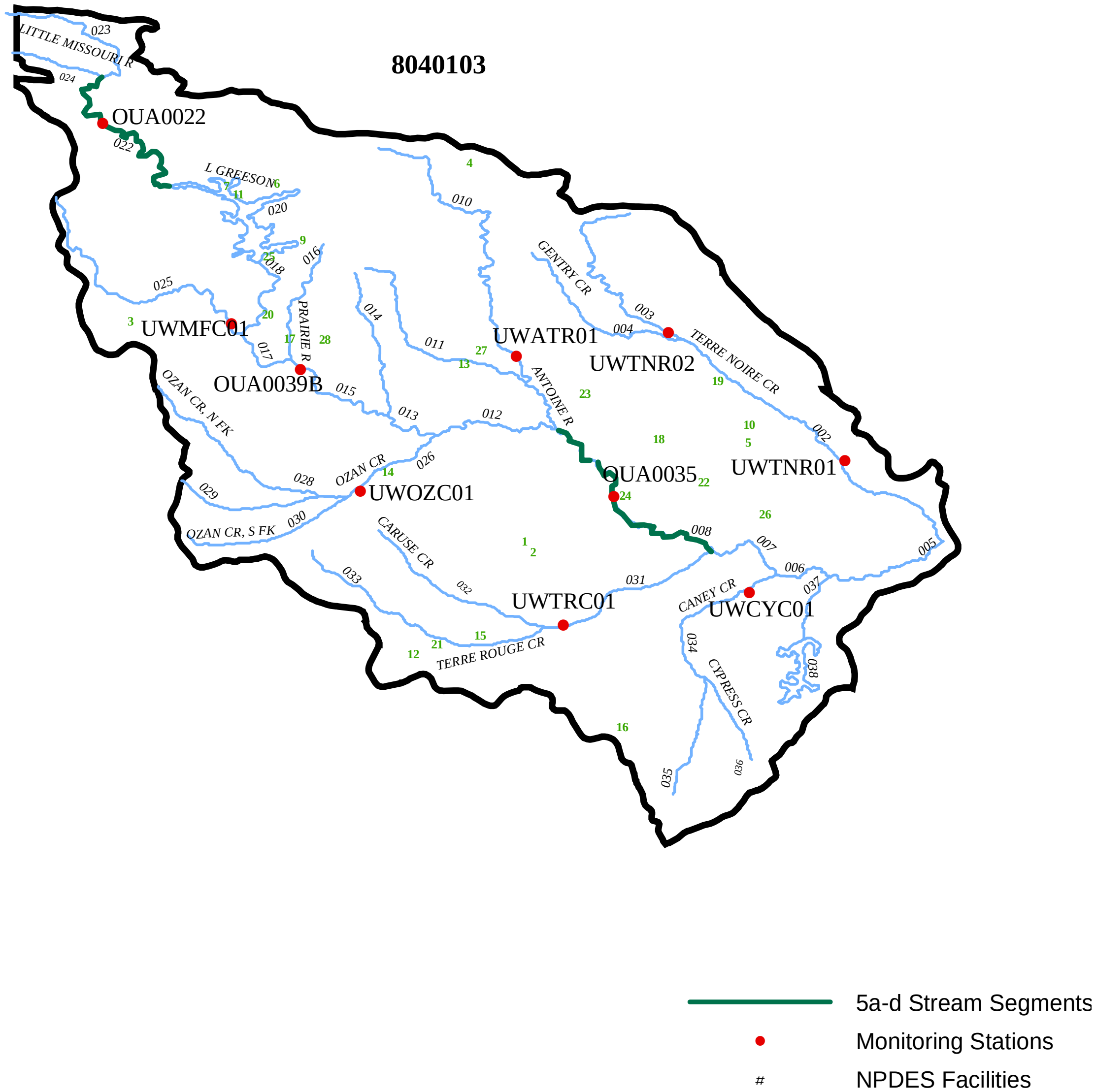
Segment 2G, located in the southwestern part of the State, covers most of Nevada and Pike Counties, large areas of Clark and Hempstead Counties, and small portions of Ouachita, Howard, Polk and Montgomery Counties. This segment encompasses the entire drainage area of the Little Missouri River with its tributaries. Major tributaries include the Antoine River, Muddy Fork, Caney Creek, Terre Noire Creek and Terre Rouge Creek. There are two large impoundments in the segment, Lake Greeson and White Oak Lake.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 208.1 miles of stream within this segment. An additional 219.4 miles were evaluated bring the total number of miles assessed with in this segment to 427.5 stream miles. Approximately 17 percent of the waters within this segment are designated as extraordinary resource waters. This segment contains a total of 427.5 stream miles.

Portions of the Little Missouri River have been listed as not attaining the aquatic life use because of excessive turbidity, copper, and zinc contamination. This is the first time this water body has been listed. Additional investigation into this problem is needed.

Figure A-12: Planning Segment 2G



(Segment 2G)

Table A-73: Planning Segment 2G—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS			
												1	2	3	4	1	2	3	4	1	2	3	4
SEG-2G																							
L. Missouri R.	8040103	-001	1.8		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-005	10.4		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-006	4.6		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-007	7.0		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-008	19.6	OUA0035	M	S	N	S	S	S	S	SE	UN			SI	Cu			5d	5d		
Terre Noire Cr.	8040103	-002	27.4	UWTNR01	M	S	S	S	S	S	S									1			
Terre Noire Cr.	8040103	-003	19.6	UWTNR02	M	S	S	S	S	S	S									1			
Gentry Creek	8040103	-004	15.4		E	S	S	S	S	S	S									1			
Antoine River	8040103	-009	5.4		E	S	S	S	S	S	S									1			
Antoine River	8040103	-010	31.6	UWATR01	M	S	S	S	S	S	S									1			
Wolf Creek	8040103	-011	18.0		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-012	10.8		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-013	5.0		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-015	10.5	OUA0039B	M	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-017	5.5		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-018	8.9		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-022	17.6	OUA0022	M	S	N	S	S	S	S	UN				Zn				5d			
L. Missouri R.	8040103	-023	13.6		E	S	S	S	S	S	S									1			
Saline Creek	8040103	-014	13.1		E	S	S	S	S	S	S									1			
Prairie Creek	8040103	-016	11.2		E	S	S	S	S	S	S									1			
Long Creek	8040103	-024	6.8		E	S	S	S	S	S	S									1			
Muddy Fork	8040103	-025	24.4	UWMFC01	M	S	S	S	S	S	S									1			
Ozan Creek	8040103	-026	8.6	UWOZC01	M	S	S	S	S	S	S									1			
Ozan Creek	8040103	-027	2.0		E	S	S	S	S	S	S									1			
N. Fork Ozan	8040103	-028	16.4		E	S	S	S	S	S	S									1			
M. Fork Ozan	8040103	-029	10.9		E	S	S	S	S	S	S									1			
S. Fork Ozan	8040103	-030	13.0		E	S	S	S	S	S	S									1			
Terre Rouge	8040103	-031	14.5	UWTRC01	M	S	S	S	S	S	S									1			
Caruse Creek	8040103	-032	15.2		E	S	S	S	S	S	S									1			
Terre Rouge	8040103	-033	20.7		M	S	S	S	S	S	S									1			
Caney Creek	8040103	-034	13.6	UWCYC01	M	S	S	S	S	S	S									1			
Caney Creek	8040103	-035	10.6		E	S	S	S	S	S	S									1			
Cypress Creek	8040103	-036	7.9		E	S	S	S	S	S	S									1			
White Oak Creek	8040103	-037	5.9		E	S	S	S	S	S	S									1			
TOTAL MILES	427.5																						
MILES UNASSESSED	0																						
MILES EVALUATED	219.4																						
MILES MONITORED	208.1																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	427.5	0
AQUATIC LIFE	390.3	37.2
PRIMARY CONTACT	427.5	0
SECONDARY CONTACT	427.5	0
DRINKING SUPPLY	427.5	0
AGRI & INDUSTRY	427.5	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0035	Little Missouri River near Boughton	Y	1	A
UWTNR01	Terre Noir Creek at Highway 51, 2.5 miles east of Red Springs		2	R
UWTNR02	Terre Noir Creek at Highway 53, 2 miles south of Hollywood		2	R
UWATR01	Antoine River at Highway 26 near Antoine		2	R
OUA0039B	Little Missouri River below Murfreesboro	Y	1	A
OUA0022	Little Missouri River near Langley	Y	1	A
UWMFC01	Muddy Fork at county road off Highway 27 near Murfreesboro		2	R
UWOCZ01	Ozan Creek at Highway 24 near Blevins		2	R
UWTRC01	Terre Rouge Creek at Highway 19, 5 miles south of Prescott		2	R
UWCYC01	Caney Creek at Highway 24 near Bluff City		2	R

Table A-74: Segment 2G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000612	Firestone Building Products Co	Garland CR & Pine CR	8040103	1
AR0000906	Potlatch Corp-Ozan Unit	Mill CR, Terre Rouge CR, Little Missouri	8040103	2
AR0020729	James Hardie Gypsum, Inc	Bluff CR, Muddy Fork CR-Little Missouri	8040103	3
AR0021521	Amity, City of	Little Antoine CR-R, Little Missouri R	8040103	4
AR0022551	Gurdon, City of	Caney CR, Terre Noir CR, Little Missouri R	8040103	5
AR0022764	USA-COE Kirby Landing Rec Area	Lake Greeson	8040103	6
AR0022772	USA-COE Self Cr Rec Area-Grees	Lake Greeson	8040103	7
AR0033481	Prescott, City of	Trib/Sewer CR, Terre Rouge CR, Little Missouri R	8040103	
AR0036030	USA-COE Narrows Dam Rec Area-	Lake Greeson	8040103	25
AR0036048	USA-COE Cowhide Cove Rec Area-	Lake Greeson	8040103	9
AR0037796	International Paper Co-Gurdon	Ditch-Hwy 67N Caney CR, Terre Noire CR	8040103	10
AR0038113	AR Parks & Tourism-Daisy State	Lake Greeson	8040103	11
AR0038458	Hope, City of-Pate Creek WWTP	Pate CR, Terre Rouge CR, Little Missouri R	8040103	12
AR0040339	International Paper Co-Whelen	Ditch, Trib, West Fork Beech CR	8040103	26
AR0041432	Delight, City of	Wolf CR	8040103	13
AR0041688	Blevins, City of	Trib, Ozan CR, Little Missouri R	8040103	14
AR0041815	Emmet, City of	Terre Rouge CR, Little Missouri R, Ouachita R	8040103	15
AR0042439	Nevada School Dist #1	Trib, Mid Caney CR, Little Missouri R	8040103	16
AR0043281	Murfreesboro, City of	Little Missouri R	8040103	17
AR0043818	Hanson Aggregates West, Inc	Wolf CR, Antoine CR, Little Missouri R	8040103	27
AR0044270	AR Hwy Dept-Gurdon Rest Area	Trib, Boggy CR	8040103	18
AR0045551	Deaton's Southfork Truck Stop	South Boat Ditch, Terre Noir CR Trib	8040103	19
AR0047155	R.D. Plant Contracting Co	Little Missouri R	8040103	20
AR0047180	Perrytown, City of	Pate CR, Terre Rouch CR, Little Missouri R	8040103	21
AR0047546	Anthony Timberlands, Inc	Mcneeley CR, Little Missouri R	8040103	22
AR0048038	Diamond Operations, Inc	Parker Creek Trib, Prairie CR	8040103	28
AR0048551	Okolona, City of-WWTP	Little Missouri R Trib	8040103	23
AR0049395	Hanson Aggregates-Prescott Pla	Upper Ditch Little Missouri R	8040103	24

Table A-75: OUA0022 Little Missouri River Near Langley, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	8.80	7.50	9.90	0.56
BOD_5 (mg/L)	54	0.55	0.01	2.15	0.45
pH (standard units)	56	7.01	6.85	7.36	0.10
Total Organic Carbon (mg/L)	44	1.51	0.68	6.78	0.99
Ammonia as N (mg/L)	60	0.01	0.01	0.07	0.02
$NO_2 + NO_3$ as N (mg/L)	60	0.11	0.01	0.62	0.10
Orthophosphate as P (mg/L)	38	0.02	0.01	0.13	0.02
Total Phosphorus as P (mg/L)	59	0.03	0.01	0.21	0.03
Total Hardness (mg/L)	22	25.14	25.00	26.00	0.35
Chloride (mg/L)	60	1.62	1.31	2.63	0.23
Sulfate (mg/L)	60	3.50	2.80	4.77	0.42
Total Dissolved Solids (mg/L)	60	36.26	17.00	92.00	10.57
Total Suspended Solids (mg/L)	60	2.73	1.00	24.00	3.33
Turbidity (NTU)	60	4.29	1.00	42.70	6.11

Table A-76: OUA0035 Little Missouri River Near Boughton, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.79	4.77	18.74	2.57
BOD_5 (mg/L)	56	1.04	0.23	2.55	0.54
pH (standard units)	59	6.80	6.12	7.73	0.38
Total Organic Carbon (mg/L)	58	4.61	2.37	9.46	2.09
Ammonia as N (mg/L)	60	0.02	0.01	0.10	0.02
$NO_2 + NO_3$ as N (mg/L)	60	0.16	0.01	0.89	0.15
Orthophosphate as P (mg/L)	53	0.02	0.01	0.07	0.01
Total Phosphorus as P (mg/L)	60	0.08	0.020	1.21	0.16
Total Hardness (mg/L)	24	31.58	25.00	57.00	9.08
Chloride (mg/L)	60	2.94	1.82	4.55	0.65
Sulfate (mg/L)	60	8.53	3.35	44.60	6.46
Total Dissolved Solids (mg/L)	59	62.26	35.00	114.00	18.72
Total Suspended Solids (mg/L)	59	25.95	3.00	261.00	41.91
Turbidity (NTU)	60	30.97	7.97	289.00	41.81

Table A-77: OUA0039B Little Missouri River Downstream of Murfreesboro

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	8.34	7.10	9.70	0.58
BOD_5 (mg/L)	56	1.08	0.02	7.73	1.41
pH (standard units)	52	6.85	6.36	6.99	0.11
Total Organic Carbon (mg/L)	51	3.11	1.18	12.35	1.87
Ammonia as N (mg/L)	56	0.02	0.01	0.09	0.02
NO_2 + NO_3 as N (mg/L)	56	0.18	0.01	0.56	0.13
Orthophosphate as P (mg/L)	37	0.01	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	54	0.03	0.01	0.13	0.02
Total Hardness (mg/L)	20	35.75	25.00	216.00	42.54
Chloride (mg/L)	56	2.46	1.29	8.76	1.09
Sulfate (mg/L)	56	10.92	2.82	185.00	24.28
Total Dissolved Solids (mg/L)	56	52.89	22.00	335.00	41.43
Total Suspended Solids (mg/L)	56	5.02	1.00	34.80	6.07
Turbidity (NTU)	56	7.12	1.11	43.80	7.26

SEGMENT 3A LOWER ARKANSAS RIVER

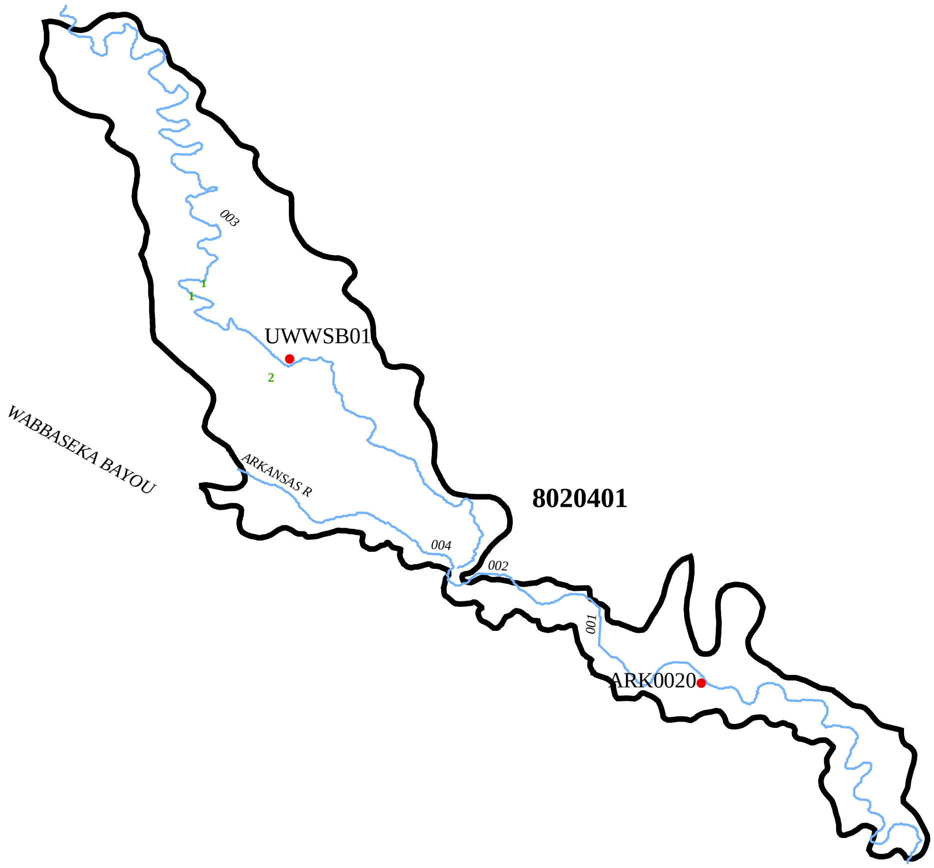
Segment 3A, located in the southeastern part of the State, includes small portions of Desha, Lincoln, Jefferson, Arkansas, and Lonoke Counties. These waters make up the last 52-mile segment of the main stem of the Arkansas River and the Wabbaseka Bayou tributary.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monitoring data was used to assess 52.2 stream miles of the Arkansas River within this segment and 101.7 miles of Wabbaseka Bayou. The remaining 32.7 stream miles were evaluated.

Wabbaseka Bayou is unable to maintain the dissolved oxygen standard for Channel Altered Delta streams. This is a naturally occurring problem throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. This issue will need to be addressed either through a standards change or an assessment methodology change.

Figure A-13: Planning Segment 3A



● Monitoring Stations

NPDES Facilities

(Segment 3A)

Table A-78: Planning Segment 3A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-3A																							
Arkansas River	8020401	-001	52.2	ARK0020	M	S	S	S	S	S	S									1			
Arkansas River	8020401	-002	13.3		E	S	S	S	S	S	S									1			
Wabbaseka B.	8020401	-003	101.7	UWWSB01	M	S	N	S	S	S	S	UN				DO				5e			
Arkansas River	8020401	-004	19.4		E	S	S	S	S	S	S									1			
TOTAL MILES	186.6																						
MILES UNASSESSED	0.0																						
MILES EVALUATED	32.7																						
MILES MONITORED	153.9																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	186.6	0
AQUATIC LIFE	84.9	101.7
PRIMARY CONTACT	186.6	0
SECONDARY CONTACT	186.6	0
DRINKING SUPPLY	186.6	0
AGRI & INDUSTRY	186.6	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0020	Arkansas River at Lock and Dam No. 2	Y	1	A
UWWSB01	Wabbaseka Bayou at Highway 79 near Wabbaseka		2	R

Table A-79: Segment 3A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0034771	Altheimer, City of	Arkansas R	8020401	
AR0035980	AR Dept of Correction-Tucker	Lagoon/Wabbaseka Bayou/Arkansas R/3B-Arkansas RB	8020401	1
AR0039896	Wabbaseka, City of	Trib, Bradley Slough, 3B-Arkansas RB	8020401	2

Table A-80: ARK0020 Arkansas River at Dam #2

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	8.85	5.70	12.80	1.70
BOD_5 (mg/L)	50	1.63	0.57	3.42	0.73
pH (standard units)	54	7.69	6.47	8.77	0.62
Total Organic Carbon (mg/L)	50	5.56	4.24	8.39	0.86
Ammonia as N (mg/L)	55	0.04	0.01	0.19	0.04
NO_2 + NO_3 as N (mg/L)	55	0.33	0.01	0.85	0.23
Orthophosphate as P (mg/L)	54	0.08	0.02	0.59	0.08
Total Phosphorus as P (mg/L)	53	0.13	0.04	0.35	0.06
Total Hardness (mg/L)	21	113.67	42.00	159.00	27.72
Chloride (mg/L)	55	75.25	15.47	179.00	36.69
Sulfate (mg/L)	55	41.65	11.34	81.88	15.22
Total Dissolved Solids (mg/L)	55	295.21	120.00	473.00	86.27
Total Suspended Solids (mg/L)	55	18.69	1.00	155.00	25.29
Turbidity (NTU)	56	24.87	4.10	100.00	22.92

SEGMENT 3B BAYOU METO AND TRIBUTARIES

Segment 3B is located in the east central portion of Arkansas and includes a major portion of Lonoke County, as well as parts of Arkansas, Jefferson, Faulkner, Pulaski and Prairie Counties. Bayou Meto and its tributaries comprise the major surface water resource in the segment. Major tributaries include Bayou Two Prairie, Mill Bayou, and Kings Bayou.

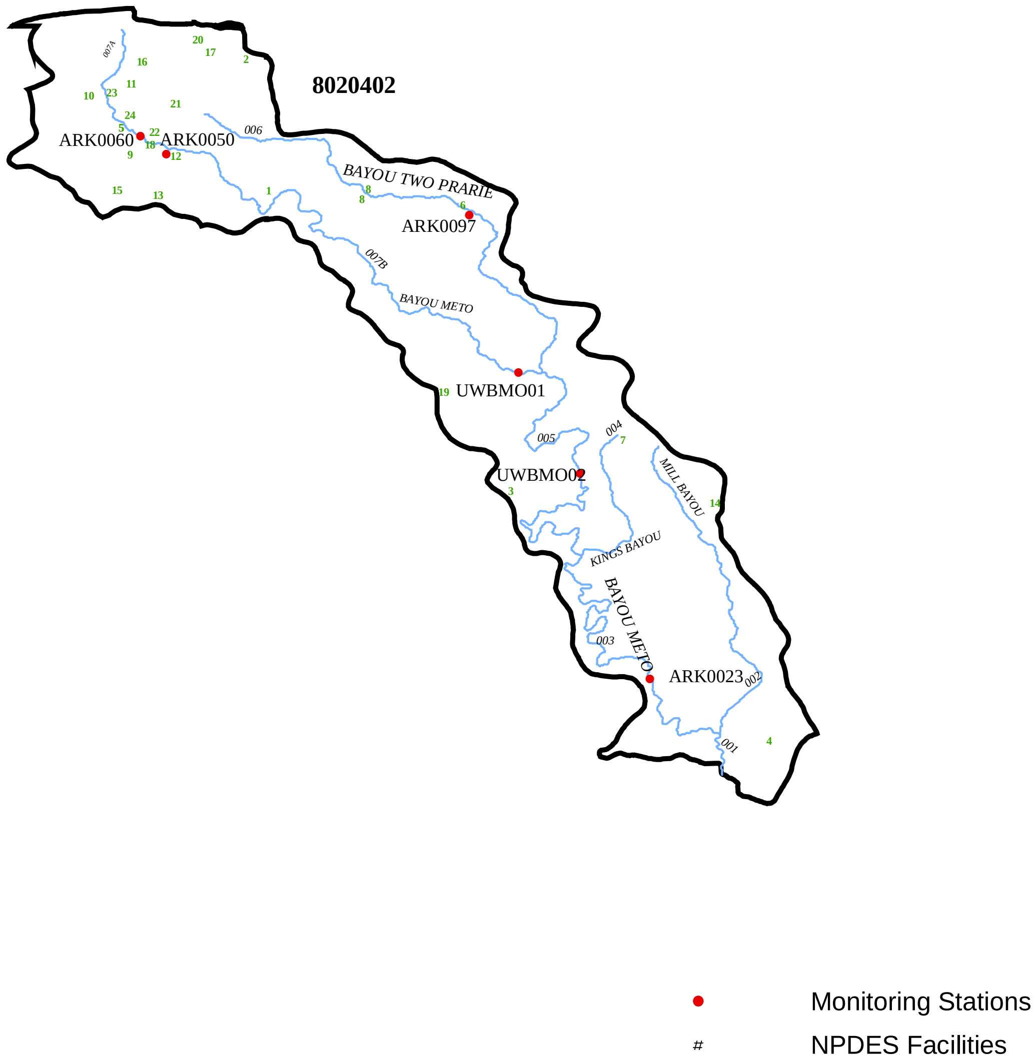
Summary of Water Quality Conditions

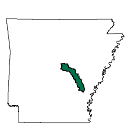
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. This segment contains a total of 233.7 stream miles, of which the majority is being assessed. This report uses monitoring data from four monthly stations and one quarterly station to assess 183.1 miles of stream. The monitoring data from these stations was also used to evaluate an additional 4.3 miles of streams. The remaining 46.3 miles of stream were unassessed.

The upper reach of Bayou Meto is under a fish consumption advisory because of the presence of dioxin in fish tissue. The source has been eliminated and the contamination is being addressed through natural attenuation.

Many segments of Bayou Meto and a segment of Bayou Two Prairie are listed because of low dissolved oxygen concentrations. This is a naturally occurring problem throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated.

Figure A-14: Planning Segment 3B





(Segment 3B)

Table A-81: Planning Segment 3B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-3B																										
Bayou Meto	8020402	-001	4.3		E	S	N	S	S	S	S	UN				DO				5E				FISH CONSUMPTION	130.3	57.1
Bayou Meto	8020402	-003	39.8	ARK0023	M	S	N	S	S	S	S	UN				DO				5E				AQUATIC LIFE	53.8	133.6
Bayou Meto	8020402	-005	41.5	UWBMO02+	M	S	S	S	S	S	S									1				PRIMARY CONTACT	187.4	0
Bayou Meto	8020402	-007A	12.3	ARK0060	M	N	S	S	S	S	S	IP	IP	UN		PO*	DO			4b	5e			SECONDARY CONTACT	187.4	0
Bayou Meto	8020402	-007B	44.8	ARK0050	M	N	N	S	S	S	S	IP	IP	UN		PO*	Zn			4b	4b			DRINKING SUPPLY	187.4	0
Mill Bayou	8020402	-002	31.0		U															3				AGRI & INDUSTRY	187.4	0
Kings Bayou	8020402	-004	15.3		U															3						
B.Two Prairie	8020402	-006	44.7	ARK0097	M	S	N	S	S	S	S	UN				DO				5E						
TOTAL MILES	233.7																									
MILES UNASSESSED	46.3																									
MILES EVALUATED	4.3																									
MILES MONITORED	183.1																									

* Dioxin

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0023	Bayou Meto near Bayou Meto		1	A
UWBMO01	Bayou Meto at county road crossing southeast of Seaton Dump		2	R
UWBMO02	Bayou Meto at Highway 79, 2 miles southwest of Stuttgart		2	R
ARK0060	Bayou Meto at west Main Street in Jacksonville		1	A
ARK0050	Bayou Meto at Highway 161 below Jacksonville		1	A
ARK0097	Bayou Two Prairie south of Carlisle		1	A

Table A-82: Segment 3B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000949	USAF-Little Rock AFB-Jacksonville	Cyprus Branch/Jack Bayou/Arkansas R	8020402	21
AR0001163	Remington Arms Co-Lonoke	Bayou Meto, Arkansas R	8020402	1
AR0021661	Cabot, City of	Bayou Two Prairie Trib, Bayou Meto	8020402	2
AR0022284	Humphrey, City of	Lateral #5 DT, Bear Bayou, Salt Bayou, Arkansas RB	8020402	3
AR0022390	Gillett, City of	Flag Lake Slough, Flag Lake	8020402	4
AR0033464	Jacksonville, City of (West ST	3A	8020402	22
AR0033642	Gravel Ridge Sid #213	Kellogg CR Trib, Bayou Meto	8020402	5
AR0033740	Carlisle, City of	Bayou Two Prairie/Bayou Meto/Arkansas R	8020402	6
AR0034380	Stuttgart, City of	King Bayou, Bayou Meto, Arkansas R	8020402	7
AR0034746	Lonoke, City of	Bayou Two Prairie/Bayou Meto/Arkansas R	8020402	8
AR0037176	Sherwood, City of Indian Head	Kellogg CR Trib, Bayou Meto	8020402	9
AR0038075	Runyan Sid #211	Trib, Kellogg CR, Bayou Meto, Arkansas R	8020402	10
AR0040126	Macon P0A, Inc	Trib-Cypress Bayou/Seg 3B-Arkansas R RB	8020402	11
AR0041335	Jacksonville Sewer Commission	Bayou Meto, Arkansas R	8020402	12
AR0041696	L'Oreal USA Products, Inc.	Ink Bayou Trib, Arkansas R	8020402	13
AR0043761	Almyra, City of	Mill Bayou, Big Bayou Meto, Arkansas R	8020402	14
AR0044318	Skeeter Hole, LLC	Ink Bayou	8020402	15
AR0044598	PCSSD - Bayou Meto Elementary	Bayou Meto	8020402	16
AR0046311	Freshour Construction Co, Inc	Trib, White Oak Branch	8020402	17
AR0046540	Stone Valley MHP	Bayou Meto	8020402	23
AR0047309	Arkansas Precast Corp	Trib, Bayou Meto, Arkansas R	8020402	18
AR0048313	H. A. C. T. WW Improvement Dist	Crooked Cr, Bayou Meto, Arkansas R	8020402	19
AR0049875	Phil Rod Acres Mobile Home Park	Ditch, Blue BR, Bayou Two Prairie, Bayou Meto	8020402	20
AR0041149	AR Military Dept-Camp Robinson	5-Mi CR,AR R,3c-Arkansas RB	8020402	
AR0050237	Heslep, Greg-D/B/A Base Common	Bayou Meto	8020402	24

Table A-83: ARK0023 Bayou Meto Near Bayou Meto, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	6.89	3.40	10.80	1.73
BOD_5 (mg/L)	54	2.04	0.42	5.11	0.96
pH (standard units)	57	7.38	5.87	8.84	0.66
Total Organic Carbon (mg/L)	53	9.08	4.94	15.71	2.21
Ammonia as N (mg/L)	58	0.05	0.01	0.27	0.05
$NO_2 + NO_3$ as N (mg/L)	58	0.17	0.01	0.83	0.17
Orthophosphate as P (mg/L)	57	0.10	0.01	0.34	0.06
Total Phosphorus as P (mg/L)	57	0.20	0.05	0.49	0.09
Total Hardness (mg/L)	22	82.05	27.00	198.00	57.71
Chloride (mg/L)	59	22.77	3.90	100.16	23.17
Sulfate (mg/L)	59	14.28	3.36	81.12	14.05
Total Dissolved Solids (mg/L)	58	177.72	56.80	410.50	87.82
Total Suspended Solids (mg/L)	58	21.95	3.20	65.80	13.99
Turbidity (NTU)	59	44.92	7.30	153.00	31.04

Table A-84: ARK0050 Bayou Meto at Hwy 161 Near Jacksonville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	7.53	3.04	11.20	1.99
BOD_5 (mg/L)	59	1.64	0.34	7.25	1.00
pH (standard units)	59	6.81	5.91	7.87	0.33
Total Organic Carbon (mg/L)	58	6.41	2.60	12.30	1.80
Ammonia as N (mg/L)	60	0.07	0.01	0.82	0.11
$NO_2 + NO_3$ as N (mg/L)	61	2.00	0.01	11.70	2.62
Orthophosphate as P (mg/L)	59	0.66	0.01	3.39	0.85
Total Phosphorus as P (mg/L)	58	0.74	0.02	2.91	0.84
Total Hardness (mg/L)	25	42.04	25.00	134.00	27.60
Chloride (mg/L)	61	17.29	1.63	46.10	13.66
Sulfate (mg/L)	61	11.43	2.59	27.20	7.35
Total Dissolved Solids (mg/L)	60	118.66	37.50	243.00	63.95
Total Suspended Solids (mg/L)	60	19.26	3.00	266.80	33.45
Turbidity (NTU)	61	26.20	4.37	180.00	22.35

Table A-85: ARK0060 Bayou Meto at W. Main St. Bridge, Jacksonville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	6.24	1.97	12.25	2.80
BOD_5 (mg/L)	55	1.71	0.43	3.89	0.88
pH (standard units)	59	6.68	6.04	7.26	0.31
Total Organic Carbon (mg/L)	58	5.80	2.26	11.40	2.14
Ammonia as N (mg/L)	60	0.03	0.01	0.24	0.04
$NO_2 + NO_3$ as N (mg/L)	61	0.10	0.01	0.70	0.12
Orthophosphate as P (mg/L)	48	0.02	0.01	0.04	0.01
Total Phosphorus as P (mg/L)	58	0.09	0.02	1.13	0.14
Total Hardness (mg/L)	24	26.38	25.00	41.00	3.62
Chloride (mg/L)	61	4.24	1.19	26.80	3.19
Sulfate (mg/L)	61	4.95	1.41	21.20	3.10
Total Dissolved Solids (mg/L)	60	63.09	36.00	344.50	43.95
Total Suspended Solids (mg/L)	60	11.65	1.00	127.00	16.64
Turbidity (NTU)	61	22.42	4.40	205.00	26.69

Table A-86: ARK0097 Bayou Two Prairie at Hwy 13 South of Carlisle

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	6.62	2.88	10.50	2.13
BOD_5 (mg/L)	54	2.71	0.88	7.30	1.43
pH (standard units)	56	6.93	5.89	7.73	0.40
Total Organic Carbon (mg/L)	57	9.18	2.39	12.90	1.85
Ammonia as N (mg/L)	59	0.09	0.01	0.25	0.06
$NO_2 + NO_3$ as N (mg/L)	60	0.39	0.01	1.05	0.25
Orthophosphate as P (mg/L)	58	0.49	0.01	7.33	1.10
Total Phosphorus as P (mg/L)	56	0.66	0.05	7.06	1.15
Total Hardness (mg/L)	24	73.21	25.00	148.00	40.56
Chloride (mg/L)	60	25.36	0.38	85.71	19.00
Sulfate (mg/L)	60	10.34	1.38	31.30	4.93
Total Dissolved Solids (mg/L)	59	165.12	64.00	376.00	69.34
Total Suspended Solids (mg/L)	59	25.09	4.20	287.60	37.60
Turbidity (NTU)	60	40.12	4.00	270.00	42.79

SEGMENT 3C ARKANSAS RIVER AND TRIBUTARIES: LOCK & DAM #4 AND DAM #7

Segment 3C is located in central Arkansas and covers large portions of Pulaski and Jefferson Counties as well as small areas of Grant, Saline, Lonoke, and Perry Counties. The Arkansas River, with its tributaries, is the major surface water resource in this segment. The principal tributaries within this segment are Plum Bayou, Maumelle River and Fourche Creek. Lake Pine Bluff and Lake Maumelle are located in this segment.

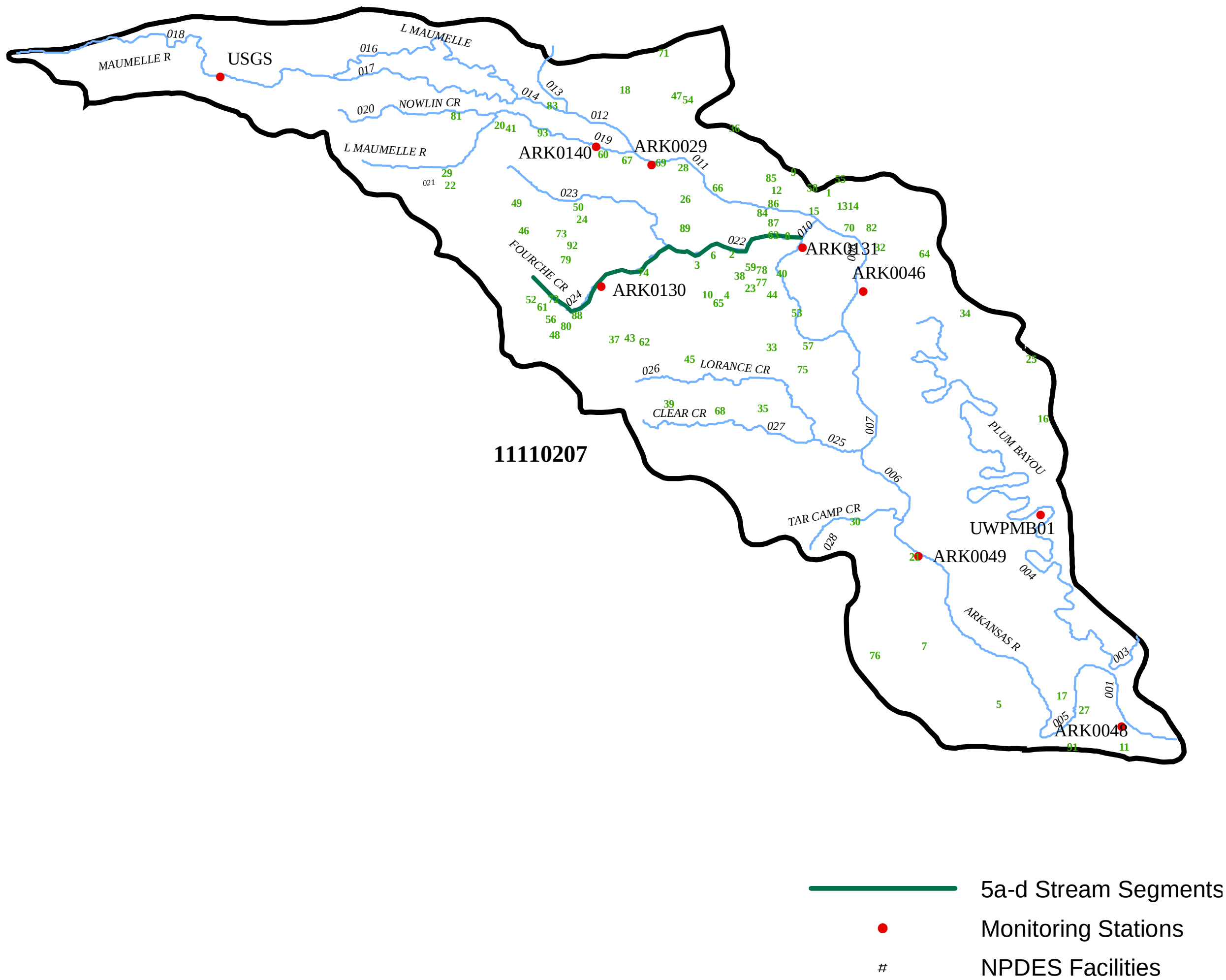
Summary of Water Quality Conditions

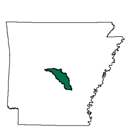
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. This planning segment contains a total of 291.8 stream miles, of which 225.1 miles were assessed. Four monitoring stations are located on the main stem of the Arkansas River which provides monitored data for 52.2 miles of the river. Data from USGS studies on the Maumelle River was used to assess this stream. Quarterly monitoring was conducted at one station on Plum Bayou.

Although occasional high turbidity values occur in the Arkansas River within this planning segment, the value and frequency of occurrence are relatively low. As a result, the Arkansas River was assessed as supporting all designated uses except for one segment which was assessed as not meeting its drinking water use because of beryllium concentrations. Additional data is needed to better assess the issue.

Fourche Creek, an Arkansas River tributary draining the Little Rock area, has been listed as not attaining the aquatic life use. The cause of the impairment is from low dissolved oxygen concentrations, elevated silt and turbidity, and metals (beryllium, lead, zinc) concentrations. The exact sources of the contamination are unknown at this time.

Figure A-15: Planning Segment 3C





(Segment 3C)

Table A-87: Planning Segment 3C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-3C																							
Arkansas River	11110207	-001	6.7	ARK0048	M	S	S	S	S	N	S	UN				Be				5d			
Plum Bayou	11110207	-002	0.3		M	S	S	S	S	S	S									1			
Indian Bayou	11110207	-003	3.2		U															3			
Plum Bayou	11110207	-004	68.4	UWPMB01	M	S	S	S	S	S	S									1			
Arkansas River	11110207	-005	28.0	ARK0049	M	S	S	S	S	S	S									1			
Arkansas River	11110207	-006	6.2		E	S	S	S	S	S	S									1			
Arkansas River	11110207	-007	9.2		E	S	S	S	S	S	S									1			
Arkansas River	11110207	-008	9.8	ARK0046	M	S	S	S	S	S	S									1			
Fourche Bayou	11110207	-009	11.0		U															3			
Fourche Bayou	11110207	-010	1.6		U															3			
Arkansas River	11110207	-011	7.7	ARK0029	M	S	S	S	S	S	S									1			
Arkansas River	11110207	-012	5.1		M	S	S	S	S	S	S									1			
Arkansas River	11110207	-013	5.7		E	S	S	S	S	S	S									1			
Maumelle River	11110207	-014	3.3		E	S	S	S	S	S	S									1			
Maumelle River	11110207	-018	24.2	USGS	M	S	S	S	S	S	S									1			
Little Maumelle	11110207	-019	9.5	ARK0140	M	S	S	S	S	S	S									1			
Little Maumelle	11110207	-021	10.1		E	S	S	S	S	S	S									1			
Nowlin Creek	11110207	-020	10.5		E	S	S	S	S	S	S									1			
Fourche Creek	11110207	-022	9.2	ARK0131+	M	S	N	S	S	S	S	UN	UN	UN	UN	DO	SI	Pb	Zn	5c	5a	5d	5d
Rock Creek	11110207	-023	13.0		U															1			
Fourche Creek	11110207	-024	11.2	ARK0130+	M	S	N	S	S	S	S	UN	UN			DO	Be			5c	5d		
Clear Creek	11110207	-025	3.2		U															3			
Lorance Creek	11110207	-026	15.2		U															3			
Clear Creek	11110207	-027	11.9		U															3			
Tar Camp Creek	11110207	-028	7.6		U															3			
TOTAL MILES	291.8																						
MILES UNASSESSED	66.7																						
MILES EVALUATED	45.0																						
MILES MONITORED	180.1																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	225.1	0
AQUATIC LIFE	204.7	20.4
PRIMARY CONTACT	225.1	0
SECONDARY CONTACT	225.1	0
DRINKING SUPPLY	218.4	6.7
AGRI & INDUSTRY	225.1	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0048	Arkansas River below Pine Bluff, Lock and Dam No. 4	Y	1	A
UWPMB01	Plum Bayou 1 mile west of Highway 15 near Tucker		1	R
ARK0049	Arkansas River above Pine Bluff, Lock and Dam No. 5	Y	1	A
ARK0046	Arkansas River at Lock and Dam No. 6	Y	1	A
ARK0029	Arkansas River at Murray Lock and Dam		1	A
ARK0140	Little Maumelle River near Little Rock		2	R
ARK0147G	Fourche Creek		1	S
ARK0147F	Fourche Creek		1	S
ARK0147E	Fourche Creek		1	S
ARK0130	Fourche Creek at I-430 bridge in Little Rock		1	R
ARK0147D	Fourche Creek		1	S
ARK0147C	Fourche Creek		1	S
ARK0147B	Fourche Creek		1	S
ARK0147A	Fourche Creek		1	S
ARK0131	Fourche Creek at Fourche Dam Pike road of I-440 in Little Rock		1	R

Table A-88: Segment 3C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0001376	Entergy AR, Inc-Lynch	Arkansas R	11110207	1
AR0001414	Minnesota Mining & Mfg-Arch St	Trib, Fourche CR, AR R	11110207	2
AR0001449	Celestica Services, Inc	Trib/Little Fourche CR	11110207	3
AR0001503	McGeorge Contracting Co, Inc	Trib-Little Fourche CR	11110207	4
AR0001601	Gaylord Container Corp	Arkansas R	11110207	5
AR0001635	Smith Fiberglass Products-Fibe	Trib, Fourche CR, Arkansas R	11110207	6
AR0001643	Georgia Pacific-NLR	Arkansas R	11110207	82
AR0001678	USA-Pine Bluff Arsenal-Pine Bluff	Trib/Phillips CR & Arkansas R	11110207	7
AR0001686	Minnesota Mining & Mfg-College	Trib, Fourche CR, Arkansas R	11110207	8
AR0001775	Union Pacific Railroad Co	East& West Branch Dark Hollow Canal	11110207	9
AR0001848	Porocel Corp	Bauxite Pit, Ditch/Willow Spr Branch/Fourche CR	11110207	10
AR0001970	International Paper Co-Pine Bluff	Arkansas R-3C (1) &Cousart Bayou-2B (2)	11110207	11
AR0002542	Allen Granite Industries, Inc	Trib/Ink Bayou	11110207	12
AR0020303	North Little Rock, City Of-Faulkner	Arkansas R	11110207	13
AR0020320	North Little Rock WW Utility-5 Mil	Arkansas R	11110207	14
AR0021806	Little Rock WW Utility-Adams F	Arkansas R	11110207	15
AR0022128	England, City Of	Wabbaseka Bayou/Plum Bayou/Arkansas R	11110207	16
AR0033316	Pine Bluff WW Utility-Boyd Pt	Arkansas R	11110207	17
AR0033626	Maumelle Suburban Improvement	Arkansas R	11110207	18
AR0034771	Altheimer, City of	Arkansas R	11110207	19
AR0035963	PCSSD-Robinson Elem School	Trib, Littleaumelle R	11110207	20
AR0036331	Entergy AR, Inc-White Bluff Pl	Arkansas R	11110207	21
AR0036421	Ferncliff Camp & Conf Ctr	Trib, Little Maumelle R, Arkansas R	11110207	22
AR0036447	Geo Specialty Chemicals-Winroc	Fish CR	11110207	23
AR0037338	Baker Apts-Chase Properties	Panther Branch, Brodie CR, Fourche CR	11110207	24
AR0037613	Keo, City Of	Trib, North Bayou, Plum Bayou	11110207	25
AR0037745	Little Rock Zoological Gardens	Coleman CR	11110207	26
AR0038181	Century Tube Corp	Lake Lanhofer, Arkansas R	11110207	27
AR0038288	North Little Rock WW Utility-White	Arkansas R	11110207	28
AR0038571	AR Parks & Tourism -Pinnacle Mountain	Ditch, Big Maumelle R	11110207	83
AR0039250	AR 4-H Education Center-Ferndale	Ferndale CR	11110207	29
AR0039357	Redfield, City Of	Arkansas R	11110207	30
AR0039543	McAlmont Church Of Christ-NLR	Stark Bend/Faulkner Lake	11110207	
AR0040177	Little Rock, City Of-Fourche C	Arkansas R	11110207	32

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0040266	One-Forty-Fifth St Wtr&Sid#345	Fish CR (001) Cane CR (002)	11110207	33
AR0040380	AR Parks & Tourism-Toltec Mds	Trib/Terre Noir CR	11110207	34
AR0040860	Maple Creek POA-Sid #1	Maple CR/Pennington Bayou	11110207	35
AR0041149	AR Military Dept-Camp Robinson	5-Mile CR, Arkansas R	11110207	36
AR0041424	Pleasant Oaks POA	Trib/Otter CR/Fourche CR	11110207	37
AR0042544	Crilanco Oil, Inc	Trib, Fish CR, Big Lake, Pennington Bayou	11110207	38
AR0042587	Timex Products, Inc	City storm sewer, Arkansas R	11110207	84
AR0042862	Sheridan School Dist-East End	Trib, Mccright Branch, Lorrance CR, Lake	11110207	39
AR0042901	Syngenta Crop Protection, Inc	West Branch-Dark Hollow Canal, Arkansas R	11110207	85
AR0042927	PCSSD-Auxiliary Service Fac	Fourche Bayou, Arkansas R	11110207	40
AR0043079	Sterling Paint, Inc	6th St Strm Swr, Arkansas R	11110207	86
AR0043826	Weyerhauser Co. DBA Northwest	Trib, Fourche CR, Arkansas R	11110207	87
AR0043893	PCSSD-Robinson High School	Ditch, Trib, Little Maumelle R	11110207	41
AR0043931	Dixon Manor mobile Home Park	Trib, Fish CR, Arkansas R	11110207	
AR0044393	Sunset Acres Subdivision	Trib, Little Fourche CR, Fourche CR	11110207	43
AR0044601	PCSSD-Fuller Elem School	Trib/Fish CR	11110207	44
AR0044610	PCSSD-Landmark Elem School	Trib, Treadway Branch, Lorance CR	11110207	45
AR0044628	PCSSD-Lawson Elem School	Ditch/Trib/Fourche CR/Arkansas R	11110207	46
AR0044750	PCSSD-Oak Grove High School	Ditch, Newton CR, White Oak Bayou	11110207	47
AR0044881	Saline Co WW & Sanitary Swr	Crooked CR, Fourche CR, Arkansas R	11110207	48
AR0045471	Youth Home Inc-Genesis Campus	Mchenry CR, Fourche CR	11110207	49
AR0045560	Oasis Renewal Center	Brodie CR Trib	11110207	50
AR0045608	Central Arkansas Sewer Systems	Woodruff CR	11110207	
AR0046051	Owen Creek Subdivision	Owen CR, Fourche CR	11110207	52
AR0046060	Pulaski County Sid #221	Fourche Bayou Trib, Arkansas R	11110207	53
AR0046086	Blems, Inc	Trib, Newton CR	11110207	54
AR0046299	Maverick Transportation Co-NLR	Ditch, Stark Bend Trib, Faulkner Lake	11110207	55
AR0046302	K Mobile Home ar	Fourche CR Trib, Arkansas R	11110207	56
AR0046370	Wrightsville, City Of	Fourche Bayou @ Arkansas R	11110207	57
AR0046591	Beazer East, Inc-Koppers Indus	Ditch Redwood Tunnel	11110207	58
AR0046710	Granite Mountain Quarries	Tribs of Fourche CR/Arkansas R	11110207	59
AR0046728	Coulson Oil-Shell Superstop 38	Trib, Crooked CR, Fourche CR	11110207	88
AR0046868	E. C. Rowlett Quarry & Asphalt	White Oak Bayou, Arkansas R	11110207	60
AR0047236	B & M MHP	Trib/Crooked & Fourche CRs	11110207	61
AR0047261	Krestwood Estates Subdivision	Trib, Little Fourche CR/Arkansas R-RB	11110207	62
AR0047422	Davis Rubber Company	Ditch, Fourche CR, Arkansas R	11110207	63

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0047449	PCSSD-Scott School Trt System	Ashley Bayou/Horseshoe/Scott Bayou	11110207	64
AR0047848	Safety-Kleen Systems, Inc	Ditch, Willow Springs Branch, Little Fourche CR	11110207	65
AR0047929	Central Arkansas Water-Ozark P	Ditch, Arkansas R	11110207	66
AR0047937	Central Arkansas Water-Jack H.	Trib, Grassyflat, Rock, Fourche CRs	11110207	67
AR0048160	Coleman Dairy Division	Little Rock storm sewer system, Coleman CR	11110207	89
AR0048399	Maple Creek Farms Tract C H	Trib, Maple Cr, Pennington Bayou	11110207	68
AR0048470	Land O'Lakes Farmland Feed LLC	Trib, Arkansas R	11110207	
AR0048542	N Little Rock Electric-Murray	Arkansas R	11110207	69
AR0048780	Union Pacific Railroad Co-South	Ditch, Arkansas R	11110207	91
AR0048895	Little Rock Harbor Service, Inc	Arkansas R	11110207	70
AR0048968	Cedar Heights Baptist Church	White Oak Bayou Trib	11110207	71
AR0049042	Owen Creek Wastewater Plant	Owen Cr, Fourche CR, Arkansas R	11110207	72
AR0049051	Humane Society Of Pulaski Co	Trib, Mchenry CR, Fourche CR	11110207	73
AR0049085	Martin Marietta Aggregates-Law	Trib, McHenry CR, Fourche CR, Arkansas R	11110207	92
AR0049131	Parker Solvents Company	Wesson Pond, Fourche CR	11110207	74
AR0049255	Kinder Morgan Power Co-Wrights	(1) Trib, Lorance CR; (2) Arkansas R	11110207	75
AR0049581	Family Church, The	Arnold CR Trib, Caney Bayou, Lake Pine Bluff	11110207	76
AR0049921	La Palapa	Trib, Little Maumelle R, Arkansas R	11110207	93
AR0049956	Dixon Street Exxon (Crilanco O	Trib, Fish Creek	11110207	77
AR0050075	Koch Materials Company	Trib, Fish Creek, Arkansas R	11110207	78
AR0050130	Callaghan Creek Subdivision	Callaghan CR, Fourche CR, Arkansas R	11110207	79
AR0050181	St. Joseph's Glen Subdivision	Trib, Crooked Creek, Fourche CR, Arkansas R	11110207	80
AR0050245	Alotian Golf, LLC-D/B/A Alotia	Nowlin CR, Maumelle R, Arkansas R	11110207	81

Table A-89: ARK0029 Arkansas River at Murray Lock & Dam #7

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.37	5.70	14.20	1.96
BOD_5 (mg/L)	51	1.48	0.30	4.07	0.81
pH (standard units)	55	7.63	6.72	8.62	0.45
Total Organic Carbon (mg/L)	54	4.97	3.76	6.19	0.59
Ammonia as N (mg/L)	57	0.02	0.00	0.08	0.02
NO_2 + NO_3 as N (mg/L)	57	0.34	0.01	0.77	0.23
Orthophosphate as P (mg/L)	57	0.06	0.01	0.20	0.04
Total Phosphorus as P (mg/L)	54	0.12	0.02	0.83	0.11
Total Hardness (mg/L)	24	116.95	44.00	163.00	30.41
Chloride (mg/L)	57	83.47	10.12	221.00	45.26
Sulfate (mg/L)	57	44.38	12.72	77.17	14.65
Total Dissolved Solids (mg/L)	56	303.52	98.50	530.00	101.43
Total Suspended Solids (mg/L)	56	14.81	3.00	88.00	15.06
Turbidity (NTU)	57	21.00	3.80	79.30	16.96

Table A-90: ARK0046 Arkansas River at David D. Terry Lock & Dam

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.31	5.62	13.40	1.82
BOD_5 (mg/L)	52	1.40	0.38	3.34	0.67
pH (standard units)	56	7.68	6.82	8.69	0.45
Total Organic Carbon (mg/L)	53	4.96	4.00	6.44	0.61
Ammonia as N (mg/L)	57	0.05	0.01	0.17	0.03
NO_2 + NO_3 as N (mg/L)	57	0.35	0.01	0.83	0.23
Orthophosphate as P (mg/L)	57	0.07	0.02	0.24	0.03
Total Phosphorus as P (mg/L)	53	0.14	0.06	0.93	0.13
Total Hardness (mg/L)	23	119.33	45.00	166.00	31.26
Chloride (mg/L)	57	87.69	10.02	201.00	43.95
Sulfate (mg/L)	57	45.57	13.40	75.46	14.02
Total Dissolved Solids (mg/L)	56	313.36	104.00	521.00	92.84
Total Suspended Solids (mg/L)	56	16.23	4.80	97.00	15.19
Turbidity (NTU)	57	22.83	5.20	90.90	17.21

Table A-91: ARK0048 Arkansas River at Lock & Dam #4

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.69	5.74	13.90	2.08
BOD_5 (mg/L)	53	1.56	0.40	3.82	0.76
pH (standard units)	56	7.63	6.55	8.46	0.49
Total Organic Carbon (mg/L)	51	5.11	4.21	8.68	0.78
Ammonia as N (mg/L)	56	0.03	0.01	0.45	0.06
NO_2 + NO_3 as N (mg/L)	56	0.34	0.01	0.94	0.24
Orthophosphate as P (mg/L)	56	0.09	0.02	0.28	0.06
Total Phosphorus as P (mg/L)	56	0.14	0.05	0.44	0.07
Total Hardness (mg/L)	22	117.73	45.00	150.00	29.50
Chloride (mg/L)	56	84.16	13.66	205.00	43.47
Sulfate (mg/L)	56	44.50	13.77	78.26	14.01
Total Dissolved Solids (mg/L)	56	304.76	114.50	504.00	86.29
Total Suspended Solids (mg/L)	56	15.26	3.00	83.70	15.63
Turbidity (NTU)	56	21.81	4.33	102.00	20.84

Table A-92: ARK0049 Arkansas River at Lock & Dam #5

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	9.58	5.79	14.40	2.05
BOD_5 (mg/L)	52	1.65	0.47	4.35	0.76
pH (standard units)	55	7.64	6.58	8.75	0.48
Total Organic Carbon (mg/L)	50	5.04	4.11	7.30	0.68
Ammonia as N (mg/L)	55	0.04	0.01	0.45	0.06
NO_2 + NO_3 as N (mg/L)	55	0.34	0.01	0.91	0.24
Orthophosphate as P (mg/L)	55	0.09	0.02	0.32	0.06
Total Phosphorus as P (mg/L)	55	0.14	0.04	0.36	0.06
Total Hardness (mg/L)	22	120.05	45.00	155.00	30.38
Chloride (mg/L)	55	82.83	14.01	221.00	41.97
Sulfate (mg/L)	55	44.11	14.30	77.32	14.03
Total Dissolved Solids (mg/L)	55	297.80	113.50	515.00	84.52
Total Suspended Solids (mg/L)	55	14.35	3.50	73.50	12.31
Turbidity (NTU)	55	21.31	3.20	81.80	18.35

SEGMENT 3D ARKANSAS RIVER AND TRIBUTARIES: LOCK & DAM #7 TO MORRILTON

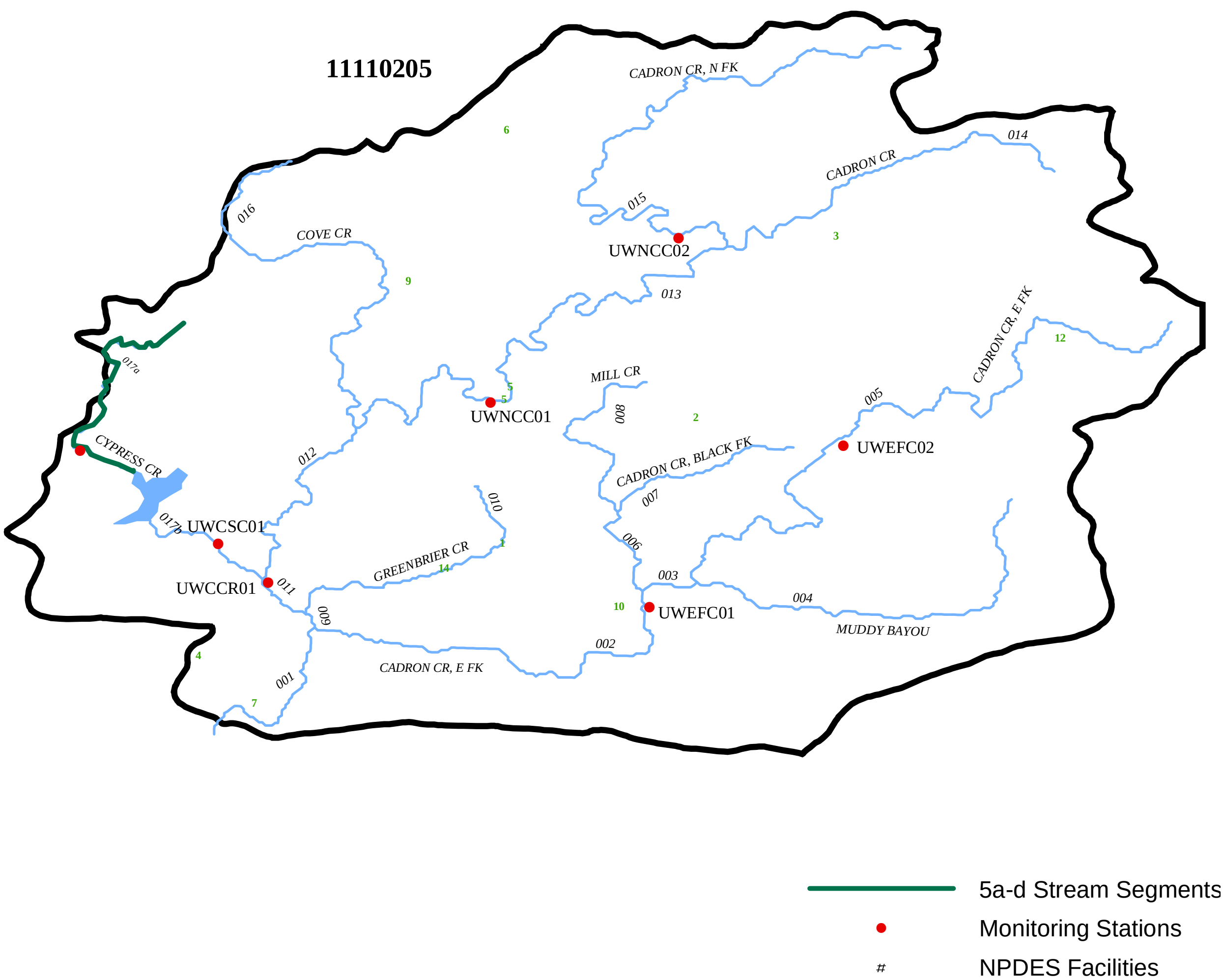
Segment 3D, located in upper central Arkansas, covers most of Conway County as well as parts of Cleburne, Van Buren, Faulkner, and Prairie Counties. The principal waters include the Cadron Creek basin.

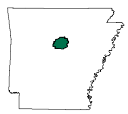
Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supply. This planning segment contains a total of 220.5 stream miles, of which 118.7 stream miles were monitored. An additional 90.7 miles of stream were evaluated bringing the total miles of assessed stream to 209.4.

A small tributary to Cadron Creek, Cypress Creek, is currently not attaining the aquatic life use because of metals (copper, zinc) contamination. This is a very small tributary that ceases to flow during the critical season. The source of the metals contamination is suspected to be from agriculture activities, primarily confined animal operations, in the watershed.

Figure A-16: Planning Segment 3D





(Segment 3D)

Table A-93: Planning Segment 3D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-3D																										
Cadron Creek	11110205	-001	7.7		E	S	S	S	S	S	S									1				FISH CONSUMPTION	209.4	0
E. Fork Cadron	11110205	-002	15.6	UWEFC01	M	S	S	S	S	S	S									1				AQUATIC LIFE	198.2	11.2
E. Fork Cadron	11110205	-003	2.0		E	S	S	S	S	S	S									1				PRIMARY CONTACT	209.4	0
E. Fork Cadron	11110205	-005	30.7	UWEFC02	M	S	S	S	S	S	S									1				SECONDARY CONTACT	209.4	0
Muddy Bayou	11110205	-004	15.7		E	S	S	S	S	S	S									1				DRINKING SUPPLY	209.4	0
Black Fork	11110205	-006	4.3		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	209.4	0
Black Fork	11110205	-007	7.2		E	S	S	S	S	S	S									1						
Mill Creek	11110205	-008	8.9		E	S	S	S	S	S	S									1						
Cadron Creek	11110205	-009	0.7		E	S	S	S	S	S	S									1						
Cadron Creek	11110205	-011	2.2	UWCCR01	M	S	S	S	S	S	S									1						
Cadron Creek	11110205	-012	9.5		E	S	S	S	S	S	S									1						
Cadron Creek	11110205	-013	26.8	UWNCC01	M	S	S	S	S	S	S									1						
Cadron Creek	11110205	-014	14.7		E	S	S	S	S	S	S									1						
Greenbrier Cr.	11110205	-010	11.1		U															3						
North Cadron	11110205	-015	26.5	UWNCC02	M	S	S	S	S	S	S									1						
Cove Creek	11110205	-016	20.0		E	S	S	S	S	S	S									1						
Cypress Creek	11110205	-017A	11.2	ARK0132	M	S	N	S	S	S	S	AG	AG			Cu	Zn			5d						
Cypress Creek	11110205	-017B	5.7	UWCSC01	M	S	S	S	S	S	S									1						
TOTAL MILES	220.5																									
MILES UNASSESSED	11.1																									
MILES EVALUATED	90.7																									
MILES MONITORED	118.7																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWEFC01	East Fork Cadron Creek at Highway 287, 3 miles southeast of Greenbrier		1	R
UWEFC02	East Fork Cadron Creek at Highway 107 near Barney		1	R
UWCCR01	Cadron Creek at county road, 5 miles west of Wooster		1	R
UWNCC01	North Cadron Creek at Highway 65 near Damascus		1	R
UWNCC02	North Cadron Creek at county road, 0.75 miles north of Highway 124		1	R
ARK0132	Cypress Creek at Highway 9 bridge near Cypress Valley		2	R
UWCSC01	Cypress Creek at county road, 2 miles southeast of Highway 92		2	R

Table A-94: Segment 3D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0036536	Greenbrier, City of	Greenbrier CR, Cadron CR, Arkansas R	11110205	1
AR0037087	AR Parks & Tourism-Wooly Hollow	Black Fork CR, East Fork Cadron CR	11110205	2
AR0040321	Quitman, City of	Mill CR/Cadron CR/ Arkansas R	11110205	3
AR0043028	Good Earth Horticulture, Inc	Trib, Tank Lake, Arkansas R	11110205	4
AR0047112	Rogers Group, Inc-Greenbrier Q	Cadron CR, Arkansas R	11110205	5
AR0047457	Cadron Creek Catfish House	Ward CR Trib/Pine Mountain CR/Cove CR	11110205	6
AR0048119	International Paper Co-Cadron	Cadron CR	11110205	7
AR0048879	Shiloh Creek Estates	Trib, Gold CR, Lake Conway	11110205	
AR0049077	Boy Scouts of America-Gus Blas	Cove CR, Cadron CR	11110205	9
AR0049620	Arkavalley Airpark RSF	E Brushy Pond, E Fork Cadron CR	11110205	10
AR0049832	Jesse Ferrel Rental Development	Trib, Little CR, Lake Conway, Palarm CR	11110205	
AR0049913	Dogwood Apartments	Trib, E Fork Cadron CR, Arkansas R	11110205	12
AR0049433	Martinfield RSF System	Trib, Greenbrier CR, Cadron CR	11110205	14
AR0050253	Fritts Construction, Inc D/B/A	Trib, Bentley CR, Palarm CR, Arkansas R	11110205	

Table A-95: UWNCC02 North Fork Cadron Creek at County Road North of Hwy 124

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	11	8.96	1.20	23.60	5.86
BOD_5 (mg/L)	11	1.17	0.07	3.32	1.28
pH (standard units)	10	6.73	5.57	7.49	0.50
Total Organic Carbon (mg/L)	12	3.18	1.45	8.12	1.91
Ammonia as N (mg/L)	12	0.01	0.01	0.04	0.01
NO_2 + NO_3 as N (mg/L)	12	0.20	0.01	0.55	0.19
Orthophosphate as P (mg/L)	6	0.01	0.01	0.02	0.00
Total Phosphorus as P (mg/L)	11	0.08	0.02	0.34	0.10
Total Hardness (mg/L)	11	25.55	25.00	31.00	1.81
Chloride (mg/L)	12	2.62	0.57	3.65	0.73
Sulfate (mg/L)	12	2.82	0.82	4.37	1.05
Total Dissolved Solids (mg/L)	12	35.96	23.00	51.00	8.20
Total Suspended Solids (mg/L)	12	4.77	0.00	20.00	5.24
Turbidity (NTU)	12	8.74	3.30	26.00	7.40

Table A-96: UWNCC01 North Fork Cadron Creek at Hwy 65

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	10	9.25	6.00	14.30	2.90
BOD_5 (mg/L)	11	0.51	0.22	0.80	0.22
pH (standard units)	10	6.89	5.90	7.51	0.48
Total Organic Carbon (mg/L)	12	2.65	1.57	3.83	0.83
Ammonia as N (mg/L)	12	0.01	0.01	0.01	0.00
NO_2 + NO_3 as N (mg/L)	12	0.34	0.04	0.81	0.22
Orthophosphate as P (mg/L)	5	0.02	0.01	0.03	0.01
Total Phosphorus as P (mg/L)	11	0.10	0.02	0.52	0.14
Total Hardness (mg/L)	11	27.64	25.00	54.00	8.74
Chloride (mg/L)	12	3.38	2.25	4.47	0.64
Sulfate (mg/L)	12	8.36	3.22	42.14	10.78
Total Dissolved Solids (mg/L)	12	41.83	29.00	87.50	15.15
Total Suspended Solids (mg/L)	12	2.80	1.00	11.00	2.98
Turbidity (NTU)	12	5.26	1.20	19.50	4.97

Table A-97: UWEFC02 East Fork Cadron Creek at Hwy 278 Near Greenbrier

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	10	9.34	3.60	17.00	4.08
BOD_5 (mg/L)	11	0.86	0.24	1.72	0.49
pH (standard units)	10	7.07	6.11	8.05	0.58
Total Organic Carbon (mg/L)	12	3.47	1.62	6.76	1.47
Ammonia as N (mg/L)	12	0.05	0.01	0.23	0.07
NO_2 + NO_3 as N (mg/L)	12	0.85	0.03	1.55	0.46
Orthophosphate as P (mg/L)	11	0.03	0.01	0.08	0.02
Total Phosphorus as P (mg/L)	11	0.12	0.02	0.63	0.17
Total Hardness (mg/L)	11	25.73	25.00	33.00	2.41
Chloride (mg/L)	12	4.44	3.00	7.07	1.26
Sulfate (mg/L)	12	3.32	1.66	5.00	1.01
Total Dissolved Solids (mg/L)	12	48.29	32.00	71.00	12.89
Total Suspended Solids (mg/L)	12	3.47	0.00	12.00	3.22
Turbidity (NTU)	12	7.27	2.80	23.90	6.44

Table A-98: UWCCR01 Cadron Creek at County Road 5 Mi. West of Wooster

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	10	7.64	3.61	13.90	3.23
BOD_5 (mg/L)	11	1.75	0.31	6.80	1.88
pH (standard units)	10	6.72	5.89	7.47	0.46
Total Organic Carbon (mg/L)	11	3.57	1.78	6.14	1.60
Ammonia as N (mg/L)	12	0.03	0.01	0.09	0.03
NO_2 + NO_3 as N (mg/L)	12	0.36	0.01	0.93	0.33
Orthophosphate as P (mg/L)	9	0.01	0.01	0.03	0.01
Total Phosphorus as P (mg/L)	11	0.18	0.02	1.149	0.32
Total Hardness (mg/L)	11	25.82	25.00	34.00	2.71
Chloride (mg/L)	12	4.58	2.77	6.95	1.34
Sulfate (mg/L)	12	3.89	2.19	4.66	0.71
Total Dissolved Solids (mg/L)	12	46.08	27.00	81.00	14.34
Total Suspended Solids (mg/L)	12	14.37	1.00	47.50	12.28
Turbidity (NTU)	12	19.67	5.71	58.70	17.51

SEGMENT 3E FOURCHE LAFAVE RIVER

Segment 3E, located in west central Arkansas, includes portions of Perry, Yell, and Scott Counties. This segment contains a 148-mile reach of the Fourche LaFave River and its tributary streams, which include Big Cedar Creek, Mill Creek, Gafford Creek, and South Fourche LaFave River. Major impoundments in this segment are Nimrod Lake (formed by a dam on Fourche LaFave River) and Harris Brake Lake.

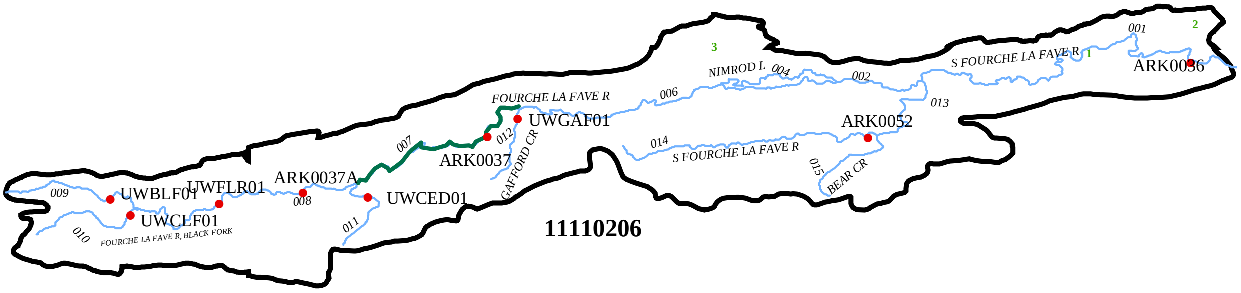
Summary of Water Quality Conditions

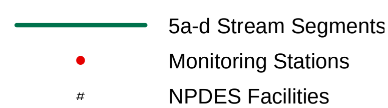
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. Monthly and roving water quality sampling stations were used to monitor 160.8 miles of stream. Another 40.5 miles were evaluated.

One segment of the Fourche LaFave River was assessed as not attaining the aquatic life use because of excessive turbidity. Previous data has shown occasional periods of elevated turbidity values which was associated with agriculture and silviculture activities. However, the construction and maintenance of an abundance of dirt and gravel roads for timber access and general transportation is likely to be the contributing factor.

Additional segments were listed because of low dissolved oxygen concentrations. These streams experience very low flow conditions reducing the streams to a series of large pools. With little to no water exchange in these pools, and high ambient air temperatures during the critical season, dissolved oxygen concentrations routinely fall below the ecoregion standard.

Figure A-17: Planning Segment 3E





(Segment 3E)

Table A-99: Planning Segment 3E—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-3E																										
Fourche LaFave	11110206	-001	44.4	ARK0036	M	S	S	S	S	S	S									1				FISH CONSUMPTION	192.6	8.7
Fourche LaFave	11110206	-002	8.7		E	N	S	S	S	S	S	UN				HG				4a				AQUATIC LIFE	144.7	56.6
Fourche LaFave	11110206	-006	21.5		E	S	S	S	S	S	S									1				PRIMARY CONTACT	201.3	0
Fourche LaFave	11110206	-007	20.2	ARK0037+	M	S	N	S	S	S	S	SE	UN			SI	DO			5a	5e			SECONDARY CONTACT	201.3	0
Fourche LaFave	11110206	-008	25.7	UWFLR01	M	S	S	S	S	S	S									1				DRINKING SUPPLY	201.3	0
Black Fork	11110206	-009	14.3	UWBLF01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	201.3	0
Clear Fork	11110206	-010	12.0	UWCLF01	M	S	S	S	S	S	S									1						
Cedar Creek	11110206	-011	9.6	UWCED01	M	S	S	S	S	S	S									1						
Gafford Creek	11110206	-012	8.5	UWGAF01	M	S	S	S	S	S	S									1						
S.FourcheLaFave	11110206	-013	10.3		E	S	N	S	S	S	S	UN				DO				5e						
S.FourcheLaFave	11110206	-014	26.1	ARK0052	M	S	N	S	S	S	S	UN				DO				5e						
Bear Creek	11110206	-015	10.2		U															1						
TOTAL MILES	211.5																									
MILES UNASSESSED	10.2																									
MILES EVALUATED	40.5																									
MILES MONITORED	160.8																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0036	Fourche La Fave River at Highway 113 south of Bigelow		2	R
ARK0037A	Fourche La Fave River near Harvey		2	A
ARK0037	Fourche La Fave River near Gravelly	Y	1	A
UWFLR01	Fourche La Fave River at county road near Bluffton		2	R
UWBLF01	Black Fork at county road 3.5 miles above Clear Fork		2	R
UWCLF01	Clear Fork at county road above Black fork, 8 miles west of Boyles		2	R
UWCED01	Big Cedar Creek at Highway 28, 3 miles east of Cedar Creek		2	R
UWGAF01	Gafford Creek at Highway 28 near Bluffton		2	R
ARK0052	South Fourche La Fave River above Hollis	Y	1	A

Table A-100: Segment 3E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0020125	Perryville, City of	Fourche Lafave R	11110206	1
AR0046957	Anne Watson Elementary School	Trib/Mill CR/Fourche Lafave R/Arkansas R	11110206	2
AR0049344	Plainview, City of	Sally Spring BR, Lake Nimrod	11110206	3

Table A-101: ARK0037 Fourche LaFave R Near Gravelly, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	8.72	1.64	14.30	2.74
BOD_5 (mg/L)	51	0.87	0.08	2.36	0.55
pH (standard units)	57	7.07	6.00	8.21	0.40
Total Organic Carbon (mg/L)	56	3.01	1.41	5.48	0.99
Ammonia as N (mg/L)	58	0.03	0.01	1.35	0.18
NO_2 + NO_3 as N (mg/L)	57	0.12	0.01	1.05	0.16
Orthophosphate as P (mg/L)	48	0.02	0.01	0.09	0.01
Total Phosphorus as P (mg/L)	58	0.06	0.02	1.04	0.13
Total Hardness (mg/L)	22	25.00	25.00	25.00	0.00
Chloride (mg/L)	58	2.90	2.06	6.07	0.58
Sulfate (mg/L)	58	3.68	2.21	5.32	0.63
Total Dissolved Solids (mg/L)	57	38.93	28.50	56.00	6.25
Total Suspended Solids (mg/L)	56	5.07	1.00	39.50	6.37
Turbidity (NTU)	58	13.77	3.60	84.30	13.39

Table A-102: ARK0052 South Fourche LaFave R AB Hollis, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	8.39	4.32	12.94	2.17
BOD_5 (mg/L)	52	1.03	0.21	2.83	0.62
pH (standard units)	55	6.67	5.69	8.28	0.36
Total Organic Carbon (mg/L)	57	5.62	2.76	11.80	2.11
Ammonia as N (mg/L)	58	0.01	0.01	0.16	0.03
NO_2 + NO_3 as N (mg/L)	58	0.11	0.01	0.46	0.10
Orthophosphate as P (mg/L)	32	0.01	0.01	0.03	0.00
Total Phosphorus as P (mg/L)	57	0.03	0.01	0.09	0.02
Total Hardness (mg/L)	23	25.00	25.00	25.00	0.00
Chloride (mg/L)	59	3.19	1.51	5.34	0.67
Sulfate (mg/L)	59	3.88	2.39	5.42	0.96
Total Dissolved Solids (mg/L)	59	41.59	29.00	62.50	7.53
Total Suspended Solids (mg/L)	59	3.34	1.00	21.80	3.93
Turbidity (NTU)	58	12.88	1.60	132.00	17.50

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SEGMENT 3F ARKANSAS RIVER

Segment 3F is located in the central portion of Arkansas and covers parts of Faulkner, Conway, Perry, Pope, and Van Buren Counties. This segment contains the Arkansas River and its tributaries. The principal tributaries are the East and West Forks of Point Remove Creek, Overcup Creek, Gum Log Creek, Palarm Creek and Galla Creek.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. This segment contains a total of 310.8 streams miles. Ten monitoring stations within this segment allow for the assessment of 92.8 streams miles with an additional 99.1 miles of stream being evaluated. The remaining stream segments were unassessed.

Stone Dam Creek was impaired by a municipal discharge with chronically toxic ammonia levels and nitrates exceeding the drinking water maximum contaminant level. A TMDL to address these issues was completed in 2003.

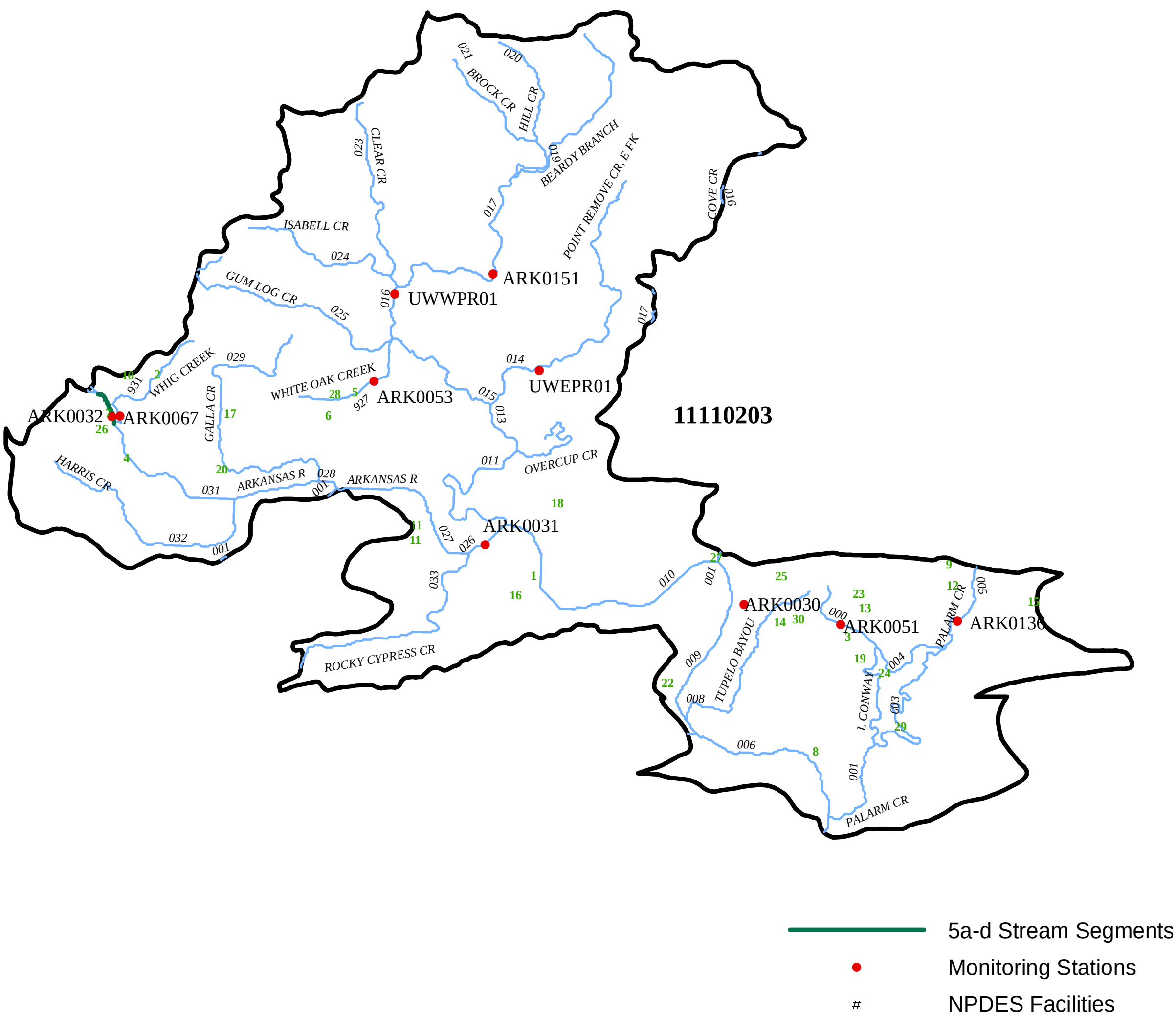
Whig Creek continues to be impaired by municipal and industrial point source discharges. Elevated levels of nutrients and copper are the cause of the impairment. A TMDL has been completed for this waterbody.

White Oak Creek continues to be listed for high silt and turbidity levels. Nonpoint sources appear to be the major problem. A TMDL addressing this issue was completed in 2006.

An approximate two mile segment of the Arkansas River below Dardanelle Reservoir occasionally had dissolved oxygen values below the standard during the summer period. This is related to hydropower releases from the upstream reservoir when very low D.O. values exist in the deeper levels of the reservoir. These low values seem to recover quickly downstream of the reservoir under low to moderate generation flows and in the presence of photosynthesis activity from planktonic algae (Figure A-19).

Several segments of the Arkansas River had total dissolved solids concentrations above the standard. Most of the exceedances occurred over a five to six month span during the winter months of 2002 and 2003. This suggests that this was a one-time weather related event and not a chronic problem.

Figure A-18: Planning Segment 3F



(Segment 3F)

Table A-103: Planning Segment 3F—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-3F																							
Palarm Creek	11110203	-001	6.4		U															3			
Stone Dam Creek	11110203	-904	3.0	ARK0051	M	S	N	S	S	N	S	MP	MP			AM	NO3			4a	4a		
Palarm Creek	11110203	-005	6.6	ARK0136	M	S	S	S	S	S	S									1			
Arkansas River	11110203	-006	10.9		E	S	S	S	S	S	S									1			
Arkansas River	11110203	-007	1.0		E	S	S	S	S	S	S									1			
Tupelo Bayou	11110203	-008	13.0		U															3			
Arkansas River	11110203	-009	10.6	ARK0030	M	S	S	S	S	S	S									1			
Arkansas River	11110203	-010	16.4		E	S	S	S	S	S	S									1			
Point Remove	11110203	-011	13.1		U															3			
Point Remove	11110203	-013	3.5		U															3			
Overcup Creek	11110203	-012	7.5		U															3			
East Pt.Remove	11110203	-014	20.9	UWEPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-015	8.2		U															3			
West Pt.Remove	11110203	-016	3.3	UWWPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-017	14.4	ARK0151	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-019	4.1		E	S	S	S	S	S	S									1			
Beardy Branch	11110203	-018	12.9		E	S	S	S	S	S	S									1			
Hill Creek	11110203	-020	7.3		E	S	S	S	S	S	S									1			
Brock Creek	11110203	-021	7.4		E	S	S	S	S	S	S									1			
Clear Creek	11110203	-022	0.7		E	S	S	S	S	S	S									1			
Clear Creek	11110203	-023	11.7		E	S	S	S	S	S	S									1			
Isabel Creek	11110203	-024	10.5		E	S	S	S	S	S	S									1			
Gum Log Creek	11110203	-025	15.8		U															3			
Arkansas River	11110203	-026	2.6	ARK0031	M	S	S	S	S	S	N	UN				TDS				5e			
Arkansas River	11110203	-027	9.9		E	S	S	S	S	S	N	UN				TDS				5e			
Arkansas River	11110203	-028	1.2		E	S	S	S	S	S	N	UN				TDS				5e			
Galla Creek	11110203	-029	20.1		U															3			
Arkansas River	11110203	-030	5.1		E	S	S	S	S	S	S	UN				TDS				5e			
Arkansas River	11110203	-031U	2.0		M	S	N	S	S	S	S	HP				DO				5a			
Arkansas River	11110203	-031L	9.4	ARK0032	M	S	S	S	S	S	S	UN				TDS				5e			
Harris Creek	11110203	-032	15.6		U															3			
Rocky Cypress	11110203	-033	15.7		U															3			
Whig Creek	11110203	-931	10.0	ARK0067	M	S	N	S	S	N	S	MP	MP			NU	Cu			4a	4a		
White Oak Creek	11110203	-927	10.0	ARK0053	M	S	N	S	S	S	S	UN				SI				4a			
TOTAL MILES	310.8																						
MILES UNASSESSED	118.9																						
MILES EVALUATED	99.1																						
MILES MONITORED	92.8																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	191.9	0
AQUATIC LIFE	166.9	25
PRIMARY CONTACT	191.9	0
SECONDARY CONTACT	191.9	0
DRINKING SUPPLY	178.9	13
AGRI & INDUSTRY	178.2	13.7

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0051	Stone Dam Creek below Conway		1	A
ARK0136	Palarm Creek at Highway 36 east of Conway		1	R
ARK0030	Arkansas River at Lock and Dam No. 8	Y	1	A
UWEPR01	East Point Remove Creek at Highway 95 near Hickory Hill		1	R
UWWPR01	West Point Remove Creek at Highway 247 near Atkins		1	R
ARK0151	West Point Remove Creek at Highway 124 near Macedonia		1	R
ARK0031	Arkansas River at Lock and Dam No. 9	Y	1	A
ARK0032	Arkansas River near Dardanelle	Y	1	A
ARK0067	Whig Creek below Russellville		1	A
ARK0053	White Oak Creek near Atkins		1	A

Table A-104: Segment 3F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0001830	Green Bay Packaging-AR Kraft	Slough-Arkansas R	11110203	1
AR0021768	Russellville City Corp	Whig CR, Arkansas R	11110203	2
AR0033359	Conway, City of-Stone Dam CR	Stone Dam CR, Lake Conway	11110203	3
AR0033421	Dardanelle, City of	Arkansas R	11110203	4
AR0034665	Atkins, City of-North WWTF	Arkansas R	11110203	5
AR0034673	Atkins, City of-South WWTP	Horse Pen CR, Galla CR, AR R	11110203	6
AR0036714	Tyson Foods Inc-Dardanelle	Arkansas R	11110203	7
AR0037206	Mayflower, City of	Arkansas R	11110203	8
AR0039454	Gold Creek Landing-Conway	Lake Conway, Arkansas R	11110203	24
AR0041301	Golden Meadows POA-Conway	Trib, Tucker CR, Tupelo Bayou, Arkansas	11110203	25
AR0042536	Rolling Creek POA	Warren CR Trib Palarm CR, Lake Conway	11110203	9
AR0042668	Grace Manufacturing, Inc	Arkansas R	11110203	26
AR0043028	Pioneer Southern, Inc	Trib/Tank Lake	11110203	
AR0043214	Rogers Group, Inc-Conway Asphalt	Trib/Stone Dam CR/Lake Conway/Arkansas RB	11110203	23
AR0044474	Freeman Brothers, Inc	Trib, Whig CR	11110203	10
AR0044717	Camp Mitchell Conference Ctr	Trib, Flat Cypress CR, Cypress CR	11110203	11
AR0044997	BHt Investment-Exxon Food Mart	Trib/Warren-Palarm CRs/Lake Conway/Arkansas	11110203	12
AR0045071	Williams Express #3059	Trib, Stone Dam CR, Lake Conway	11110203	13
AR0047104	Rogers Group, Inc-Toadsucr Quarry	Slough, Arkansas R	11110203	27
AR0047279	Conway, City of Tucker Creek W	Arkansas R	11110203	14
AR0047520	Rogers Group, Inc-Beryl Quarry	Trib, Palarm CR, Lake Conway	11110203	15
AR0047643	Oppelo, City of	Trib, Cypress CR, Arkansas R	11110203	16
AR0048011	Pottsville, City of	Trib, Galla CR, Swma Res	11110203	17
AR0048429	Dover, City of	Bakers CR, Illinois Bayou, Lake Dardanelle	11110203	
AR0048453	Dean Pickle & Spec Products Co	Trib White Oak CR/White Oak CR, Arkansas R	11110203	28
AR0048623	Gericorp, Inc	CR, Old River Lake, Miller Bayou, Arkansas R	11110203	18
AR0048682	Wilhelmina Cove POA	Gold CR, Lake Conway, Palarm CR, Arkansas R	11110203	19
AR0048917	Regions Bank; Formerly: AG&R Ente	Trib, Galla CR, Arkansas R	11110203	20
AR0049361	Menifee, City of	Trib, Gap CR, Arkansas	11110203	
AR0049654	Green Lake Estates Phase III	Lake Conway, Palarm CR, Arkansas R	11110203	29
AR0049999	Bigelow, City of	Trib, Taylor CR, Arkansas R	11110203	22
AR0050067	Central Baptist Church	Trib, Tucker CR, Tupelo Bayou, Arkansas	11110203	30

Table A-105: ARK0030 Arkansas River at Lock & Dam #8

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	26	10.42	5.44	13.52	1.95
BOD_5 (mg/L)	25	1.53	0.74	3.83	0.75
pH (standard units)	26	7.70	6.73	8.68	0.51
Total Organic Carbon (mg/L)	27	4.59	3.67	8.70	0.97
Ammonia as N (mg/L)	27	0.03	0.01	0.10	0.03
NO_2 + NO_3 as N (mg/L)	27	0.41	0.01	0.99	0.30
Orthophosphate as P (mg/L)	27	0.04	0.01	0.08	0.02
Total Phosphorus as P (mg/L)	28	0.09	0.03	0.19	0.03
Total Hardness (mg/L)	14	115.36	45.00	158.00	34.18
Chloride (mg/L)	28	81.49	4.70	212.00	54.47
Sulfate (mg/L)	28	47.01	7.99	77.52	19.69
Total Dissolved Solids (mg/L)	28	314.04	88.50	535.00	130.52
Total Suspended Solids (mg/L)	28	14.06	4.00	80.50	15.82
Turbidity (NTU)	27	21.58	3.00	66.00	16.63

Table A-106: ARK0031 Arkansas River at Lock & Dam #9

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	27	9.66	7.03	13.24	1.98
BOD_5 (mg/L)	26	1.40	0.65	3.26	0.56
pH (standard units)	27	7.59	6.75	8.51	0.52
Total Organic Carbon (mg/L)	28	4.63	3.74	9.02	1.00
Ammonia as N (mg/L)	28	0.03	0.01	0.13	0.04
NO_2 + NO_3 as N (mg/L)	28	0.88	0.01	13.30	2.45
Orthophosphate as P (mg/L)	28	0.16	0.01	3.18	0.59
Total Phosphorus as P (mg/L)	28	0.23	0.06	3.47	0.64
Total Hardness (mg/L)	13	122.00	56.00	163.00	33.15
Chloride (mg/L)	29	104.99	19.82	263.00	68.57
Sulfate (mg/L)	29	55.51	17.41	191.00	31.42
Total Dissolved Solids (mg/L)	29	350.05	115.00	614.00	135.77
Total Suspended Solids (mg/L)	29	14.19	2.50	80.80	16.01
Turbidity (NTU)	28	21.73	3.10	68.00	17.62

Table A-107: ARK0032 Arkansas River Near Dardanell, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.95	4.72	14.80	2.52
BOD_5 (mg/L)	53	1.32	0.39	6.68	0.90
pH (standard units)	56	7.71	6.56	8.98	0.40
Total Organic Carbon (mg/L)	58	4.63	3.79	6.39	0.59
Ammonia as N (mg/L)	59	0.04	0.01	0.13	0.03
NO_2 + NO_3 as N (mg/L)	59	0.40	0.03	1.00	0.25
Orthophosphate as P (mg/L)	59	0.07	0.01	0.19	0.03
Total Phosphorus as P (mg/L)	59	0.13	0.02	0.29	0.05
Total Hardness (mg/L)	23	128.61	80.00	162.00	25.35
Chloride (mg/L)	59	97.88	24.78	399.00	65.93
Sulfate (mg/L)	60	49.76	21.00	79.00	14.95
Total Dissolved Solids (mg/L)	60	344.55	135.00	692.00	110.46
Total Suspended Solids (mg/L)	60	16.75	2.50	118.30	17.50
Turbidity (NTU)	59	26.77	4.20	87.40	19.18

Table A-108: ARK0051 Stone Dam Creek Downstream of Conway, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	7.45	2.86	12.91	1.92
BOD_5 (mg/L)	49	4.34	1.27	7.98	1.76
pH (standard units)	55	6.87	6.17	7.86	0.29
Total Organic Carbon (mg/L)	57	8.82	1.60	15.50	2.13
Ammonia as N (mg/L)	58	4.07	0.01	12.98	3.79
NO_2 + NO_3 as N (mg/L)	58	5.51	0.67	14.80	4.04
Orthophosphate as P (mg/L)	58	1.78	0.19	3.71	0.84
Total Phosphorus as P (mg/L)	56	1.95	0.27	3.42	0.83
Total Hardness (mg/L)	22	67.14	40.00	104.00	17.95
Chloride (mg/L)	59	42.24	9.03	92.10	15.08
Sulfate (mg/L)	57	116.11	0.04	337.00	65.90
Total Dissolved Solids (mg/L)	58	347.87	116.50	628.00	117.96
Total Suspended Solids (mg/L)	59	13.00	4.00	40.80	7.27
Turbidity (NTU)	58	18.96	5.20	86.40	14.44

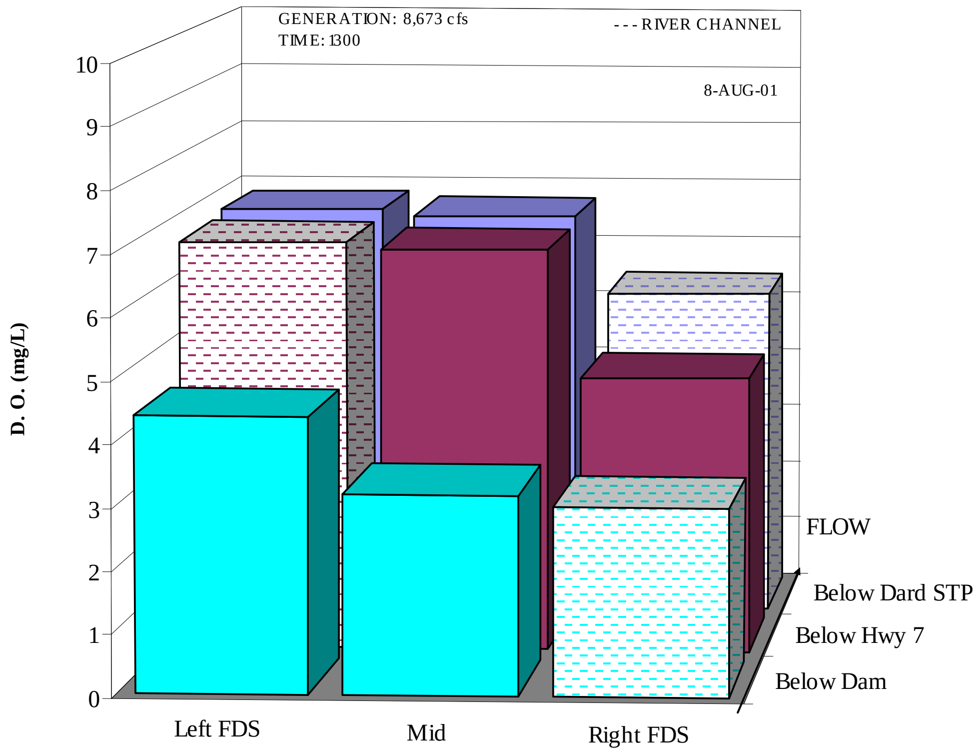
Table A-109: ARK0053 White Oak Creek Near Atkins, AR

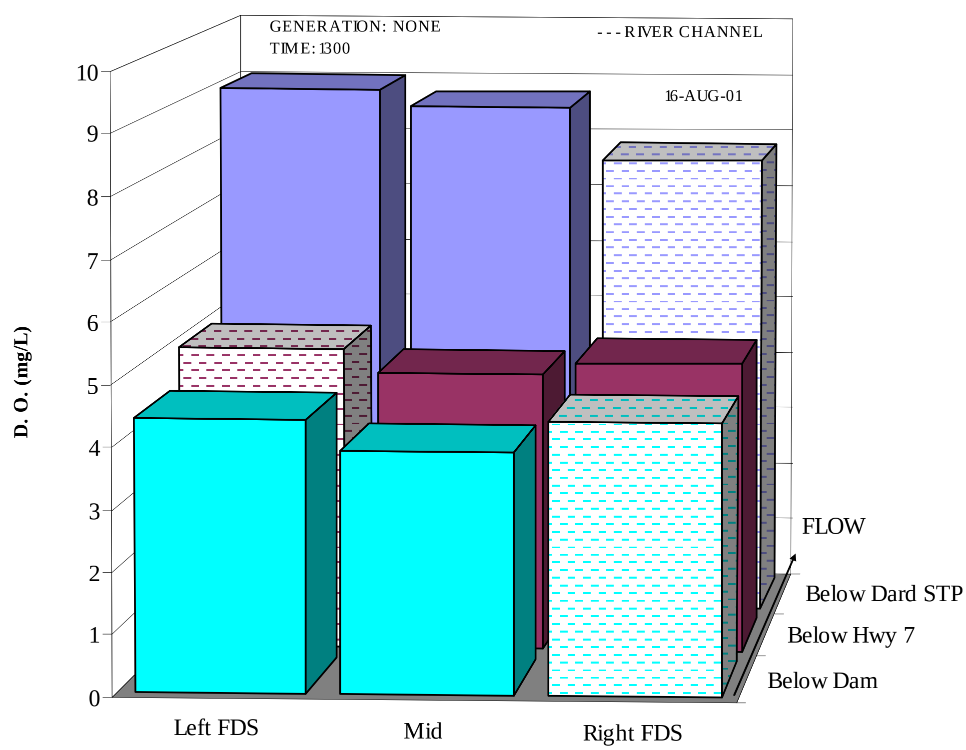
Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	9.44	3.80	16.76	2.79
BOD_5 (mg/L)	47	1.83	0.34	6.17	1.09
pH (standard units)	51	7.30	6.28	8.89	0.69
Total Organic Carbon (mg/L)	52	6.92	3.66	16.10	2.44
Ammonia as N (mg/L)	53	0.03	0.01	0.16	0.04
NO_2 + NO_3 as N (mg/L)	53	0.23	0.01	1.35	0.28
Orthophosphate as P (mg/L)	44	0.04	0.01	0.16	0.03
Total Phosphorus as P (mg/L)	53	0.09	0.02	0.29	0.06
Total Hardness (mg/L)	21	45.86	25.00	92.00	16.66
Chloride (mg/L)	54	35.40	4.08	143.00	27.28
Sulfate (mg/L)	54	17.31	6.03	41.10	6.43
Total Dissolved Solids (mg/L)	54	156.26	68.00	394.00	67.30
Total Suspended Solids (mg/L)	54	9.06	1.00	63.00	9.62
Turbidity (NTU)	53	27.43	3.60	128.00	23.99

Table A-110: ARK0067 Whig Creek Downstream of Russellville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.58	3.43	12.60	2.17
BOD_5 (mg/L)	53	1.58	0.29	7.51	1.30
pH (standard units)	57	7.09	6.27	7.68	0.26
Total Organic Carbon (mg/L)	58	6.71	4.06	9.70	1.12
Ammonia as N (mg/L)	59	0.28	0.01	1.94	0.42
NO_2 + NO_3 as N (mg/L)	59	9.33	0.78	28.50	5.00
Orthophosphate as P (mg/L)	59	4.07	0.23	9.15	2.30
Total Phosphorus as P (mg/L)	58	4.23	0.37	9.40	2.22
Total Hardness (mg/L)	23	61.17	44.00	124.00	16.85
Chloride (mg/L)	60	47.21	3.87	96.40	22.02
Sulfate (mg/L)	60	38.97	11.80	70.90	10.23
Total Dissolved Solids (mg/L)	59	283.29	79.50	443.00	84.50
Total Suspended Solids (mg/L)	60	13.19	2.20	271.00	34.61
Turbidity (NTU)	59	20.61	2.70	342.00	43.65

Figure A-19: Arkansas River Dissolved Oxygen Sampling,
1 foot Depth Below Dardanelle Lock & Dam, 2001





SEGMENT 3G PETIT JEAN RIVER AND TRIBUTARIES

Segment 3G, located in west central Arkansas, includes portions of Yell, Conway, Perry, Logan, Sebastian, and Scott Counties. This segment includes the entire length of the Petit Jean River and its tributary streams. Major tributaries include Dutch Creek, Spring Creek, Chickalah Creek and Rose Creek. Blue Mountain Lake, formed by damming the Petit Jean River, is the largest impoundment in the segment.

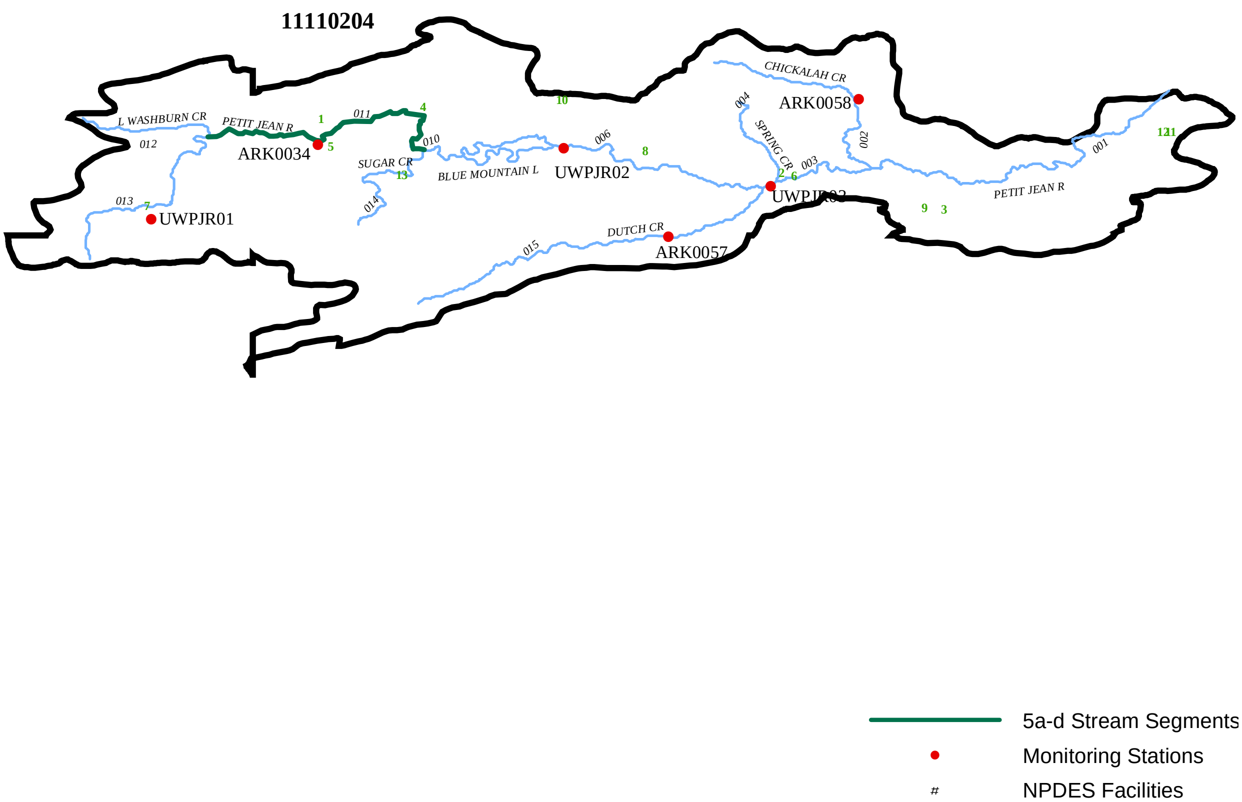
Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supply. This planning segment contains 198.5 stream miles. Monitoring data were utilized to assess 108.2 stream miles. An additional 8.7 stream miles were evaluated. The remaining stream miles within this segment did not have adequate information for assessment and are therefore listed as unassessed. The primary land use of the watersheds in this segment is agriculture activities (primarily pasture land) and timber harvest.

One segment of the Petit Jean River was listed as not attaining the public drinking water use because of the presence of beryllium. The three beryllium values detected, out of a total 20 samples, were all less than 0.20 ug/L. Contamination during the collection and analysis is a concern. In addition, current public health criteria used in the assessment may need updating.

Two streams, Chickalah Creek and Dutch Creek (an ecoregion reference stream), were listed because of low dissolved oxygen concentrations. Most of the low dissolved oxygen readings occurred during the late summer to early fall sampling events when the flow in the streams is minimal and the streams are reduced to small pools.

Figure A-20: Planning Segment 3G



(Segment 3G)

Table A-111: Planning Segment 3G—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-3G																										
Petit Jean R.	11110204	-001	30.1		U															3				FISH CONSUMPTION	116.9	0
Petit Jean R.	11110204	-003	8.7		E	S	S	S	S	S	S									1				AQUATIC LIFE	68.7	48.2
Petit Jean R.	11110204	-005	1.3	UWPJR03	M	S	S	S	S	S	S									1				PRIMARY CONTACT	116.9	0
Petit Jean R.	11110204	-006	17.9	UWPJR02	M	S	S	S	S	S	S									1				SECONDARY CONTACT	116.9	0
Petit Jean R.	11110204	-007	6.0		U															3				DRINKING SUPPLY	95.3	21.6
Petit Jean R.	11110204	-010	4.1		U															3				AGRI & INDUSTRY	116.9	0
Petit Jean R.	11110204	-011	21.6	ARK0034	M	S	S	S	S	N	S	UN				Be				5d						
Petit Jean R.	11110204	-013	19.2	UWPJR01	M	S	S	S	S	S	S									1						
Chickalah Cr.	11110204	-002	19.3	ARK0058	M	S	N	S	S	S	S	UN				DO				5e						
Spring Creek	11110204	-004	18.6		U															3						
L. Washburn Cr.	11110204	-012	10.0		U															3						
Sugar Creek	11110204	-014	12.8		U															3						
Dutch Creek	11110204	-015	28.9	ARK0057	M	S	N	S	S	S	S	UN				DO				5e						
TOTAL MILES	198.5																									
MILES UNASSESSED	81.6																									
MILES EVALUATED	8.7																									
MILES MONITORED	108.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWPJR03	Petit Jean River at Highway 10 at Danville		2	R
UWPJR02	Petit Jean River at Highway 309 near Waveland		2	R
ARK0034	Petit Jean River south of Booneville	Y	1	A
UWPJR01	Petit Jean River at county road off Highway 71 at Elm Park		2	R
ARK0058	Chickalah Creek at Chickalah	Y	1	A
ARK0057	Dutch Creek below Shark	Y	1	A

Table A-112: Segment 3G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021571	Booneville, City of	Trib, Petit Jean R, Arkansas R	11110204	1
AR0022241	Danville, City of	Petit Jean R	11110204	2
AR0035688	Ola, City of	Keeland CR, Petit Jean R	11110204	3
AR0037397	Magazine, City of	Reville CR Trib, Petit Jean R	11110204	4
AR0037541	Booneville Human Dev Ctr-ADHS	Petit Jean R	11110204	5
AR0037648	AR Parks & Tourism-Petit Jean	Ditch, Cedar CR, Petit Jean R, Arkansas R	11110204	12
AR0038768	Wayne Farms	Petit Jean R	11110204	6
AR0045799	AR Hwy Dept-Waldron Rest Area-	Trib, Petit Jean R	11110204	7
AR0046256	Havana, City of	Petit Jean R	11110204	8
AR0046426	AR Game & Fish Comm-Blue Mountain	Trib/Sugar CR, Petit Jean R, Blue Mountain	11110204	13
AR0048640	Deltic Timber Corp - Ola Mill	Keeland CR, Petit Jean R	11110204	9
AR0048852	AR Parks & Tourism-Mt Magazine	West Bass CR	11110204	10
AR0049972	AR Parks & Tourism-Petit Jean	Ditch, Cedar CR, Petit Jean R, Arkansas R	11110204	11

Table A-113: ARK0034 Petit Jean River Near Booneville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	7.80	1.76	13.40	3.01
BOD_5 (mg/L)	47	1.55	0.11	4.86	0.97
pH (standard units)	53	6.99	4.00	8.16	0.54
Total Organic Carbon (mg/L)	52	4.73	2.63	7.92	1.38
Ammonia as N (mg/L)	54	0.01	0.01	0.07	0.02
NO_2 + NO_3 as N (mg/L)	53	0.18	0.01	0.89	0.23
Orthophosphate as P (mg/L)	42	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	54	0.09	0.02	1.17	0.16
Total Hardness (mg/L)	20	28.85	25.00	41.00	5.30
Chloride (mg/L)	54	6.13	0.42	68.35	8.71
Sulfate (mg/L)	54	8.01	0.04	42.09	5.35
Total Dissolved Solids (mg/L)	53	72.19	49.00	250.00	27.29
Total Suspended Solids (mg/L)	52	8.96	1.20	66.50	9.01
Turbidity (NTU)	54	20.92	5.70	65.00	12.17

Table A-114: ARK0057 Dutch Creek Downstream of Shark, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	7.71	2.53	12.57	2.82
BOD_5 (mg/L)	51	1.31	0.08	6.75	1.25
pH (standard units)	54	6.69	5.20	7.18	0.29
Total Organic Carbon (mg/L)	56	4.02	1.47	9.72	1.89
Ammonia as N (mg/L)	57	0.11	0.01	1.20	0.22
NO_2 + NO_3 as N (mg/L)	57	0.49	0.01	3.01	0.48
Orthophosphate as P (mg/L)	49	0.02	0.01	0.12	0.02
Total Phosphorus as P (mg/L)	56	0.07	0.02	0.40	0.07
Total Hardness (mg/L)	22	27.50	25.00	42.00	5.21
Chloride (mg/L)	58	4.53	1.42	9.45	1.40
Sulfate (mg/L)	58	4.08	1.10	6.04	1.36
Total Dissolved Solids (mg/L)	58	56.44	34.00	90.50	13.46
Total Suspended Solids (mg/L)	58	8.28	1.00	131.30	18.51
Turbidity (NTU)	57	20.00	4.30	192.00	26.77

Table A-115: ARK0058 Chickalah Creek at Chickalah, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	7.82	1.34	12.90	3.02
BOD_5 (mg/L)	50	1.10	0.11	3.86	0.92
pH (standard units)	54	6.79	5.82	7.69	0.30
Total Organic Carbon (mg/L)	55	3.17	1.15	7.32	1.65
Ammonia as N (mg/L)	56	0.04	0.01	0.26	0.06
NO_2 + NO_3 as N (mg/L)	56	0.47	0.01	2.18	0.42
Orthophosphate as P (mg/L)	48	0.02	0.01	0.05	0.01
Total Phosphorus as P (mg/L)	56	0.05	0.02	0.18	0.03
Total Hardness (mg/L)	23	28.96	25.00	54.00	9.09
Chloride (mg/L)	57	5.46	1.69	14.50	3.17
Sulfate (mg/L)	57	4.50	0.63	10.40	1.86
Total Dissolved Solids (mg/L)	57	58.86	32.50	102.00	17.58
Total Suspended Solids (mg/L)	57	7.86	1.00	92.50	14.94
Turbidity (NTU)	56	21.80	7.00	171.00	23.19

SEGMENT 3H ARKANSAS RIVER AND TRIBUTARIES: STATE LINE TO RIVER MILE 210

Segment 3H, located in the lower portion of the northwest quarter of Arkansas, includes most of Crawford, Franklin and Johnson Counties, as well as parts of Sebastian, Logan, Pope, Newton, Madison and Washington Counties. This segment contains a reach of the Arkansas River from the Oklahoma state line to the lower end of Lake Dardanelle. Major tributaries in this reach include Illinois Bayou, Big Piney Creek, Lee Creek, Mulberry River, Six Mile Creek, and Vache Grasse Creek.

Summary of Water Quality Conditions

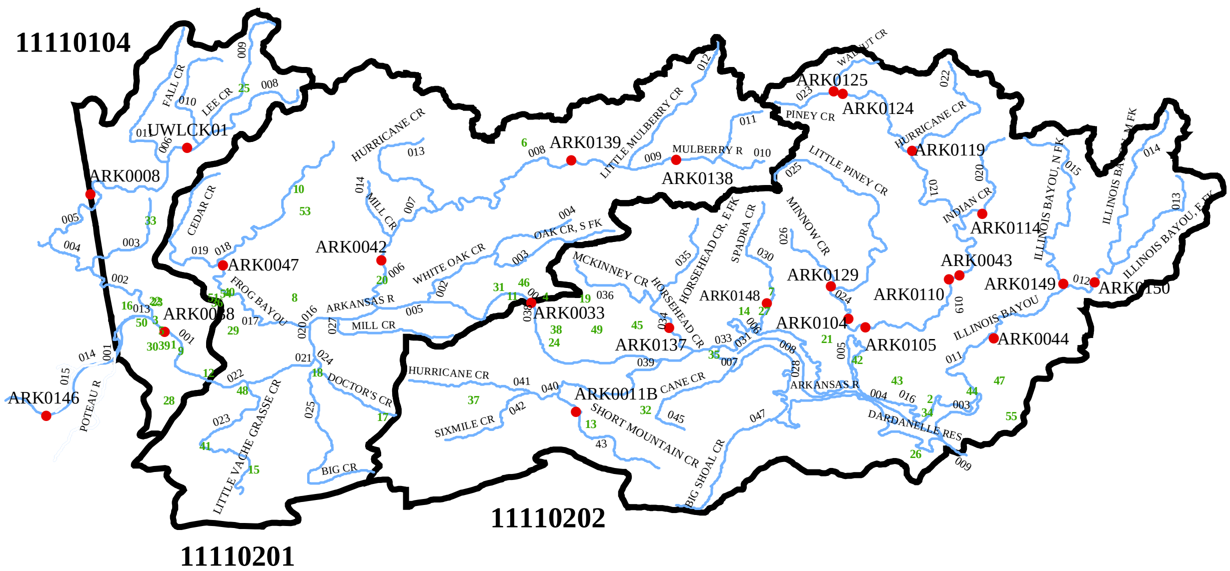
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supply. Seventeen monitoring stations are located within this segment. An intensive survey of the Big Piney Creek watershed and its tributaries was also used to asses the waters of this segment. Altogether, 365.2 miles of stream were monitored and another 261 stream miles were evaluated; the remainder of the stream segments were unassessed.

One segment of the Arkansas River was listed for excessive total dissolved solids concentrations. Most of the exceedances occurred over a five to six month span during the winter months of 2002 and 2003. This suggests that this was a one-time weather related event and not a chronic problem.

Short Mountain Creek is not maintaining the aquatic life use because of toxic copper concentrations. The source is a municipal point source discharge. Additional permit controls will be added to address this issue.

One segment of the Mulberry River, an ecoregion reference stream, was listed because of low pH values. The statewide pH standard of 6 to 9 standard units does not take into account natural variations because of geology or land use.

Figure A-21: Planning Segment 3H



Monitoring Stations

NPDES Facilities

(Segment 3H)

Table A-116: Planning Segment 3H—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-3H																										
Arkansas River	11110202	-001	2.8		E	S	S	S	S	S	S									1				FISH CONSUMPTION	626.2	0
Illinois Bayou	11110202	-011	21.0	ARK0044	M	S	S	S	S	S	S									1				AQUATIC LIFE	602.2	24
Illinois Bayou	11110202	-012	8.1	ARK0150	M	S	S	S	S	S	S									1				PRIMARY CONTACT	626.2	0
Illinois Bayou	11110202	-013	14.1		E	S	S	S	S	S	S									1				SECONDARY CONTACT	626.2	0
M.Fk.Ill.Bayou.	11110202	-014	19.8	ARK0149	M	S	S	S	S	S	S									1				DRINKING SUPPLY	626.2	0
N.Fk.Ill.Bayou.	11110202	-015	24.0		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	613.8	12.4
Piney Creek	11110202	-018	5.8	ARK0105	M	S	S	S	S	S	S									1						
Piney Creek	11110202	-019	26.3	ARK0043	M	S	S	S	S	S	S									1						
Mill Creek	11110202	-901	8.6	ARK0110	M	S	S	S	S	S	S									1						
Indian Creek	11110202	-020	12.2	ARK0114	M	S	S	S	S	S	S									1						
Piney Creek	11110202	-021	11.9		E	S	S	S	S	S	S									1						
Hurricane Creek	11110202	-022	15.4	ARK0119	M	S	S	S	S	S	S									1						
Piney Creek	11110202	-023	19.0	ARK0124	M	S	S	S	S	S	S									1						
Walnut Creek	11110202	-902	5.1	ARK0125	M	S	S	S	S	S	S									1						
Little Piney	11110202	-024	6.2	ARK0104	M	S	S	S	S	S	S									1						
Minnow Creek	11110202	-026	9.5	ARK0129	M	S	S	S	S	S	S									1						
Little Piney	11110202	-025	27.2	ARK0126	M	S	S	S	S	S	S									1						
Spadra Creek	11110202	-030	15.1	ARK0148	M	S	S	S	S	S	S									1						
Arkansas River	11110202	-033	2.5		E	S	S	S	S	S	S									1						
Horsehead Cr.	11110202	-034	7.9		E	S	S	S	S	S	S									1						
Horsehead Cr.	11110202	-035	11.2	ARK0137	M	S	S	S	S	S	S									1						
McKinney Cr.	11110202	-036	11.8		E	S	S	S	S	S	S									1						
Arkansas River	11110202	-037	3.2		E	S	S	S	S	S	S									1						
Arkansas River	11110202	-038	16.2		E	S	S	S	S	S	S									1						
Sixmile Creek	11110202	-039	14.6		U															3						
Sixmile Creek	11110202	-040	3.0		U															3						
Hurricane Creek	11110202	-041	11.6		U															3						
Sixmile Creek	11110202	-042	10.7		U															3						
Short Mountain	11110202	-043	14.9	ARK0011B	M	S	N	S	S	S	S	MP				Cu				4b						
Cane Creek	11110202	-045	12.3		U															3						
Big Shoal Cr.	11110202	-047	15.4		U															3						
Arkansas River	11110201	-001	12.4	ARK0033	M	S	S	S	S	S	N	UN				TDS				5e						
White Oak	11110201	-002	9.2		U															3						
S. Fork White Oak Cr.	11110201	-003	13.9		U															3						
N. Fork White Oak Cr.	11110201	-004	8.8		U															3						
Arkansas River	11110201	-005	4.5		U															3						
Mulberry River	11110201	-006	10.4	ARK0042	M	S	S	S	S	S	S									1						
Mulberry River	11110201	-007	6.4		E	S	S	S	S	S	S									1						
Mulberry River	11110201	-008	27.2	ARK0139	M	S	S	S	S	S	S									1						
Mulberry River	11110201	-009	9.1	ARK0138	M	S	N	S	S	S	S	UN				pH				5e						
Mulberry River	11110201	-010	5.1		E	S	S	S	S	S	S									1						
Panther Creek	11110201	-011	7.4		E	S	S	S	S	S	S									1						
Little Mulberry	11110201	-012	17.4		M	S	S	S	S	S	S									1						
Hurricane Creek	11110201	-013	14.8		E	S	S	S	S	S	S									1						
Mill Creek	11110201	-014	7.0		E	S	S	S	S	S	S									1						
Arkansas River	11110201	-015	3.9		E	S	S	S	S	S	S									1						
Arkansas River	11110201	-016	2.9		E	S	S	S	S	S	S									1						
Frog Bayou	11110201	-017	15.7		E	S	S	S	S	S	S									1						
Frog Bayou	11110201	-018	20.4	ARK0047	M	S	S	S	S	S	S									1						
Cedar Creek	11110201	-019	17.0		E	S	S	S	S	S	S									1						
Arkansas River	11110201	-020	3.5		E	S	S	S	S	S	S									1						
Arkansas River	11110201	-021	7.0		E	S	S	S	S	S	S									1						
Arkansas River	11110201	-022	3.0		E	S	S	S	S	S	S									1						
L. Vache Grass	11110201	-023	20.5		U															3						
Doctors Creek	11110201	-024	1.5		U															3						
Big Creek	11110201	-025	20.9		U															3						
Doctors Creek	11110201	-026	9.1		U															3						
Mill Creek	11110201	-027	11.9		U															3						
Arkansas River	11110104	-001	11.0	ARK0038	M	S	S	S	S	S	S									1						
Arkansas River	11110104	-013	17.0	ARK0146	M	S	S	S	S	S	S									1						
Lee Creek	11110104	-002	10.5	ARK0008	M	S	S	S	S	S	S									1						
Lee Creek	11110104	-005	11.4		E	S	S	S	S	S	S									1						
Lee Creek	11110104	-006	4.4	UWLCK01	M	S	S	S	S	S	S									1						
Lee Creek	11110104	-007	1.8		E	S	S	S	S	S	S									1						
Lee Creek	11110104	-008	12.3		E	S	S	S	S	S	S									1						
Fall Creek	11110104	-009	15.2		E	S	S	S	S	S	S									1						
Cove Creek	11110104	-010	13.3		E	S	S	S	S	S	S									1						
Mt. Fork Creek	11110104	-011	18.9		E	S	S	S	S	S	S									1						
TOTAL MILES	794.1																									
MILES UNASSESSED	167.9																									
MILES EVALUATED	261.0																									
MILES MONITORED	365.2																									

Table A-116 continued: Planning Segment 3H—Designated Use Attainment Status and Water Quality Monitoring

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0044	Illinois Bayou northwest of Dover	Y	1	A
ARK0149	North Fork Illinois Bayou on county road north of Scottsville		1	R
ARK0150	Illinois Bayou at Highway 27 north of Hector		1	R
ARK0105	Big Piney Creek at Highway 359, 6 miles east of Lamar		2	S
ARK0043	Big Piney Creek at Highway 164	Y	1	A
ARK0110	Mill Creek at county road 0.4 miles south of Highway 164 near Twin Bridges		2	S
ARK0114	Indian Creek at FAS road 1808 near Treat		2	S
ARK0119	Hurricane Creek at FAS road 1003 near Ft. Douglas		2	S
ARK0124	Big Piney Creek at FAS road 1458 south of Edwards Junction		2	S
ARK0125	Walnut Creek as FAS road 1217 south of Edwards Junction		2	S
ARK0104	Little Piney Creek at Highway 359 east of Lamar		2	R
ARK0129	Minnow Creek at county road 50 bridge, south of Hagarville		2	S
ARK0109	Unnamed tributary at Highway 164 bridge		2	S
ARK0126	Little Piney Creek at Highway 123 bridge near Hagarville		2	S
ARK0148	Spadra Creek at US 64 near Clarksville		1	R
ARK0137	Horsehead Creek at Highway 64 east of Hartman		1	R
ARK0011B	Short Mountain Creek below Paris		1	A
ARK0033	Arkansas River at Ozark Lock and Dam	Y	1	A
ARK0042	Mulberry River at I-40	Y	1	A
ARK0138	Mulberry River at Highway 103 west of Oark		1	R
ARK0139	Mulberry River 4.3 miles east of Highway 23 near Cass		1	R
ARK0047	Frog Bayou at Highway 282		1	R
ARK0038	Arkansas River near Fort Smith, AR.	Y	1	A
ARK0146	Arkansas River below Mayo Lock and Dam		1	A
ARK0008	Lee Creek at Highway 59 near Natural Dam		1	R
UWLCK01	Lee Creek at Highway 220, 10 miles north of Cedarville		1	R

Table A-117: Segment 3H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0001341	Arkhola-Van Buren Sand Plant	Arkansas R	11110104	1
AR0001392	Entergy AR, Inc-AR Nuclear 1	Lake Dardanelle	11110202	2
AR0001511	Gerber Products Co-Ft Smith	Arkansas R	11110104	3
AR0001759	Arkansas Electric Coop-Fitzhug	Arkansas R	11110201	4
AR0001791	Fort James Operating Co	Ditch, Sixth St Ditch, Arkansas R	11110104	5
AR0020648	USDAFS-Cass CCC-Job Corps	Fane CR, Mulberry R	11110201	6
AR0020737	Greenville Tube Corp	Ditch, Spadra CR, Lake Dardanelle	11110202	7
AR0021466	Alma, City of	Arkansas R	11110201	8
AR0021482	Van Buren, City of-Main Plant	Arkansas R	11110104	9
AR0021512	Mountainburg, City of	Trib/Pigeon CR, Arkansas R	11110201	10
AR0021563	Ozark, City of	Arkansas R	11110201	11
AR0021750	Fort Smith, City of (Massard W	Arkansas R	11110104	12
AR0021857	Paris, City of	Short Mountain CR,6-Mi CR	11110202	13
AR0022187	Clarksville, City of	Blue CR, Spadra CR, Lake Dardanelle	11110202	14
AR0022454	Greenwood, City of	Trib/Vache Grasse CR/Arkansas R	11110201	15
AR0033278	Fort Smith, City of ("P" Street)	Arkansas R	11110104	16
AR0033791	Charleston, City of	Doctors Cr/Big CR	11110201	17
AR0034070	Lavaca, City of	Arkansas R	11110201	18
AR0034592	Wiederkehr Wine Cellars Inc	Watershed Lake, Dirty CR, Horseshoe CR	11110202	19
AR0034932	Mulberry, City Of	Arkansas R	11110201	20
AR0035491	Lamar, City of	Trib, Cabin CR, Arkansas R	11110202	21
AR0036552	Bekaert Corporation	Arkansas R	11110104	22
AR0037567	Van Buren-Lee CR Industrial Pk	Arkansas R	11110104	23
AR0037851	SGL Carbon Corp	Trib, West CR, Arkansas R	11110202	24
AR0037940	AR Parks & Tourism-Devil's Den	Ditch, Lee CR, Arkansas R	11110104	25
AR0037966	AR Parks & Tourism-Mt Nebo St Park	Trib, Chickalah CR	11110104	26
AR0039268	Tyson Foods Inc-Clarksville	Trib, Blue CR, Spadra CR, Arkansas R	11110202	27
AR0039730	Quanex Corp-Macsteel Div	Massard CR Trib	11110104	28
AR0040720	Van Buren Pub School-Tate Elem	Mays CR Trib	11110201	29
AR0040967	Van Buren, City of-North	Lee Creek	11110104	30
AR0040983	Mountain View Lodge, Inc	Trib, Arkansas R	11110201	31
AR0040991	Subiaco, Town of	Cane CR	11110202	32
AR0041068	Lectra Circuits, Inc.	Ditch, Frog Bayou	11110201	53
AR0041289	Cedarville Public Schools	Little Weber CR Trib, Lee CR	11110104	33
AR0042447	Tyson Foods Inc-Training Ctr	Lake Dardanelle On Arkansas R	11110202	34
AR0042455	Tyson Foods Inc-River Valley	Arkansas R	11110202	35

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0043699	Concord Baptist Church	Trib/Frog Bayou	11110201	54
AR0044385	S&D Properties-D/B/A Cabana Es	Trib, Flat Rock CR	11110104	36
AR0044636	County Line School Dist	N Fork-Little CR/6 Mile CR	11110202	37
AR0044725	Altus, City of	Arkansas R	11110202	38
AR0044938	Ecology Mgt, Inc	Arkansas R	11110104	39
AR0045063	Arkhola-Preston Quarry	Ditch, Trib, Flat Rock CR, Arkansas R	11110104	40
AR0045365	Arkhola-Jenny Lind Quarry	Ditch, Bear CR, Vache Grasse CR	11110201	41
AR0045683	AR Hwy Dept-Big Piney East	Trib, Big Piney CR, Lake Dardanelle	11110202	42
AR0045691	AR Hwy Dept-Big Piney-West	Trib, Lake Dardanelle	11110202	43
AR0046396	Pleasant View Estates	Ditch, Lake Dardanelle	11110202	44
AR0047686	Coal Hill, City of	Arkansas R	11110202	45
AR0048267	Cargill, Inc	Arkansas R	11110201	46
AR0048429	Dover, City of	Bakers CR, Illinois Bayou, Lake Dardanelle	11110202	47
AR0048739	Flying J Travel Plaza #5038	Municipal storm sewer system, Prairie CR	11110202	55
AR0048801	Barling, City of	Arkansas R	11110201	48
AR0049212	Cargill, Inc-Feed Mill	Hwy Ditch, Cedar CR, Arkansas R	11110202	49
AR0049808	Norton Proppants	Ditch, Arkansas R	11110104	50
AR0050199	Lendel Vines Co. D/B/A Lendel	Ditch, Trib, Flat Rock CR, Hollis Lake	11110104	51
AR0050431	Southern Hills LLC-Black Stone	Cedar CR, Poteau R, Arkansas R	11110105	

Table A-118: ARK0011B Short Mountain Cr. Downstream of Paris, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	8.08	1.84	13.20	2.97
BOD_5 (mg/L)	54	1.08	0.17	6.52	0.87
pH (standard units)	57	7.11	5.00	8.20	0.49
Total Organic Carbon (mg/L)	57	3.43	2.11	6.73	0.92
Ammonia as N (mg/L)	58	0.06	0.01	0.21	0.05
NO_2 + NO_3 as N (mg/L)	57	1.78	0.08	5.16	1.48
Orthophosphate as P (mg/L)	58	0.23	0.01	0.60	0.20
Total Phosphorus as P (mg/L)	58	0.30	0.02	1.37	0.26
Total Hardness (mg/L)	20	42.70	25.00	167.00	31.35
Chloride (mg/L)	58	13.46	0.44	129.00	19.06
Sulfate (mg/L)	58	19.05	0.04	74.20	12.42
Total Dissolved Solids (mg/L)	57	124.47	43.50	437.00	75.63
Total Suspended Solids (mg/L)	56	6.65	1.00	50.80	9.41
Turbidity (NTU)	58	13.72	3.30	96.00	15.50

Table A-119: ARK0033 Arkansas River at Ozark Lock & Dam

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	9.44	2.53	16.80	2.90
BOD_5 (mg/L)	52	1.43	0.61	5.24	0.80
pH (standard units)	58	7.66	6.00	8.80	0.59
Total Organic Carbon (mg/L)	57	4.83	3.15	6.40	0.66
Ammonia as N (mg/L)	59	0.04	0.01	0.72	0.09
NO_2 + NO_3 as N (mg/L)	58	0.45	0.01	4.54	0.61
Orthophosphate as P (mg/L)	57	0.07	0.01	0.70	0.11
Total Phosphorus as P (mg/L)	59	0.14	0.02	1.20	0.18
Total Hardness (mg/L)	23	135.91	46.00	182.00	29.49
Chloride (mg/L)	58	101.11	0.43	356.00	71.95
Sulfate (mg/L)	59	50.61	0.04	86.00	15.74
Total Dissolved Solids (mg/L)	58	359.43	158.50	726.00	122.88
Total Suspended Solids (mg/L)	57	13.66	2.80	67.80	11.40
Turbidity (NTU)	59	24.21	5.00	82.60	17.54

Table A-120: ARK0038 Arkansas River Near Fort Smith, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.82	3.85	16.40	2.74
BOD_5 (mg/L)	53	1.70	0.66	4.51	0.70
pH (standard units)	58	7.77	6.09	9.05	0.46
Total Organic Carbon (mg/L)	58	4.97	3.86	6.84	0.65
Ammonia as N (mg/L)	60	0.03	0.01	0.13	0.03
NO_2 + NO_3 as N (mg/L)	59	0.37	0.01	1.08	0.26
Orthophosphate as P (mg/L)	60	0.06	0.01	0.12	0.02
Total Phosphorus as P (mg/L)	60	0.13	0.02	1.19	0.14
Total Hardness (mg/L)	23	142.78	62.00	194.00	28.33
Chloride (mg/L)	59	105.44	12.76	337.00	75.66
Sulfate (mg/L)	60	52.91	17.11	95.00	16.68
Total Dissolved Solids (mg/L)	59	368.84	114.00	777.00	142.16
Total Suspended Solids (mg/L)	58	16.62	5.20	49.40	9.02
Turbidity (NTU)	59	29.49	5.30	109.00	19.25

Table A-121: ARK0042 Mulberry River at I-40

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	8.90	1.78	13.40	2.68
BOD_5 (mg/L)	46	0.50	0.04	1.97	0.38
pH (standard units)	55	7.19	4.00	8.71	0.62
Total Organic Carbon (mg/L)	49	1.63	0.90	2.94	0.50
Ammonia as N (mg/L)	56	0.01	0.01	0.04	0.01
NO_2 + NO_3 as N (mg/L)	55	0.11	0.02	0.46	0.09
Orthophosphate as P (mg/L)	41	0.01	0.01	0.11	0.02
Total Phosphorus as P (mg/L)	56	0.04	0.00	0.51	0.07
Total Hardness (mg/L)	21	25.00	25.00	25.00	0.00
Chloride (mg/L)	56	1.81	0.19	3.37	0.61
Sulfate (mg/L)	56	2.87	0.04	3.88	0.55
Total Dissolved Solids (mg/L)	55	33.47	23.50	59.00	6.47
Total Suspended Solids (mg/L)	54	4.05	1.00	92.30	12.32
Turbidity (NTU)	56	9.58	2.24	70.70	11.73

Table A-122: ARK0043 Big Piney Creek at Hwy 164

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.71	5.45	16.12	2.05
BOD_5 (mg/L)	46	0.44	0.02	1.35	0.34
pH (standard units)	58	7.07	6.06	8.14	0.32
Total Organic Carbon (mg/L)	53	1.53	0.62	4.80	0.73
Ammonia as N (mg/L)	60	0.01	0.01	0.08	0.01
NO_2 + NO_3 as N (mg/L)	60	0.08	0.01	0.55	0.08
Orthophosphate as P (mg/L)	36	0.02	0.01	0.18	0.03
Total Phosphorus as P (mg/L)	59	0.03	0.01	0.18	0.02
Total Hardness (mg/L)	23	25.52	25.00	30.00	1.44
Chloride (mg/L)	61	4.23	1.08	156.00	19.77
Sulfate (mg/L)	61	4.04	2.62	49.30	5.91
Total Dissolved Solids (mg/L)	61	46.50	24.50	442.00	52.04
Total Suspended Solids (mg/L)	61	2.48	1.00	56.00	7.14
Turbidity (NTU)	60	7.27	0.60	57.00	8.66

Table A-123: ARK0044 Illinois Bayou NW of Dover, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	9.24	4.73	15.99	2.18
BOD_5 (mg/L)	45	0.49	0.03	1.57	0.40
pH (standard units)	55	6.84	6.35	7.36	0.24
Total Organic Carbon (mg/L)	54	1.75	0.75	4.70	0.80
Ammonia as N (mg/L)	57	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	57	0.15	0.01	1.07	0.20
Orthophosphate as P (mg/L)	38	0.01	0.01	0.03	0.01
Total Phosphorus as P (mg/L)	55	0.03	0.01	0.160	0.02
Total Hardness (mg/L)	22	30.50	25.00	146.00	25.80
Chloride (mg/L)	58	2.46	1.30	7.27	1.23
Sulfate (mg/L)	58	2.95	2.11	5.16	0.47
Total Dissolved Solids (mg/L)	58	33.72	18.00	63.00	7.71
Total Suspended Solids (mg/L)	58	4.08	1.00	111.00	14.67
Turbidity (NTU)	57	10.34	2.20	81.00	13.41

Table A-124: ARK0146 Arkansas River Near W.D. Mayo Lock & Dam (Oklahoma)

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	13	9.38	5.80	12.60	2.23
BOD_5 (mg/L)	15	1.35	0.79	1.91	0.39
pH (standard units)	16	7.56	7.24	8.40	0.32
Total Organic Carbon (mg/L)	16	4.73	3.77	6.60	0.84
Ammonia as N (mg/L)	16	0.03	0.01	0.06	0.01
NO_2 + NO_3 as N (mg/L)	15	0.32	0.03	0.69	0.23
Orthophosphate as P (mg/L)	16	0.04	0.02	0.07	0.01
Total Phosphorus as P (mg/L)	16	0.08	0.05	0.11	0.02
Total Hardness (mg/L)	7	150.29	124.00	180.00	19.91
Chloride (mg/L)	16	93.33	41.84	166.48	36.84
Sulfate (mg/L)	16	63.07	34.40	96.15	15.69
Total Dissolved Solids (mg/L)	16	371.63	222.50	535.00	88.36
Total Suspended Solids (mg/L)	16	14.78	5.50	30.00	6.66
Turbidity (NTU)	16	18.15	5.00	44.00	12.61

SEGMENT 3I POTEAU RIVER

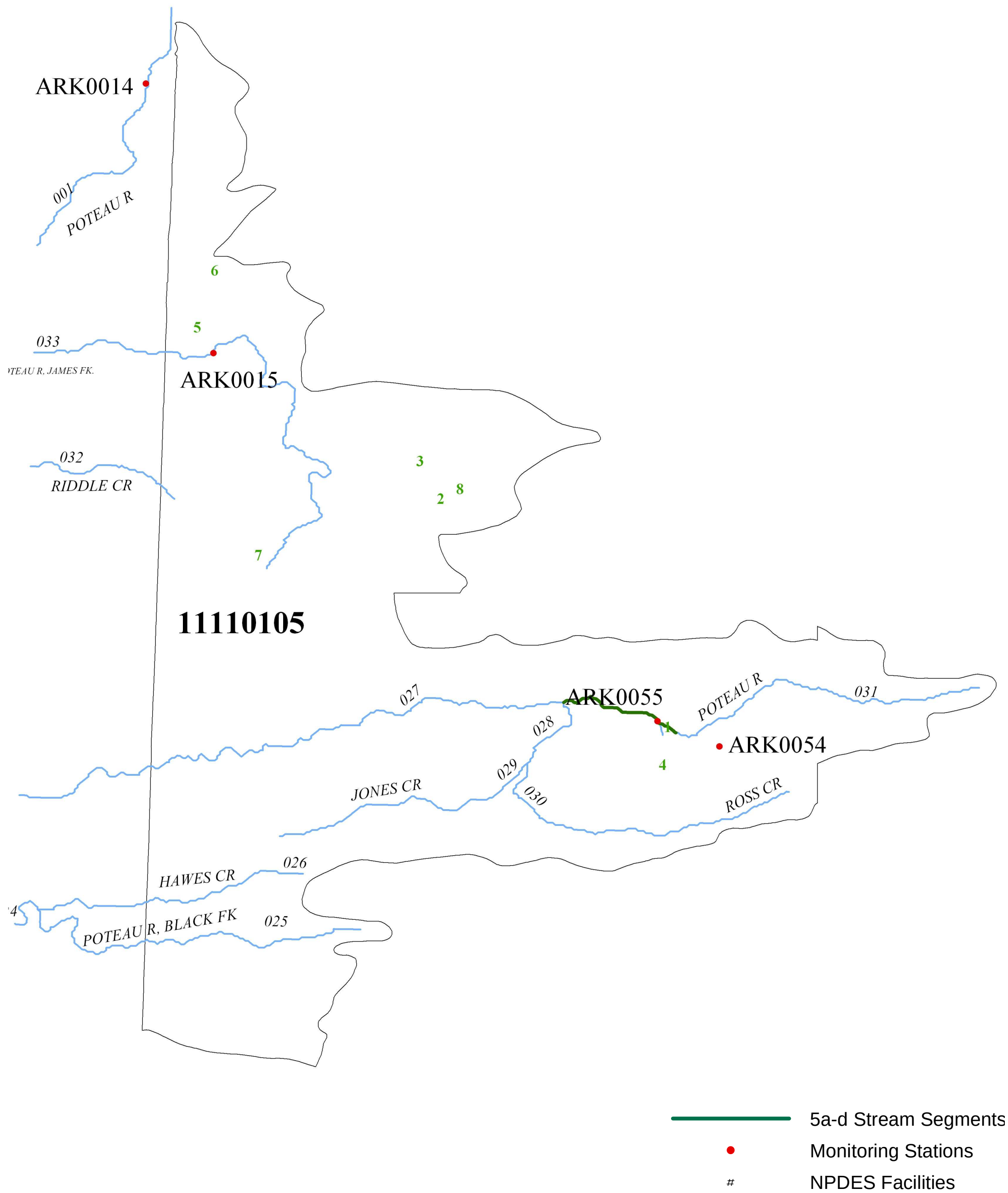
Segment 3I is located on the western edge of Arkansas, just south of the Arkansas River. This segment includes large portions of Scott and Sebastian Counties and a small part of northwestern Polk County. The waters of this segment include the Poteau River from its headwaters to the Oklahoma state line, as well as the tributary streams. Major tributaries include Jones Creek and James Fork.

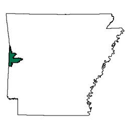
Summary of Water Quality Condition

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. This planning segment contains 105.3 stream miles. Five monitoring stations, including one operated by USGS, are located within this segment and were utilized to assess 55.8 stream miles. The remaining 49.5 miles were unassessed.

A short section of the Poteau River below Waldron was listed as not supporting aquatic life uses due to elevated metals and total phosphorus. Both a municipal and industrial discharge occurs in this segment. In addition, a short section of the Poteau River just above its confluence with the Arkansas River was listed as not supporting the aquatic life use because of excessive turbidity. A TMDL to address these issues was completed in 2006.

Figure A-22: Planning Segment 3I





(Segment 3I)

Table A-125: Planning Segment 3I—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-3I																										
Poteau River	11110105	-001	2.0	ARK0014	M	S	N	S	S	S	S	SE				SI				4a				FISH CONSUMPTION	55.8	0
Black Fork	11110105	-025	8.0		U															3				AQUATIC LIFE	47.2	8.6
Poteau River	11110105	-027	16.0	USGS	M	S	S	S	S	R	S									1				PRIMARY CONTACT	55.8	0
Hawes Creek	11110105	-026	11.6		U															3				SECONDARY CONTACT	55.8	0
Jones Creek	11110105	-028	4.0		U															3				DRINKING SUPPLY	33.2	0
Jones Creek	11110105	-029	11.6		U															3				AGRI & INDUSTRY	55.8	0
Ross Creek	11110105	-030	14.3		U															3						
Poteau River	11110105	-931	12.8	ARK0054	M	S	S	S	S	S	S									1						
Poteau River	11110105	-031	6.6	ARK0055	M	S	N	S	S	R	S	IP/MP				TP	Cu	Zn	MN	4a	4a	4a	5a			
James Fork	11110105	-033	18.4	ARK0015	M	S	S	S	S	S	S									1						
TOTAL MILES	105.3																									
MILES UNASSESSED	49.5																									
MILES EVALUATED	0.0																									
MILES MONITORED	55.8																									

This impairment is caused by a combination of a municipal and industrial point source discharges.

MN = CL, SO4, TDS

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0014	Poteau River near Fort Smith		1	A
ARK0054	Poteau River above Waldron	Y	1	A
ARK0055	Poteau River below Waldron	Y	1	A
ARK0015	James Fork near Hacket	Y	1	A

Table A-126: Segment 3I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0035769	Waldron, City Of	Trib, Poteau R, Arkansas R	11110105	1
AR0036293	Mansfield, City Of	Coop-Cherokee CR/Prairie CR	11110105	2
AR0037419	Huntington, City Of	Cherokee CR, Prairie CR, James Fork R	11110105	3
AR0038482	Tyson Foods Inc-Waldron	Poteau R Trib	11110105	4
AR0039781	Hackett, City Of	Big Branch Hackett CR, James Fork, Poteau R	11110105	5
AR0041165	Sebastian Lake Utility Co, Inc	Trib/Hackett CR/Big Branch	11110105	6
AR0044679	Hartford School Dist	Trib/West CR	11110105	7
AR0048232	Travis Lumber Co, Inc	Trib, Coop CR, Cherokee CR, James Fork	11110105	8

Table A-127: ARK0014 Poteau River Near Fort Smith, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.99	2.38	14.40	2.83
BOD_5 (mg/L)	53	2.42	0.69	8.96	1.96
pH (standard units)	60	7.27	5.72	9.02	0.47
Total Organic Carbon (mg/L)	59	5.54	3.50	7.55	0.99
Ammonia as N (mg/L)	61	0.04	0.01	0.21	0.04
NO_2 + NO_3 as N (mg/L)	60	0.33	0.01	1.43	0.29
Orthophosphate as P (mg/L)	60	0.03	0.01	0.14	0.02
Total Phosphorus as P (mg/L)	61	0.13	0.02	1.08	0.14
Total Hardness (mg/L)	23	45.70	25.00	85.00	17.30
Chloride (mg/L)	61	10.70	1.62	86.50	13.72
Sulfate (mg/L)	61	21.41	3.41	78.60	12.07
Total Dissolved Solids (mg/L)	60	126.43	38.50	298.00	54.15
Total Suspended Solids (mg/L)	59	26.86	1.50	134.00	19.97
Turbidity (NTU)	61	53.63	2.00	203.00	34.25

Table A-128: ARK0015 James Fork Near Hackett, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	7.91	2.84	13.30	2.67
BOD_5 (mg/L)	50	0.99	0.01	4.01	0.60
pH (standard units)	56	7.25	6.59	8.20	0.29
Total Organic Carbon (mg/L)	55	3.81	1.91	8.00	1.09
Ammonia as N (mg/L)	57	0.02	0.01	0.10	0.02
NO_2 + NO_3 as N (mg/L)	56	0.16	0.01	1.57	0.26
Orthophosphate as P (mg/L)	43	0.02	0.01	0.16	0.02
Total Phosphorus as P (mg/L)	57	0.08	0.01	1.60	0.21
Total Hardness (mg/L)	21	104.71	25.00	183.00	40.51
Chloride (mg/L)	57	9.39	2.89	39.40	7.09
Sulfate (mg/L)	57	54.94	9.55	97.80	20.26
Total Dissolved Solids (mg/L)	56	182.62	57.50	304.00	58.03
Total Suspended Solids (mg/L)	55	9.35	1.00	71.00	10.41
Turbidity (NTU)	57	18.39	4.40	80.00	13.76

Table A-129: ARK0054 Poteau River Upstream of Waldron, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	9.10	2.26	15.00	3.13
BOD_5 (mg/L)	44	1.59	0.03	5.43	1.07
pH (standard units)	50	7.23	4.00	8.39	0.60
Total Organic Carbon (mg/L)	49	5.85	2.83	13.40	2.40
Ammonia as N (mg/L)	51	0.01	0.01	0.10	0.02
NO_2 + NO_3 as N (mg/L)	50	0.54	0.01	20.80	2.93
Orthophosphate as P (mg/L)	46	0.02	0.01	0.23	0.03
Total Phosphorus as P (mg/L)	51	0.11	0.02	1.89	0.26
Total Hardness (mg/L)	18	39.56	25.00	66.00	13.67
Chloride (mg/L)	51	7.71	3.19	16.60	3.45
Sulfate (mg/L)	51	11.55	4.77	31.60	6.20
Total Dissolved Solids (mg/L)	50	85.50	47.50	152.00	27.80
Total Suspended Solids (mg/L)	49	4.90	1.00	26.50	5.64
Turbidity (NTU)	51	17.51	2.18	151.00	21.68

Table A-130: ARK0055 Poteau River Downstream of Waldron, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	7.56	3.06	14.21	2.88
BOD_5 (mg/L)	54	4.37	0.73	27.10	4.63
pH (standard units)	58	7.15	6.32	8.30	0.34
Total Organic Carbon (mg/L)	57	7.86	3.96	13.50	2.16
Ammonia as N (mg/L)	59	1.02	0.01	5.70	1.50
NO_2 + NO_3 as N (mg/L)	58	4.21	0.15	27.00	6.44
Orthophosphate as P (mg/L)	59	2.68	0.05	15.13	3.39
Total Phosphorus as P (mg/L)	59	3.09	0.09	22.89	4.30
Total Hardness (mg/L)	23	40.00	25.00	77.00	12.80
Chloride (mg/L)	58	61.95	3.92	181.00	44.11
Sulfate (mg/L)	59	65.15	0.04	172.00	43.32
Total Dissolved Solids (mg/L)	58	318.69	49.50	695.00	182.78
Total Suspended Solids (mg/L)	57	17.37	2.20	239.30	38.70
Turbidity (NTU)	59	15.39	3.99	61.70	11.97

SEGMENT 3J GRAND NEOSHO BASIN

Segment 3J occupies the northwestern corner of Arkansas, and covers most of Benton County and a large part of Washington County. This segment includes the Illinois River and its tributaries within Arkansas. The main tributaries are Osage Creek, Spavinaw Creek, Little Sugar Creek, Flint Creek, and Spring Creek.

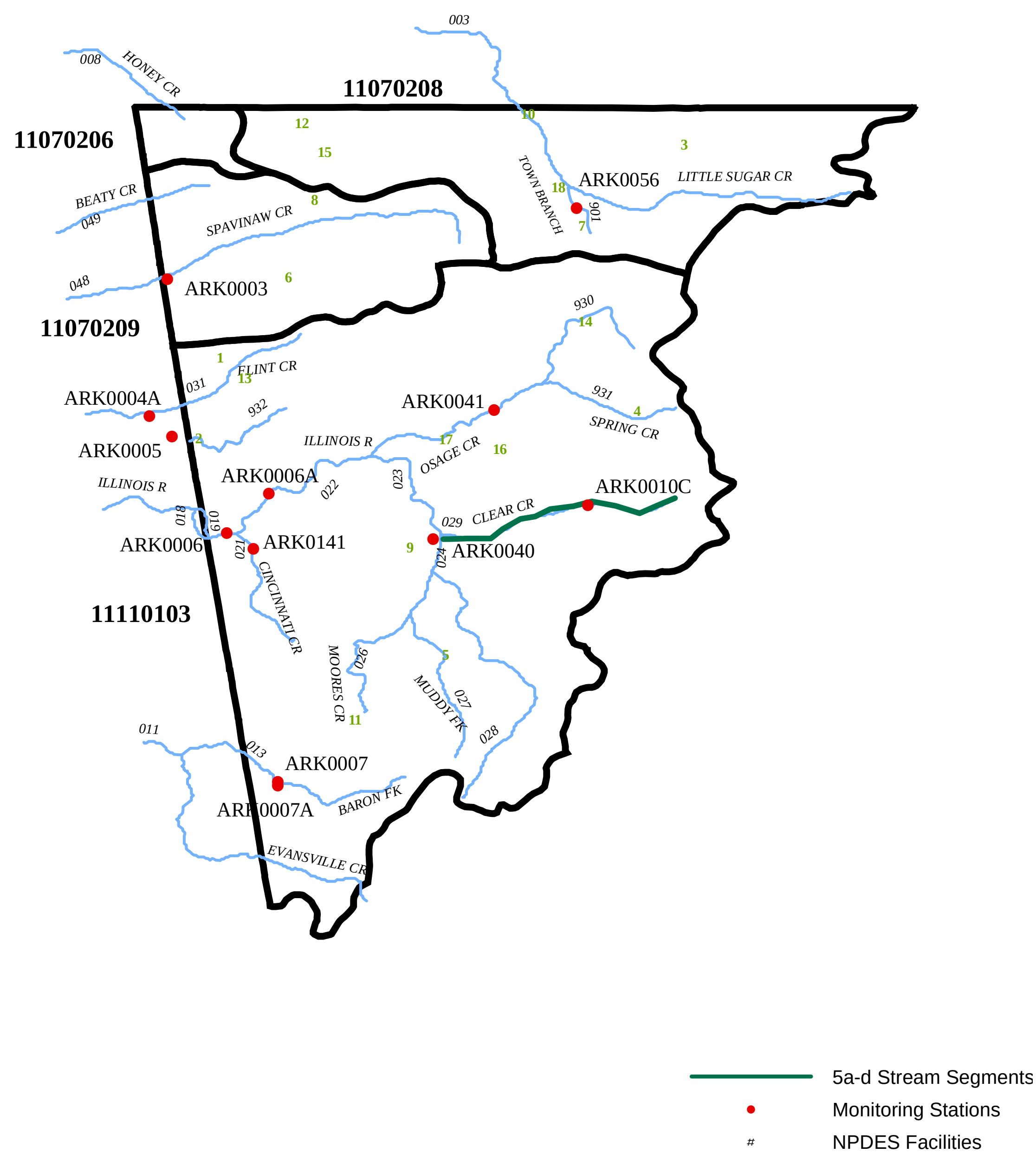
Summary of Water Quality Conditions

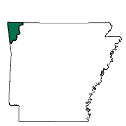
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. This segment contains 211.3 stream miles. Eleven permanent monitoring stations and several temporary stations in this planning segment were utilized to monitor 179.2 stream miles. An additional 17.9 stream miles were evaluated.

Nonpoint source impacts affecting waters in this segment are primarily from development and pasture land which generally recieves applications of poultry waste products. In addition, in stream gravel removal is destabilizing the streambed and causing excessive bank erosion. Road construction and maintenance is also contributing to siltation problems. Three major municipal, point source discharges enter the Illinois River via Osage Creek and Clear Creek, and a minor municipal discharge enters the Illinois River from Muddy Fork of the Illinois River. All four of these dischargers have voluntarily agreed to reduce the discharge phosphorus concentration to 1.0 mg/L.

A municipal point source discharge is impairing the aquatic life use in Town Branch Creek from excessive nutrient discharges. In addition, the drinking water use was listed as impaired in Sager Creek because of the municipal point source discharge. Both of these segments have been placed in Category 4b. Point source controls will be implemented to address these problems.

Figure A-23: Planning Segment 3J





(Segment 3J)

Table A-131: Planning Segment 3J—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-3J																							
Evansville Cr.	11110103	-012	9.0		U															3			
Baron Fork	11110103	-013	10.0	ARK0007A+	M	S	S	S	S	S	S									1			
Illinois River	11110103	-020	1.6	ARK0006	M	S	S	S	S	S	S									1			
Cincinnati Cr.	11110103	-021	9.0	ARK0141	M	S	S	S	S	S	S									1			
Illinois River	11110103	-022	10.8	ARK0006A	M	S	S	S	S	S	S									1			
Illinois River	11110103	-023	8.1		E	S	S	S	S	S	S									1			
Illinois River	11110103	-024	2.5	ARK0040	M	S	S	S	S	S	S									1			
Muddy Fork.	11110103	-025	3.2	MFI04+	M	S	S	S	S	S	S									1			
Moores Creek	11110103	-026	9.8		E	S	S	S	S	S	S									1			
Muddy Fork	11110103	-027	11.0	MFI02B+	M	S	S	S	S	S	S									1			
Illinois River	11110103	-028	19.9	ILL01	M	S	S	S	S	S	S									1			
Clear Creek	11110103	-029	13.5	ARK0010C	M	S	S	N	S	S	S	UR				PA				5d			
Osage Creek	11110103	-030	15.0	ARK0041	M	S	S	S	S	S	S									1			
Osage Creek	11110103	-930	10.2	OSC03+	M	S	S	S	S	S	S									1			
Spring Creek	11110103	-931	8.4	SPG03+	M	S	S	S	S	S	S									1			
Flint Creek	11110103	-031	9.6	ARK0004A	M	S	S	S	S	S	S									1			
Sager Creek	11110103	-932	8.0	ARK0005	M	S	S	S	S	N	S	MP				NO3				4b			
Spavinaw Cr.	11070209	-048	19.3	ARK0003	M	S	S	S	S	S	S									1			
Beaty Creek	11070209	-049	5.2		U															3			
Little Sugar	11070208	-003	24.2		M	S	S	S	S	S	S									1			
Town Branch	11070208	-901	3.0	ARK0056	M	S	S	S	S	S	S	MP				TP				4b			
TOTAL MILES	211.3																						
MILES UNASSESSED	14.2																						
MILES EVALUATED	17.9																						
MILES MONITORED	179.2																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	197.1	0
AQUATIC LIFE	197.1	0
PRIMARY CONTACT	183.6	13.5
SECONDARY CONTACT	197.1	0
DRINKING SUPPLY	189.1	8
AGRI & INDUSTRY	197.1	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0007A	Barren Fork at county road 11 near Dutch Mills	Y	1	A
ARK0007	Barren Fork at Highway 59 near Dutch Mills		2	A
ARK0006	Illinois River at Highway 59	Y	1	A
ARK0141	Cincinnati Creek at Highway 244		1	A
ARK0006A	Illinois River south of Siloam Springs		2	A
ARK0040	Illinois River near Savoy	Y	1	A
MFI04+	Muddy Fork Illinois River at Highway 156 north of Viney Grove		2	S
MFI02B+	Muddy Fork Illinois River on county road west of Viney Grove		2	S
ILL01	Illinois River east of Highway 156 north of Viney Grove		2	S
ARK0010C	Clear Creek below Fayetteville		1	A
ARK0041	Osage Creek near Elm Springs	Y	1	A
OSC03+	Osage Creek off of Highway 112 south of Cave Springs near Elm Springs		2	S
SPG03+	Spring Creek Highway 112 south of Cave Springs		2	S
ARK0004A	Flint Creek near Siloam Springs	Y	1	A
ARK0005	Sager Creek near Siloam Springs		1	A
ARK0003	Spavinaw Creek north of Cherokee	Y	1	A
ARK0056	Town Branch below Bentonville		1	A

Table A-132: Segment 3J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0020184	Gentry, City of	Swepco Lake, Lt Flint CR	11110103	1
AR0020273	Siloam Springs, City of	Sager CR/Flint CR/Illinois R	11110103	2
AR0020672	Pea Ridge, City of	Otter CR, Big Sugar CR, Elake R	11070208	3
AR0022063	Springdale, City of	Spring CR Osage CR, Illinois R	11110103	4
AR0022098	Prairie Grove, City of	Muddy Fork/Illinois R	11110103	5
AR0022292	Decatur, City of	Columbia Hollow CR, Spavinaw CR	11070209	6
AR0022403	Bentonville, City of	Town Branch, Little Sugar CR	11070208	7
AR0023833	Gravette, City of	RR Hollow/Spavinaw/Grand Neosho	11070209	8
AR0033910	USDAFS-Lake Wedington Rec Area	Illinois R Trib	11110103	9
AR0034258	Village Wastewater Co-North	Little Sugar CR	11070208	10
AR0034266	Village Wastewater Co, Inc	Little Sugar CR	11070208	18
AR0035246	Lincoln, City of	Bush CR Trib	11110103	11
AR0036480	Sulphur Springs, City of	Butler CR	11070208	12
AR0037842	Southwestern Electric Power Co	Swepco Reservoir, Little Flint CR, Flint CR	11110103	13
AR0043397	Rogers, City of	(1)Osage CR, Arkansas R-(2) “C” Lake Arkansas R	11110103	14
AR0046639	Benton County Stone Co, Inc	Butler CR Trib	11070208	15
AR0049824	Genova Arkansas I, LLC	Osage CR	11110103	16
AR0050024	Village Wastewater Co, Inc	Little Sugar CR	11070208	17

Table A-133: ARK0003 Spavinaw Creek N of Cherokee, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.64	6.82	14.50	1.82
BOD_5 (mg/L)	43	0.33	0.02	1.16	0.25
pH (standard units)	51	7.87	7.32	8.56	0.30
Total Organic Carbon (mg/L)	42	1.34	0.80	3.11	0.47
Ammonia as N (mg/L)	58	0.01	0.00	0.08	0.01
$NO_2 + NO_3$ as N (mg/L)	57	4.31	2.98	6.95	0.96
Orthophosphate as P (mg/L)	58	0.20	0.07	0.35	0.08
Total Phosphorus as P (mg/L)	58	0.20	0.02	0.43	0.08
Total Hardness (mg/L)	21	135.38	123.00	150.00	7.53
Chloride (mg/L)	58	13.16	6.10	18.60	3.14
Sulfate (mg/L)	57	7.87	6.01	14.50	1.66
Total Dissolved Solids (mg/L)	57	195.45	151.50	247.00	17.90
Total Suspended Solids (mg/L)	58	1.49	0.70	8.20	1.41
Turbidity (NTU)	58	1.71	0.20	8.64	1.79

Table A-134: ARK0004A Flint Creek NW of W. Siloam Springs, OK

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	9.94	6.59	14.40	2.21
BOD_5 (mg/L)	52	0.55	0.02	1.85	0.39
pH (standard units)	51	7.59	7.01	8.39	0.29
Total Organic Carbon (mg/L)	49	1.65	1.03	3.31	0.48
Ammonia as N (mg/L)	58	0.01	0.01	0.12	0.02
NO_2 + NO_3 as N (mg/L)	57	2.13	0.37	5.26	1.26
Orthophosphate as P (mg/L)	53	0.04	0.01	0.16	0.03
Total Phosphorus as P (mg/L)	58	0.05	0.02	0.21	0.04
Total Hardness (mg/L)	21	112.71	99.00	128.00	6.88
Chloride (mg/L)	58	10.67	6.04	14.60	1.72
Sulfate (mg/L)	57	19.65	8.09	38.70	6.44
Total Dissolved Solids (mg/L)	57	170.62	135.50	202.00	14.41
Total Suspended Solids (mg/L)	58	3.91	1.00	28.00	4.33
Turbidity (NTU)	58	4.32	0.70	24.90	4.63

Table A-135: ARK0005 Sager Creek Near Siloam Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.27	7.54	16.43	2.08
BOD_5 (mg/L)	56	0.80	0.12	3.02	0.63
pH (standard units)	51	7.70	6.52	8.93	0.43
Total Organic Carbon (mg/L)	54	3.11	1.76	8.85	1.10
Ammonia as N (mg/L)	58	0.02	0.01	0.22	0.04
NO_2 + NO_3 as N (mg/L)	57	7.85	2.30	13.90	2.60
Orthophosphate as P (mg/L)	58	1.08	0.24	2.18	0.51
Total Phosphorus as P (mg/L)	58	1.10	0.21	2.20	0.50
Total Hardness (mg/L)	21	137.43	119.00	164.00	9.96
Chloride (mg/L)	57	37.05	9.36	129.64	19.78
Sulfate (mg/L)	57	27.21	11.73	50.40	10.46
Total Dissolved Solids (mg/L)	57	270.98	163.50	416.00	58.28
Total Suspended Solids (mg/L)	58	5.82	1.00	166.00	21.70
Turbidity (NTU)	58	7.44	0.80	186.00	24.58

Table A-136: ARK0006 Illinois River S. of Siloam Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.00	6.61	14.70	2.22
BOD_5 (mg/L)	50	0.71	0.13	4.80	0.73
pH (standard units)	51	7.71	6.71	8.75	0.36
Total Organic Carbon (mg/L)	53	2.22	1.13	6.95	1.12
Ammonia as N (mg/L)	58	0.01	0.00	0.07	0.01
NO_2 + NO_3 as N (mg/L)	57	2.46	1.12	4.64	0.70
Orthophosphate as P (mg/L)	58	0.19	0.03	0.55	0.12
Total Phosphorus as P (mg/L)	58	0.22	0.02	0.62	0.13
Total Hardness (mg/L)	22	120.91	72.00	138.00	15.27
Chloride (mg/L)	58	16.27	5.36	28.50	5.71
Sulfate (mg/L)	57	16.10	8.04	28.29	4.79
Total Dissolved Solids (mg/L)	57	193.47	122.50	251.00	26.63
Total Suspended Solids (mg/L)	58	16.37	1.00	226.00	36.63
Turbidity (NTU)	58	19.11	0.85	228.00	42.72

Table A-137: ARK0007A Baron Fork on County Road 21 Near Dutch Mills

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	12.18	3.20	18.17	2.98
BOD_5 (mg/L)	45	0.97	0.22	2.84	0.54
pH (standard units)	44	8.07	6.56	9.47	0.56
Total Organic Carbon (mg/L)	47	3.04	1.55	7.18	1.24
Ammonia as N (mg/L)	51	0.01	0.00	0.08	0.02
NO_2 + NO_3 as N (mg/L)	50	2.15	0.25	5.98	1.29
Orthophosphate as P (mg/L)	51	0.07	0.01	0.28	0.05
Total Phosphorus as P (mg/L)	51	0.09	0.02	0.33	0.06
Total Hardness (mg/L)	20	140.75	110.00	174.00	16.86
Chloride (mg/L)	51	9.85	3.08	20.10	3.60
Sulfate (mg/L)	50	18.31	8.90	26.60	4.07
Total Dissolved Solids (mg/L)	50	187.67	112.00	238.00	27.47
Total Suspended Solids (mg/L)	51	3.86	1.00	41.00	6.22
Turbidity (NTU)	51	6.95	0.60	54.00	10.20

Table A-138: ARK0010C Clear Creek at Hwy 112 Bridge

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	10.11	6.77	15.30	2.09
BOD_5 (mg/L)	48	0.85	0.14	2.55	0.51
pH (standard units)	48	7.69	6.20	8.38	0.40
Total Organic Carbon (mg/L)	49	3.29	1.44	4.82	0.64
Ammonia as N (mg/L)	53	0.05	0.01	1.24	0.17
NO_2 + NO_3 as N (mg/L)	52	2.70	1.26	5.39	0.98
Orthophosphate as P (mg/L)	52	0.05	0.01	0.21	0.04
Total Phosphorus as P (mg/L)	52	0.07	0.02	0.21	0.04
Total Hardness (mg/L)	20	137.95	25.00	158.00	28.76
Chloride (mg/L)	53	19.43	5.70	42.90	9.60
Sulfate (mg/L)	52	38.54	9.31	92.50	17.91
Total Dissolved Solids (mg/L)	52	246.91	156.50	376.00	52.81
Total Suspended Solids (mg/L)	53	3.95	1.00	16.20	3.30
Turbidity (NTU)	53	6.66	1.60	33.90	6.63

Table A-139: ARK0040 Illinois River Near Savoy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	10.09	5.78	14.70	2.37
BOD_5 (mg/L)	49	1.01	0.24	3.41	0.72
pH (standard units)	49	7.73	6.79	8.77	0.37
Total Organic Carbon (mg/L)	51	2.96	1.49	8.04	1.33
Ammonia as N (mg/L)	55	0.02	0.01	0.19	0.03
NO_2 + NO_3 as N (mg/L)	55	1.91	0.43	3.86	0.80
Orthophosphate as P (mg/L)	55	0.06	0.01	0.32	0.05
Total Phosphorus as P (mg/L)	56	0.10	0.02	0.55	0.10
Total Hardness (mg/L)	20	119.45	70.00	152.00	19.69
Chloride (mg/L)	56	8.17	0.49	12.80	2.16
Sulfate (mg/L)	55	11.12	1.12	19.30	3.70
Total Dissolved Solids (mg/L)	55	166.91	98.50	204.00	25.76
Total Suspended Solids (mg/L)	56	10.42	1.00	86.40	14.84
Turbidity (NTU)	56	14.02	1.50	137.00	21.17

Table A-140: ARK0041 Osage Creek Near Elm Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	10.38	6.72	18.10	2.50
BOD_5 (mg/L)	52	0.71	0.14	2.00	0.44
pH (standard units)	52	7.79	6.04	8.99	0.53
Total Organic Carbon (mg/L)	54	2.67	1.62	4.67	0.64
Ammonia as N (mg/L)	58	0.01	0.01	0.15	0.02
$NO_2 + NO_3$ as N (mg/L)	57	3.82	0.02	6.30	1.03
Orthophosphate as P (mg/L)	57	0.65	0.01	3.40	0.67
Total Phosphorus as P (mg/L)	58	0.73	0.03	4.86	0.82
Total Hardness (mg/L)	22	124.50	25.00	147.00	25.05
Chloride (mg/L)	58	25.70	3.07	39.30	9.25
Sulfate (mg/L)	57	23.91	2.18	42.30	9.02
Total Dissolved Solids (mg/L)	57	239.67	35.00	303.00	45.90
Total Suspended Solids (mg/L)	58	6.54	1.00	29.50	7.15
Turbidity (NTU)	58	7.97	1.00	59.20	10.71

Table A-141: ARK0056 Little Sugar Creek Tributary Downstream of Bentonville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	8.71	5.73	14.80	1.77
BOD_5 (mg/L)	56	1.00	0.11	11.58	1.69
pH (standard units)	52	7.52	6.57	8.62	0.34
Total Organic Carbon (mg/L)	55	3.90	1.09	6.21	1.02
Ammonia as N (mg/L)	59	0.09	0.01	2.19	0.34
$NO_2 + NO_3$ as N (mg/L)	58	4.87	1.79	11.32	2.37
Orthophosphate as P (mg/L)	59	2.79	0.12	10.75	1.67
Total Phosphorus as P (mg/L)	59	2.68	0.12	5.75	1.41
Total Hardness (mg/L)	21	134.38	111.00	154.00	10.12
Chloride (mg/L)	59	33.42	8.89	54.20	11.08
Sulfate (mg/L)	58	33.25	8.36	51.80	9.85
Total Dissolved Solids (mg/L)	58	283.05	181.00	358.00	39.53
Total Suspended Solids (mg/L)	59	10.97	1.00	507.00	65.72
Turbidity (NTU)	59	9.46	0.90	363.00	46.88

SEGMENT 4A LOWER WHITE RIVER AND TRIBUTARIES

Segment 4A, located on the east central edge of Arkansas, includes most of the drainage from Monroe and Phillips Counties. It also includes parts of Arkansas, Prairie, Woodruff, St. Francis and Lee counties. This segment is drained by the lower 133-mile reach of the White River from Wattensaw Bayou to its mouth. Principal tributaries include Big Creek, La Grue Bayou, Lick Creek, and Cypress Bayou.

Summary of Water Quality Conditions

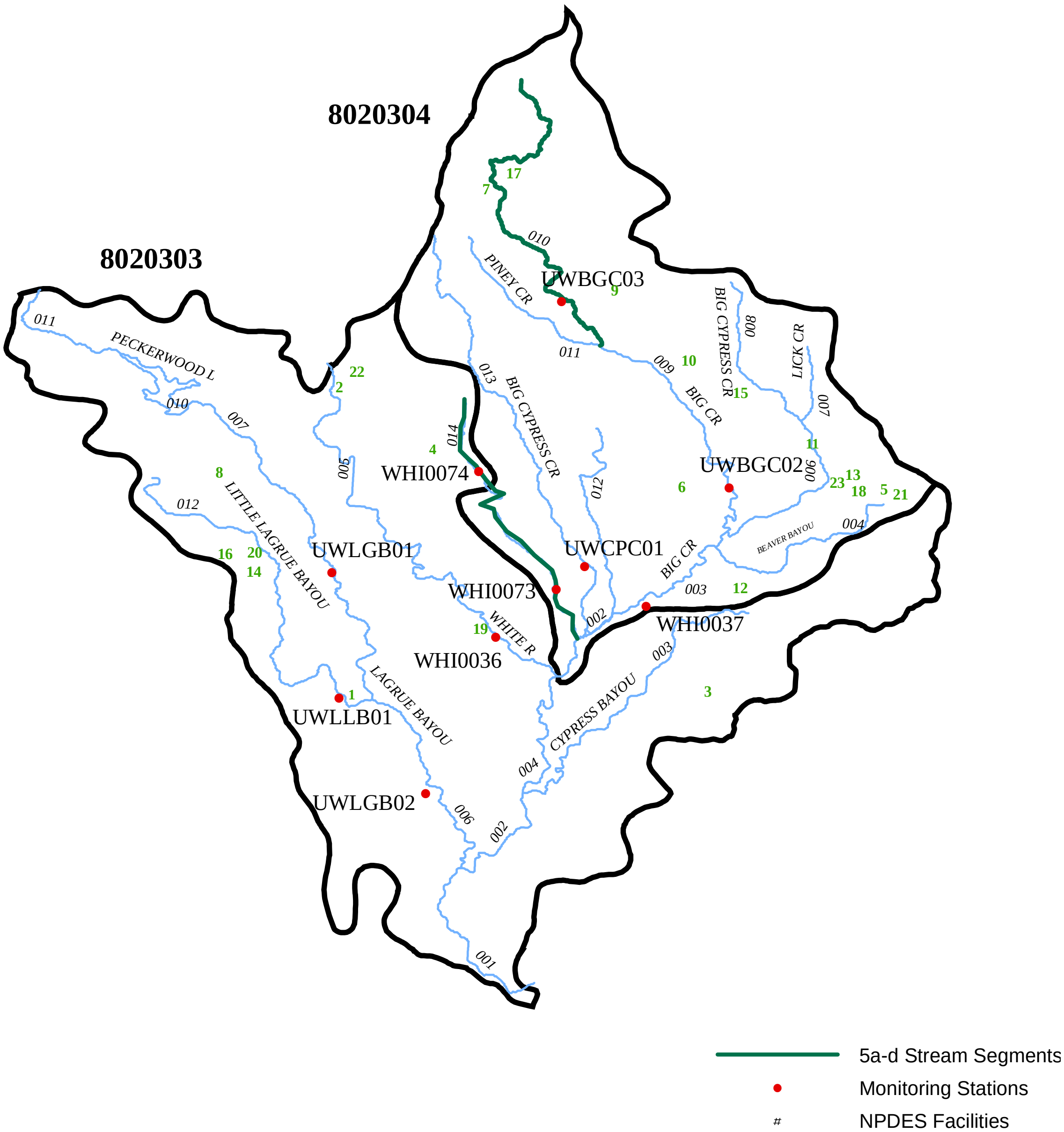
All waters within this segment have been designated for propagation of fish and wildlife, primary and secondary contact recreation, and domestic, agricultural, and industrial water supply. None are designated as outstanding state or national resource waters. Monitoring stations within the segment allowed the assessment of 283.6 miles; an additional 120.3 miles were evaluated.

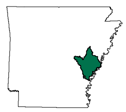
A segment of Big Creek was listed as not supporting the agriculture and industrial water supply use because of excessive chlorides and total dissolved solids concentrations. The source is suspected to be from row crop agriculture activities.

Prairie Cypress Creek was listed as not supporting the aquatic life use because of lead toxicity. Additional sampling and investigation is necessary to confirm this listing.

Prairie Cypress Creek and Boat Gunwale Slash were both listed because of low dissolved oxygen concentrations. This is a naturally occurring problem throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated.

Figure A-24: Planning Segment 4A





(Segment 4A)

Table A-142: Planning Segment 4A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS			
												1	2	3	4	1	2	3	4	1	2	3	4
SEG-4A																							
White River	8020303	-001	16.2		E	S	S	S	S	S	S									1			
White River	8020303	-002	11.3		E	S	S	S	S	S	S									1			
Cypress Bayou	8020303	-003	30.0		U															3			
White River	8020303	-004	14.8		E	S	S	S	S	S	S									1			
White River	8020303	-005	46.6	WHI0036	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-006	20.1	UWLGB02	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-007	36.1	UWLGB01	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-011	11.7		U															3			
L.La Grue Bayou	8020303	-012	37.0	UWLLB01	M	S	S	S	S	S	S									1			
Big Creek	8020304	-001	4.1		E	S	S	S	S	S	S									1			
Big Creek	8020304	-002	2.7		E	S	S	S	S	S	S									1			
Big Creek	8020304	-003	12.4	WHI0037	M	S	S	S	S	S	S									1			
Beaver Bayou	8020304	-004	17.4		E	S	S	S	S	S	S									1			
Big Creek	8020304	-005	1.7		E	S	S	S	S	S	S									1			
Lick Creek	8020304	-006	15.5		E	S	S	S	S	S	S									1			
Lick Creek	8020304	-007	6.8		E	S	S	S	S	S	S									1			
Big Cypress Cr.	8020304	-008	14.9		E	S	S	S	S	S	S									1			
Big Creek	8020304	-009	25.2	UWBGC02	M	S	S	S	S	S	S									1			
Big Creek	8020304	-010	34.3	UWBGC03	M	S	S	S	S	S	N	AG	AG			Cl	TDS			5d	5d		
Piney Creek	8020304	-011	14.9		E	S	S	S	S	S	S									1			
Little Cypress	8020304	-012	19.3		U															3			
Big Cypress Cr.	8020304	-013	40.8	UWCPC01	M	S	S	S	S	S	S									1			
Prairie Cypress	8020304	-014	26.1	WHI0073	M	S	N	S	S	S	S	AG	AG			DO	Pb			4c	5d		
Big Creek	8020304	-015	1.2		U															3			
Boat Gunwale Slash	8020304	-914	5.0	WHI0074	M	S	N	S	S	S	S	AG				DO				4c			

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	403.9	0
AQUATIC LIFE	372.8	31.1
PRIMARY CONTACT	403.9	0
SECONDARY CONTACT	403.9	0
DRINKING SUPPLY	403.9	0
AGRI & INDUSTRY	403.9	34.3

TOTAL MILES	466.1
MILES UNASSESSED	62.2
MILES EVALUATED	120.3
MILES MONITORED	283.6

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0036	White River at Highway 1 near St. Charles	Y	1	A
UWLGB02	LaGrue Bayou at Highway 17 at LaGrue Springs		1	R
UWLGB01	LaGrue Bayou at Highway 33 near LaGrue		1	R
UWLLB01	Little LaGrue Bayou at Highway 1 near Dewitt		2	R
WHI0037	Big Creek at Highway 318 near Watkins Corner		1	R
UWBGC02	Big Creek at Highway 49 near Poplar Bluff		1	R
UWBGC03	Big Creek at Highway 79, 3 miles west of Moro		1	R
UWCPC01	Big Cypress Creek at Highway 1, 4 miles northeast of Cross Roads		1	R
WHI0073	Prairie Cypress Creek at Highway 1 near Cross Roads		1	A
WHI0074	Boat Gunwale Slash at Highway 146 near Holly Grove		1	A

Table A-143: Segment 4A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000418	Hoffinger Industries	Ditch/Lick-Crooked-Big CRs/White RB	8020304	21
AR0021431	Dewitt, City of	Conf/Big & Little Lagrue Bayou, White R	8020303	1
AR0021644	Clarendon, City of	White R	8020303	2
AR0022420	Elaine, City of	Govan Slough/Gauzley/Cypressbayou	8020303	3
AR0022438	Holly Grove, City of	Dial CR/Cut Bluff Sl/White R	8020303	4
AR0022756	Helena Chemical Co-Phillips	Ditch, CR	8020304	5
AR0034851	Baird Mfg, Inc	Mill Bayou Trib	8020303	22
AR0035840	Marvell, City of	Big CR/White R	8020304	6
AR0036315	Wheatley, City of	Flat Fork CR/Big CR/White R	8020304	7
AR0038008	Ulm, City of	Trib/Sherril CR/Lagrue Bayou	8020303	8
AR0038237	Moro, City of	Hog Tusk CR, Big CR	8020304	9
AR0038784	Aubrey, City of	Ditch/Trib/Cat CR/Spring CR/White R	8020304	10
AR0041092	Lexa, City of	Lick CR	8020304	11
AR0041327	Lake View, City of	Johnson Bayou/Big CR/White R	8020304	12
AR0042404	Southland Improvement Dist	Crooked, Lick & Big CRs/White R	8020304	13
AR0044415	U Of A Rice Research & Ext Ctr	Little Lagrue Bayou	8020303	14
AR0045373	Rondo, City of	Ditch, Big Cypress CR, Lick CR	8020304	15
AR0046469	Monsanto Ag Research	Wildcat Ditch Trib, Little Lagrue Bayou	8020303	16
AR0046752	Mapco Express, Inc-3154 Wheatley	Trib, Flat Fork CR	8020303	17
AR0048534	P.E. Barnes & Sons, Ltd	Trib	8020304	18
AR0048666	Brown’s Equip & Rental-Wycamp	Trib, Lick CR, Big CR, White R	8020303	23
AR0049310	St Charles, City of	White R	8020303	19
AR0049352	USDA-Aquaculture Research Cent	27 Acre RSRR, Little Lagrue Bayou, White R	8020303	20

Table A-144: WHI0036 White River at St. Charles, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.45	5.30	12.20	1.51
BOD_5 (mg/L)	53	1.32	0.44	4.12	0.61
pH (standard units)	56	7.70	6.35	8.60	0.54
Total Organic Carbon (mg/L)	52	4.12	1.52	8.24	1.68
Ammonia as N (mg/L)	57	0.01	0.01	0.11	0.02
$NO_2 + NO_3$ as N (mg/L)	57	0.14	0.01	0.30	0.10
Orthophosphate as P (mg/L)	53	0.04	0.01	0.17	0.04
Total Phosphorus as P (mg/L)	55	0.10	0.03	0.35	0.06
Total Hardness (mg/L)	21	120.05	64.00	165.00	28.58
Chloride (mg/L)	58	12.14	2.17	204.00	31.53
Sulfate (mg/L)	58	8.90	3.12	61.00	10.42
Total Dissolved Solids (mg/L)	57	157.42	64.00	437.00	59.65
Total Suspended Solids (mg/L)	57	34.85	2.50	142.10	25.25
Turbidity (NTU)	58	35.48	8.27	148.00	26.25

Table A-145: WHI0073 Prairie Cypress Creek at Hwy 1

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	45	5.95	1.10	11.50	2.19
BOD_5 (mg/L)	42	2.50	0.54	6.38	1.69
pH (standard units)	45	6.94	5.33	7.98	0.59
Total Organic Carbon (mg/L)	41	13.05	5.31	24.92	4.56
Ammonia as N (mg/L)	44	0.19	0.01	4.77	0.73
$NO_2 + NO_3$ as N (mg/L)	44	0.06	0.01	0.40	0.09
Orthophosphate as P (mg/L)	43	0.10	0.01	0.32	0.07
Total Phosphorus as P (mg/L)	43	0.24	0.04	0.74	0.17
Total Hardness (mg/L)	17	47.82	25.00	96.00	23.84
Chloride (mg/L)	45	4.59	1.21	17.50	3.60
Sulfate (mg/L)	45	3.75	0.64	26.00	4.75
Total Dissolved Solids (mg/L)	44	106.66	5.00	217.00	42.47
Total Suspended Solids (mg/L)	44	8.60	1.00	65.00	10.66
Turbidity (NTU)	45	20.68	1.70	200.00	33.21

Table A-146: WHI0074 Boat Gunwale Slash at Hwy 146

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	47	5.10	0.52	12.10	2.88
BOD_5 (mg/L)	43	1.86	0.49	5.10	1.18
pH (standard units)	47	7.01	5.39	8.10	0.57
Total Organic Carbon (mg/L)	43	9.03	2.64	27.70	3.62
Ammonia as N (mg/L)	46	0.03	0.01	0.17	0.04
NO_2 + NO_3 as N (mg/L)	46	0.04	0.01	0.33	0.06
Orthophosphate as P (mg/L)	46	0.07	0.01	0.30	0.05
Total Phosphorus as P (mg/L)	45	0.17	0.02	0.93	0.14
Total Hardness (mg/L)	18	76.28	25.00	183.00	54.98
Chloride (mg/L)	47	6.05	1.18	16.30	4.11
Sulfate (mg/L)	47	4.68	1.00	17.30	3.09
Total Dissolved Solids (mg/L)	46	116.60	58.50	272.00	55.59
Total Suspended Solids (mg/L)	46	8.06	1.00	84.00	13.72
Turbidity (NTU)	47	15.34	1.20	69.00	16.83

SEGMENT 4B BAYOU DEVIEW AND CACHE RIVER

Segment 4B, located in the northeastern part of Arkansas, is a long, narrow segment that includes parts of Greene, Craighead, Poinsett, Jackson, Woodruff, Monroe, Prairie, Lawrence, and Clay counties. The segment includes Bayou DeView and Cache River and their major tributaries including Cow Ditch, Buffalo Creek and Flag Slough.

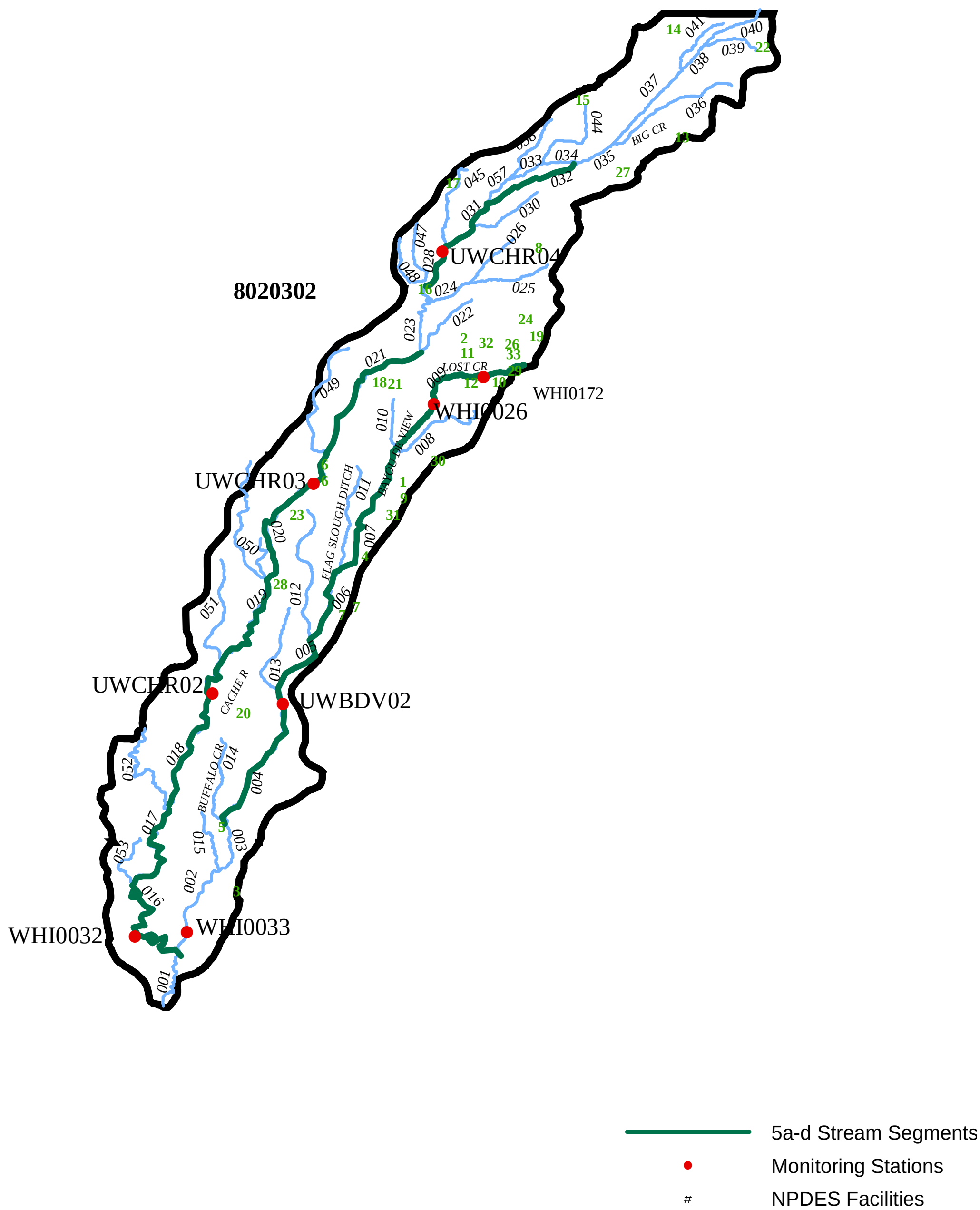
Summary of Water Quality Conditions

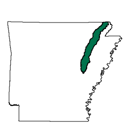
The 599.1 miles of streams in this segment are designated for propagation of fish and wildlife, primary and secondary contact recreation, and domestic, agricultural, and industrial water supplies. None of these are designated as outstanding state or national resource waters. Water sampling stations allowed for the monitoring of 129.8 stream miles in this segment. An additional 114.6 miles of this stream were evaluated.

The upper section of Bayou DeView and Lost Creek Ditch are not meeting the aquatic life use because of toxic metals (aluminum, beryllium, copper, lead, and zinc). In addition, elevated levels of chlorides and total dissolved solids are also listed as causes. Potential sources include an industrial point source discharge and row crop agriculture activities.

Several segments of the Cache River have been listed because of lead contamination. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the River. Additional investigation is needed to more accurately assess this problem.

Figure A-25: Planning Segment 4B





(Segment 4B)

Table A-147: Planning Segment 4B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-4B																							
Cache River	8020302	-001	8.6		U															3			
Bayou DeView	8020302	-002	13.7	WHI0033	M	S	S	S	S	S	S									1			
Bayou DeView	8020302	-003	7.1		E	S	S	S	S	S	S									1			
Bayou DeView	8020302	-004	21.2	UWBDV02	M	S	N	S	S	S	S	AG				Pb				5d			
Bayou DeView	8020302	-005	8.6		E	S	N	S	S	S	S	AG				Pb				5d			
Bayou DeView	8020302	-006	10.2		E	S	N	S	S	S	S	AG				Pb				5d			
Bayou DeView	8020302	-007	18.2		E	S	N	S	S	S	S	AG				Pb				5d			
Lost Creek Ditch	8020302	-009U	7.9	WHI0172	M	S	N	S	S	S	S	IP	IP	IP	IP	Cu	Pb	Zn	Be	5d	5d	5d	5d
Bayou DeView	8020302	-009L	11.7	WHI0026	M	S	N	S	S	S	S	AG	MP	MP		TDS	CL	ME*		5a	5a	5d	
Black Creek	8020302	-008	13.0		U															3			
Johnson Ditch	8020302	-010	6.5		U															3			
Flag Slough	8020302	-011	14.7		U															3			
Cow Ditch	8020302	-012	19.2		U															3			
May Br. Lateral	8020302	-013	12.6		U															3			
Buffalo Creek	8020302	-014	13.1		U															3			
Gum Flat	8020302	-015	8.8		U															3			
Cache River	8020302	-016	21.8	WHI0032	M	S	N	S	S	S	S	AG				Pb				5d			
Cache River	8020302	-017	15.8		E	S	N	S	S	S	S	AG				Pb				5d			
Cache River	8020302	-018	25.0	UWCHR02	M	S	N	S	S	S	S	AG				Pb				5d			
Cache River	8020302	-019	13.7		E	S	N	S	S	S	S	AG				Pb				5d			
Cache River	8020302	-020	22.6	UWCHR03	M	S	N	S	S	S	S	AG				Pb				5d			
Cache River	8020302	-021	18.4		E	S	N	S	S	S	S	AG				Pb				5d			
Gum Slough	8020302	-022	9.5		U															3			
Cache River	8020302	-023	7.9		U															3			
Ditch 26	8020302	-024	5.4		U															3			
Poplar Creek	8020302	-025	9.2		U															3			
Ditch 26	8020302	-026	7.8		U															3			
Cache River	8020302	-027	3.9		E	S	N	S	S	S	S	AG	AG	AG		SI	Pb	TDS		4a	5d	5d	
Cache River	8020302	-028	5.9	UWCHR04	M	S	N	S	S	S	S	AG	AG	AG		SI	Pb	TDS		4a	5d	5d	
Cache River	8020302	-029	3.9		E	S	N	S	S	S	S	AG	AG	AG		SI	Pb	TDS		4a	5d	5d	
Swan Ditch	8020302	-030	9.1		U															3			
Cache River	8020302	-031	3.4		E	S	N	S	S	S	S	AG	AG	AG		SI	Pb	TDS		4a	5d	5d	
Cache River	8020302	-032	11.4		E	S	N	S	S	S	S	AG	AG	AG		SI	Pb	TDS		4a	5d	5d	
Cache River	8020302	-033	4.3		U															3			
Cache River	8020302	-034	3.7		U															3			
Cache River	8020302	-035	4.6		U															3			
Big Creek	8020302	-036	16.2		U															3			
Cache River	8020302	-037	12.3		U															3			
Little Cache	8020302	-038	4.4		U															3			
Housman Creek	8020302	-039	6.7		U															3			
Little Cache	8020302	-040	8.1		U															3			
Cache River	8020302	-041	8.7		U															3			
Big Gum Lateral	8020302	-044	11.2		U															3			
Beaver Dam Cr.	8020302	-045	11.8		U															3			
Kello Ditch	8020302	-046	0.6		U															3			
Kello Ditch	8020302	-047	8.5		U															3			
Fry Ditch	8020302	-048	8.0		U															3			
Willow Ditch	8020302	-049	17.6		U															3			
Locust Creek	8020302	-050	18.8		U															3			
Overcup Creek	8020302	-051	15.7		U															3			
Cache Bayou	8020302	-052	18.7		U															3			
Hill Bayou	8020302	-053	8.1		U															3			
Locust Bayou	8020302	-055	0.4		U															3			
Cypress Creek	8020302	-056	6.5		U															3			
Cache River	8020302	-057	4.7		U															3			
Petersburg Ditch	8020302	-058	9.7		U															3			
TOTAL MILES	599.1																						
MILES UNASSESSED	354.7																						
MILES EVALUATED	114.6																						
MILES MONITORED	129.8																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	244.4	0
AQUATIC LIFE	20.8	223.6
PRIMARY CONTACT	244.4	0
SECONDARY CONTACT	244.4	0
DRINKING SUPPLY	244.4	0
AGRI & INDUSTRY	244.4	0

ME* Metals include AL, Cu, Pb, and Zn.

Table A-147 continued: Planning Segment 4B—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0033	Bayou DeView at Highway 70 near Brinkley		1	R
UWBDV02	Bayou DeView at Highway 64 east of McCrory		1	R
WHI0172	Lost Creek Ditch at Lacy Drive near Jonesboro		1	A
WHI0026	Bayou DeView on Highway 226 west of Gibson	Y	1	A
WHI0032	Cache River at Highway 70 near Brinkley		1	R
UWCHR02	Cache River at Highway 64 at Peterson		1	R
UWCHR03	Cache River at Highway 18 near Gruggs		1	R
UWCHR04	Cache River at Highway 412 east of Walnut Ridge		1	R

Table A-148: Segment 4B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000175	Gen Electric Co-Jonesboro	Christian CR/Lost CR...Cache R	8020302	29
AR0020354	Weiner, City of	Bayou Deview Trib	8020302	1
AR0020699	Bono, City of	Trib/Whaley Slough DT/Cache R	8020302	2
AR0021890	Brinkley, City Of	Caney Slash/Bayou Deview	8020302	3
AR0022446	Fisher, City of	Trib/Bayou Deview	8020302	4
AR0033391	Cotton Plant, City of	Turkey CR, Ditch, Bayou Deview, Cache R	8020302	5
AR0034614	Grubbs, Town of	Cache R	8020302	6
AR0034720	Hickory River	Bayou De View	8020302	7
AR0035947	AR Parks & Tourism-Crowley’s	Ditch, Big Ditch, Cache, White R	8020302	8
AR0037834	ADM-Riceland Partnership-Walde	Ditch, Bayou Deview	8020302	9
AR0037907	Jonesboro City Water & Light-W	Big CR Trib, Deview Bayou Trib	8020302	10
AR0038351	ADM-Riceland Partnership-Otwel	Trib, Big CR Ltrl #1	8020302	30
AR0041629	Westside Consol School Dist #5	Trib, Big CR Ditch, Bayou Deview, R	8020302	11
AR0042188	Northern MHP	Trib, Big CR, Cache R	8020302	12
AR0042552	Tri-County Sand & Gravel, Inc	Dort CR, Cache R Ditch #10, Cache R	8020302	13
AR0042781	Mcdougal, City of	Little Cache R Trib, White R	8020302	14
AR0043290	Knobel, Town of	Trib/Cache R	8020302	15
AR0043443	Sedgwick, City of	West Cache R Ditch/Cache R	8020302	16
AR0043486	Tri-City Utilities, Inc	Trib, Beaver Dam Ditch	8020302	17
AR0043524	Egypt, City of	Cache R/White R	8020302	18
AR0043605	Waldenburg, City of	Trib/Bayou Deview/Cache R	8020302	31
AR0044211	Olivetan Benedictine Sisters,	Trib/Lost CR/Big CR Ditch	8020302	19
AR0044954	Mccrory, City of	Cache R/White R	8020302	20
AR0045284	Cash, City of	Trib/Cache R	8020302	21
AR0045489	Pollard, City of	Pollard CR, Ditch #2,Ditch #1	8020302	22
AR0046604	Amagon, City of	Cache R Trib, White R	8020302	23
AR0046981	Hedger Aggregate, Inc.	Trib-Mud CR/Big & Lost CR Ditch	8020302	24
AR0047589	Biscoe, City of	White R	8020302	25
AR0048208	Best Petroleum Plus, Inc	Davis Branch	8020302	32
AR0048402	LMJ Trailer Park	Big CR Ditch Trib, White R	8020302	26
AR0048771	Williams MHP	Lost CR Trib	8020302	33
AR0048909	Lafe, City of	Big CR	8020302	27
AR0049603	Beedeville, City of	Cache R, White R, Arkansas R	8020302	28

Table A-149: WHI0026 Bayou DeView W. of Gibson, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	7.13	3.65	12.20	1.96
BOD_5 (mg/L)	55	2.94	0.21	7.53	1.38
pH (standard units)	58	7.55	6.35	8.97	0.59
Total Organic Carbon (mg/L)	54	8.11	1.76	13.00	2.11
Ammonia as N (mg/L)	58	0.10	0.01	1.10	0.18
NO_2 + NO_3 as N (mg/L)	57	0.93	0.05	3.03	0.73
Orthophosphate as P (mg/L)	58	0.82	0.01	3.36	0.86
Total Phosphorus as P (mg/L)	58	0.96	0.02	3.46	0.86
Total Hardness (mg/L)	22	68.73	25.00	278.00	63.32
Chloride (mg/L)	58	15.98	2.32	53.00	10.93
Sulfate (mg/L)	58	13.41	3.80	36.70	7.85
Total Dissolved Solids (mg/L)	57	187.32	99.50	421.00	75.00
Total Suspended Solids (mg/L)	57	54.13	2.80	441.00	91.17
Turbidity (NTU)	58	72.52	5.10	455.00	88.52

SEGMENT 4C VILLAGE CREEK AND TRIBUTARIES

Segment 4C includes portions of Lawrence, Jackson, Woodruff and White counties. This segment includes Village Creek and its tributaries and a segment of the White River, including the Departee and Glaise Creeks.

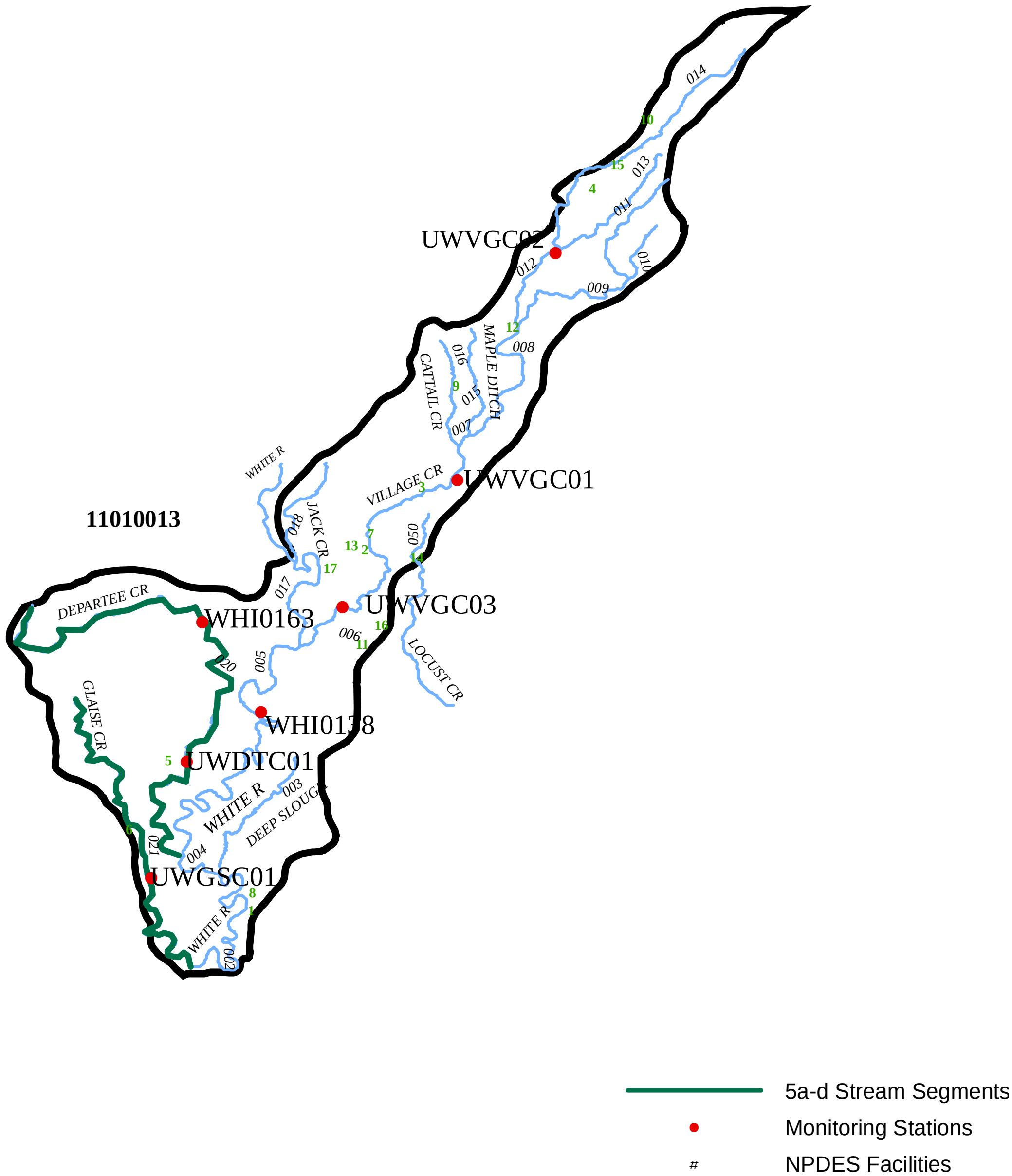
Summary of Water Quality Conditions

Propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supply are the designated uses for all waters within this segment. Assessment of designated use support was made on 208.5 miles of the total of 285 miles of stream within this segment.

Three segments of Village Creek were listed because of low dissolved oxygen concentrations. This is a naturally occurring problem throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated

One segment of Departee Creek and one segment of Glaise Creek were listed as not supporting the aquatic life use because of zinc toxicity. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the streams. Additional investigation is needed to more accurately assess this problem.

Figure A-26: Planning Segment 4C



(Segment 4C)

Table A-150: Planning Segment 4C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-4C																							
White River	11010013	-001	0.8		E	S	S	S	S	S	S									1			
White River	11010013	-002	20.8		E	S	S	S	S	S	S									1			
Deep Slough	11010013	-003	12.7		U															3			
White River	11010013	-004	4.4		E	S	S	S	S	S	S									1			
White River	11010013	-005	36.7	WHI0138	M	S	S	S	S	S	S									1			
Village Cr	11010013	-006	25.2	UWVGC01,3	M	S	N	S	S	S	S	AG				DO				5e			
Village Cr	11010013	-007	1.2		E	S	N	S	S	S	S	AG				DO				5e			
Village Cr	11010013	-008	13.0		E	S	N	S	S	S	S	AG				DO				5e			
Lick Pond Slough	11010013	-009	10.9		U															3			
Lick Pond Slough	11010013	-011	10.4		U															3			
Village Cr	11010013	-012	7.4	UWVGC02	M	S	S	S	S	S	S									1			
Village Cr	11010013	-014	22.8		E	S	S	S	S	S	S									1			
Maple Ditch	11010013	-015	9.5		U															3			
Cattail Cr	11010013	-016	9.3		U															3			
White River	11010013	-017	13.7		U															3			
Jack Creek	11010013	-018	9.6		U															3			
White River	11010013	-019	0.4		U															3			
Departee Creek	11010013	-020	46.1	UWDTC01	M	S	N	S	S	S	S	AG				Zn				5d			
Glaise Creek	11010013	-021	30.1	UWGSC01	M	S	N	S	S	S	S	AG				Zn				5d			
TOTAL MILES	285.0																						
MILES UNASSESSED	76.5																						
MILES EVALUATED	63.0																						
MILES MONITORED	145.5																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	208.5	0
AQUATIC LIFE	92.9	115.6
PRIMARY CONTACT	208.5	0
SECONDARY CONTACT	208.5	0
DRINKING SUPPLY	208.5	0
AGRI & INDUSTRY	208.5	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0138	White River at Highway 67 near Newport	Y	1	A
UWVGC01	Village Creek at Highway 37 near Tuckerman		1	R
UWVGC03	Village Creek at Highway 24 near Newport		1	R
UWVGC02	Village Creek at Highway 228 near Miniturn		1	R
UWDTC01	Departee Creek east of Bradford		1	R
UWGSG01	Glaise Creek at Highway 64 east of Bald Knob		1	R

Table A-151: Segment 4C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000400	Arkansas Electric Coop-Bailey	White R	11010013	1
AR0001481	Norandal USA, Inc	Ditch, Village CR	11010013	2
AR0020001	Tuckerman, City of	Tuckerman Ditch/Village CR	11010013	3
AR0020141	Hoxie, City of	Trib/Turkey CR	11010013	4
AR0022136	Bradford, City of	Butter CK, Departee CR, White R	11010013	5
AR0022217	Russell, City of	Graise CR, White R	11010013	6
AR0034550	Arkansas Steel Assoc	Village CR Trib	11010013	7
AR0034738	Augusta, City of	White R	11010013	8
AR0034860	Swifton, City of	Cattail CR/Village CR	11010013	9
AR0036668	Frit Industries, Inc-Walnut Ri	Trib, Coon CR, Village CR, White R	11010013	10
AR0037044	Newport, City of-Hwy 14	Village CR	11010013	11
AR0039675	Alicia, City of	Black Spice Ditch	11010013	12
AR0039837	Patterson, City of	Cache R	11010013	
AR0041033	Diaz, City of-WWTP	Ditch, Village CR, White R	11010013	14
AR0045225	Newport, City of-Airport/Ind	Trib/Locust CR, CR	11010013	15
AR0046566	Walnut Ridge, City of	Village CR/White R	11010013	16
AR0049441	CSO LLC	Mayberry Slough Trib	11010013	17
AR0049735	Duke Energy Jackson, LLC	White R	11010013	18

Table A-152: WHI0138 White River at Hwy 14 Bridge S. of Newport, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	8.27	4.71	12.90	2.03
BOD_5 (mg/L)	50	0.72	0.07	2.37	0.45
pH (standard units)	48	7.82	6.43	8.77	0.41
Total Organic Carbon (mg/L)	50	2.60	1.29	6.63	0.97
Ammonia as N (mg/L)	54	0.01	0.01	0.06	0.01
NO_2 + NO_3 as N (mg/L)	54	0.22	0.01	0.39	0.10
Orthophosphate as P (mg/L)	50	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	52	0.06	0.02	0.24	0.04
Total Hardness (mg/L)	21	128.62	25.00	175.00	46.50
Chloride (mg/L)	54	4.88	0.41	7.17	1.46
Sulfate (mg/L)	54	6.47	0.88	9.07	1.26
Total Dissolved Solids (mg/L)	54	159.74	36.50	200.00	36.57
Total Suspended Solids (mg/L)	54	20.45	2.70	92.30	15.55
Turbidity (NTU)	54	21.05	2.60	136.00	20.48

SEGMENT 4D WHITE RIVER, WATTENSAW BAYOU, AND BAYOU DES ARC

Segment 4D includes portions of White, Prairie, Lonoke, and Faulkner Counties in central Arkansas. The segment encompasses a 67-mile stretch of the White River, along with Wattensaw and Des Arc Bayous.

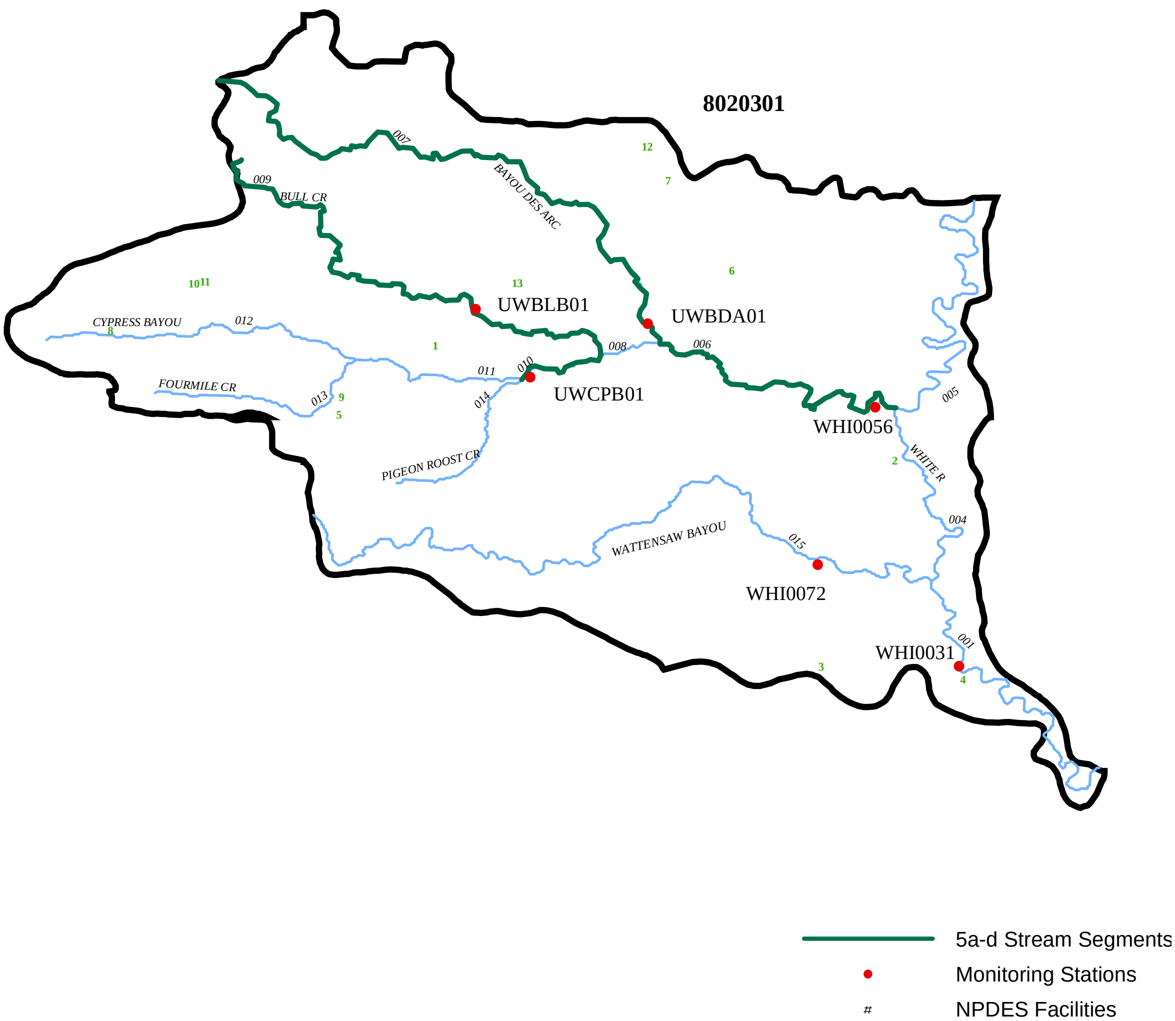
Summary of Water Quality Conditions

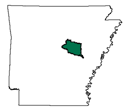
The designated uses for all waters within this segment include propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supply. No outstanding state or national resource waters are located in this segment. Monitoring stations provided data to assess 160.7 miles of streams. An additional 43 miles were evaluated.

Two stream segments on Bayou Des Arc and one segment each on Bull Bayou and Cypress Bayou were listed as not supporting the aquatic life use because of metals toxicity. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the Bayous. Additional investigation is needed to more accurately assess this problem.

Wattensaw Bayou was listed because of low dissolved oxygen concentrations. This is a naturally occurring problem throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. This issue will need to be addressed either through a standards change or an assessment methodology change.

Figure A-27: Planning Segment 4D





(Segment 4D)

Table A-153: Planning Segment 4D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-4D																										
White River	8020301	-001	24.3	WHI0031	M	S	S	S	S	S	S									1				FISH CONSUMPTION	203.7	0
White River	8020301	-004	14.8		E	S	S	S	S	S	S									1				AQUATIC LIFE	115.5	88.2
White River	8020301	-005	28.2		E	S	S	S	S	S	S									1				PRIMARY CONTACT	203.7	0
Bayou Des Arc	8020301	-006	17.8	WHI0056	M	S	N	S	S	S	S	AG				Zn				5d				SECONDARY CONTACT	203.7	0
Bayou Des Arc	8020301	-007	36.4	UWBDA01	M	S	N	S	S	S	S	AG				Zn				5d				DRINKING SUPPLY	203.7	0
Cypress Bayou	8020301	-008	3.2		U															3				AGRI & INDUSTRY	203.7	0
Bull Bayou	8020301	-009	29.0	UWBLB01	M	S	N	S	S	S	S	AG				Zn				5d						
Cypress Bayou	8020301	-010	5.0	UWCPB01	M	S	N	S	S	S	S	AG				Pb				5d						
Cypress Bayou	8020301	-011	9.5		U															3						
Cypress Bayou	8020301	-012	17.5		U															3						
Fourmile Creek	8020301	-013	12.8		U															3						
Pigeon Roost	8020301	-014	11.0		U															3						
Wattensaw Bayou	8020301	-015	48.2	WHI0072	M	S	S	S	S	S	S	UN				DO				5e						
TOTAL MILES	257.7																									
MILES UNASSESSED	54.0																									
MILES EVALUATED	43.0																									
MILES MONITORED	160.7																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0031	White River at DeValls Bluff	Y	1	A
WHI0056	Bayou DesArc at Highway 11 near Walker		1	R
UWBDA01	Bayou DesArc at county road above Cypress Creek		1	R
UWBLB01	Bull Bayou at Highway 367 near Beebe		1	R
UWCPB01	Cypress Creek at Highway 13 southeast of Beebe		1	R
WHI0072	Wattensaw Bayou north of Hazen	Y	1	A

Table A-154: Segment 4D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021504	McRae, City of	Dry Branch CR, Cane CR, Bayou Des Arc	8020301	1
AR0022101	Beebe, City of	Cypress Bayou/Bayou Des Arc/White R	8020301	2
AR0022225	Des Arc, City of	White R	8020301	3
AR0022411	Hazen, City of	Little Hurricane CR	8020301	4
AR0035611	Devalls Bluff, City of	Ditch/White R	8020301	5
AR0038369	Austin, City of	Four Mile CR, Bayou Des Arc, White R	8020301	6
AR0042803	Griffithville, City of	Trib, Dogwood CR, Bayou Des Arc CR	8020301	7
AR0044822	Higginson, City of	Gum Springs CR, Glade CR, Bayou Des Arc	8020301	8
AR0047121	Vilonia, City of	Cypress Bayou	8020301	9
AR0047554	Ward, City of	4-Mile CR/Cypress & Des Arc Bayou	8020301	10
AR0049298	J-Mar Express, Inc	Ditch, Hwy 367 Ditch, Gum Springs CR	8020301	13
AR0049301	River City Energy Co-Texaco Ma	Ditch, Little Cypress CR Trib, Cypress Bayou	8020301	11
AR0050156	Mad Jack’s 32, LLC	Trib, Little Cypress CR, Cypress Bayou	8020301	12

Table A-155: WHI0031 White River at DeValls Bluff, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.51	3.60	12.90	1.90
BOD_5 (mg/L)	54	1.02	0.25	2.08	0.42
pH (standard units)	56	7.51	6.39	8.59	0.48
Total Organic Carbon (mg/L)	57	3.50	1.64	6.52	1.33
Ammonia as N (mg/L)	59	0.01	0.01	0.04	0.01
$NO_2 + NO_3$ as N (mg/L)	60	0.18	0.01	0.65	0.12
Orthophosphate as P (mg/L)	54	0.02	0.01	0.05	0.01
Total Phosphorus as P (mg/L)	56	0.08	0.02	0.37	0.06
Total Hardness (mg/L)	24	124.21	52.00	183.00	32.99
Chloride (mg/L)	60	6.31	2.25	67.30	8.15
Sulfate (mg/L)	60	9.81	4.76	145.04	19.05
Total Dissolved Solids (mg/L)	59	152.25	62.00	282.00	30.31
Total Suspended Solids (mg/L)	59	39.37	1.00	150.00	32.51
Turbidity (NTU)	60	32.15	3.20	172.00	26.97

Table A-156: WHI0072 Wattensaw Bayou N. of Hazen, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	18.44	2.07	687.00	89.36
BOD_5 (mg/L)	54	2.54	0.83	8.03	1.48
pH (standard units)	57	6.99	6.12	8.04	0.37
Total Organic Carbon (mg/L)	57	10.33	5.21	15.10	2.09
Ammonia as N (mg/L)	59	0.06	0.01	0.58	0.09
$NO_2 + NO_3$ as N (mg/L)	60	0.14	0.01	1.43	0.19
Orthophosphate as P (mg/L)	59	0.10	0.03	1.31	0.16
Total Phosphorus as P (mg/L)	56	0.21	0.02	1.41	0.22
Total Hardness (mg/L)	24	81.79	25.00	158.00	41.13
Chloride (mg/L)	60	21.30	3.12	79.89	14.48
Sulfate (mg/L)	60	7.54	1.60	25.80	4.25
Total Dissolved Solids (mg/L)	59	164.01	61.50	351.00	66.48
Total Suspended Solids (mg/L)	59	12.97	1.70	104.30	15.09
Turbidity (NTU)	60	24.60	3.60	130.00	23.70

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SEGMENT 4E LITTLE RED RIVER: HEADWATERS TO MOUTH

Segment 4E includes portions of Searcy, Van Buren, Stone, Cleburne, White and Independence counties. The segment contains the entire 81 mile length of the Little Red River and its major tributaries the Middle, South, and North Forks, Archey Creek, Devil's Fork, and Big Creek.

Summary of Water Quality Conditions

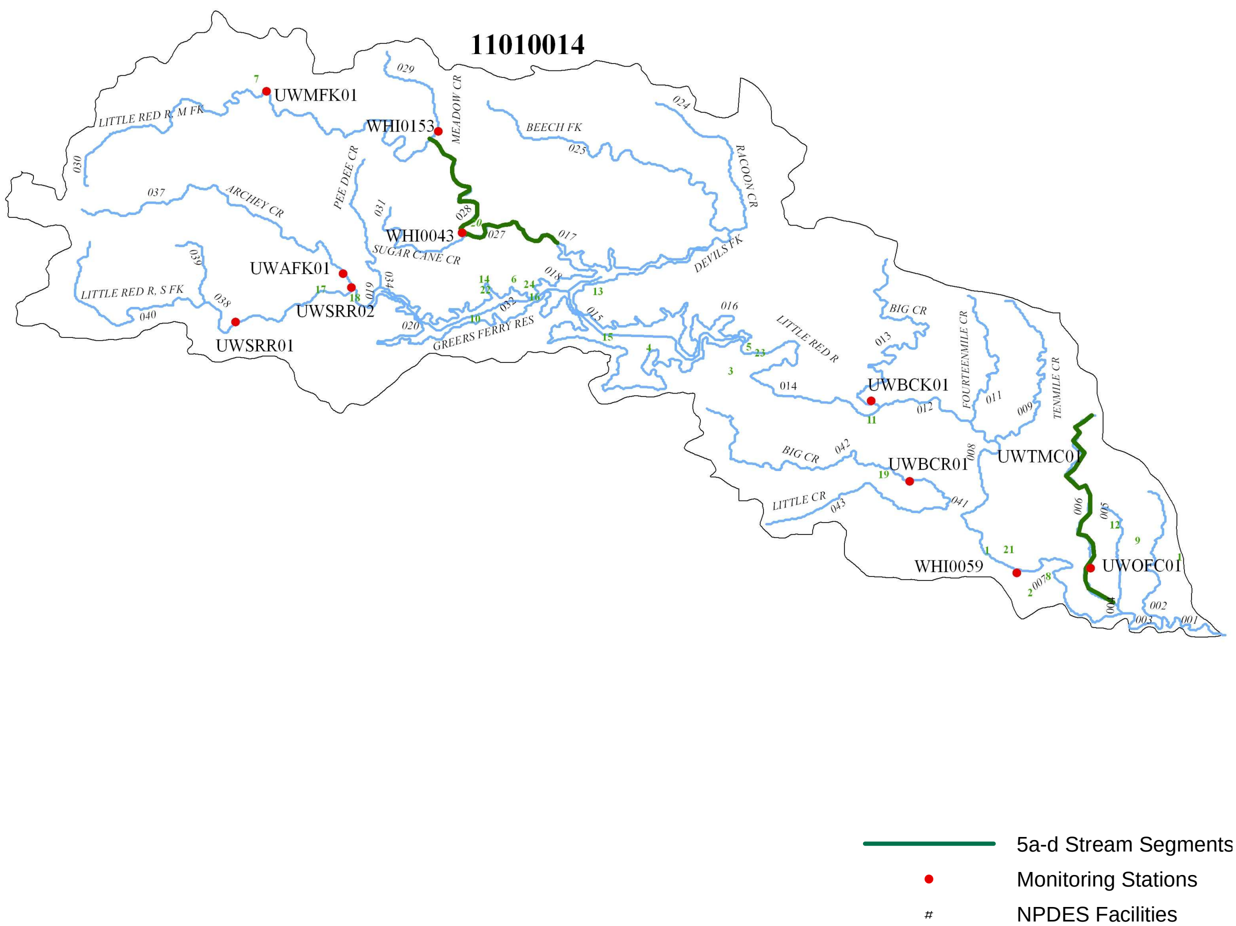
The designated uses of waters within this segment include propagation of fish and wildlife, primary and secondary contact recreation, and domestic, agricultural, and industrial water supply. Additionally, 158.1 miles, approximately one-third of the stream miles, are designated as outstanding state or national resource waters. Monitoring stations allowed for use support assessment of 221.4 miles. An additional 48.5 stream miles were evaluated bring the total stream miles assessed in this segment to 269.9.

Approximately two miles of the South Fork of the Little Red River at the upper end of Greers Ferry Reservoir was found to have mercury contamination of certain predator fishes and was placed under a fish consumption advisory.

The Middle Fork Little Red River near Shirley is currently assessed as not attaining the aquatic life use because of low in stream dissolved oxygen concentrations. It is also assessed as not attaining the primary contact recreation use because of pathogen contamination. Currently, an intensive survey of the watershed is being conducted by ADEQ to better assess these waters and determine the sources of the impairments.

Two segments of Overflow Creek were listed as not supporting the aquatic life use because of zinc toxicity. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the creek. Additional investigation is needed to more accurately assess this problem.

Figure A-28: Planning Segment 4E



(Segment 4E)

Table A-157: Planning Segment 4E—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-4E																										
Little Red R.	11010014	-001	7.5		U															3				FISH CONSUMPTION	269.9	0
Big Mingo Cr.	11010014	-002	14.4		U															3				AQUATIC LIFE	226.8	43.1
Little Red R.	11010014	-003	5.4		U															3				PRIMARY CONTACT	249.1	20.8
Overflow Creek	11010014	-004	0.6		E	S	N	S	S	S	S	AG				Zn				5d				SECONDARY CONTACT	269.9	0
Unnamed	11010014	-005	9.5		U															3				DRINKING SUPPLY	269.9	0
Overflow Cr.	11010014	-006	21.7	UWOFC01	M	S	N	S	S	S	S	AG				Zn				5d				AGRI & INDUSTRY	269.9	0
Little Red R.	11010014	-007	21.4	WHI0059	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-008	9.0		U															3						
Ten Mile Creek	11010014	-009	18.6	UWTMC01	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-010	2.9		U															3						
Fourteen Mile	11010014	-011	13.9		U															3						
Little Red R.	11010014	-012	8.0		U															3						
Big Creek	11010014	-013	26.9	UWBCK01	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-014	22.0		U															3						
Devils Fork	11010014	-023	2.9		U															3						
Raccoon Creek	11010014	-024	15.7		U															3						
Beech Creek	11010014	-025	28.4		U															3						
Middle Fork	11010014	-027	8.8	WHI0043	M	S	N	N	S	S	S	UN	UN			PA	DO			5d	5d					
Middle Fork	11010014	-028	12.0		E	S	N	N	S	S	S	UN	UN			PA	DO			5d	5d					
Middle Fork	11010014	-030	44.2	UWMFK01	M	S	S	S	S	S	S									1						
Meadow Creek	11010014	-029	10.3	WHI0153	M	S	S	S	S	S	S									1						
Sugar Cane Cr.	11010014	-031	10.8		U															3						
Pee Dee Creek	11010014	-034	12.9		U															3						
Archey Creek	11010014	-037	27.3	UWAFK01	M	S	S	S	S	S	S									1						
South Fork	11010014	-036	2.0		E	S	S	S	S	S	S									1						
South Fork	11010014	-038	14.7	UWSRR01&2	M	S	S	S	S	S	S									1						
Opossum Walk	11010014	-039	7.0		U															3						
South Fork	11010014	-040	17.7		E	S	S	S	S	S	S									1						
Big Creek	11010014	-041	1.2		E	S	S	S	S	S	S									1						
Big Creek	11010014	-042	27.5	UWBCR01	M	S	S	S	S	S	S									1						
Little Creek	11010014	-043	15.0		E	S	S	S	S	S	S									1						
TOTAL MILES	440.2																									
MILES UNASSESSED	170.3																									
MILES EVALUATED	48.5																									
MILES MONITORED	221.4																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWOFC01	Overflow Creek 1.5 miles southeast of Judsonia		1	R
WHI0059	Little Red River at Highway 367 below Searcy		1	A
UWTMC01	Ten Mile Creek at Highway 157 north of Providence		1	R
UWBCK01	Big Creek off Highway 110 near Hiram		1	R
WHI0043	Middle Fork Little Red River at Highway 9 near Shirley	Y	1	A
UWMFK01	Middle Fork Little Red River at US 65 near Leslie		1	R
WHI0153	Meadow Creek at county road northeast of Old Lexington		1	R
UWAFK01	Archey Fork Little Red River at Highway 65 near Clinton		1	R
UWSRR01	South Fork Little Red River at Highway 95 near Scotland		1	R
UWSRR02	South Fork Little Red River at US 65 near Clinton		1	R
UWBCR01	Big Creek at Highway 16 neat Letona		1	R

Table A-158: Segment 4E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021601	Searcy, City of	Little Red R	11010014	1
AR0022322	Kensett, City of	Black CR, Little Red R	11010014	2
AR0022381	Heber Springs, City of	Little Red R	11010014	3
AR0024066	Eden Isle Corp	Greers Ferry Lake/L' Red R	11010014	4
AR0029181	USDIFWS-Greers Ferry Nat'l Fish	Little Red R	11010014	5
AR0034401	Fairfield Bay-Dave Creek WWTP	Dave CR, Greers Ferry Lake	11010014	6
AR0034428	Fairfield Bay-Hidden Valley	Trib, Lynn CR, Greers Ferry Lake	11010014	22
AR0034509	USDIFWS-Greers Ferry Nat'l Fish	Little Red R	11010014	23
AR0034657	Leslie, City of	Cove CR	11010014	7
AR0035742	Judsonia, City of	Little Red R	11010014	8
AR0035807	Bald Knob, City of	Big Mingo CR, Little Red R	11010014	9
AR0037303	Fairfield Bay-Hamilton Hills	Trib, Lynn CR, Greers Ferry Lake	11010014	10
AR0039233	Pangburn, City of	Little Red R	11010014	11
AR0042714	Arkansas General Industries	Ditch, Gum CR, Little Red R, White R	11010014	12
AR0042919	Shirley Car Wash & Laundry	Ditch, Little Red R	11010014	20
AR0043460	Fairfield Bay-Hooten Hollow	Hooten Hollow/Greers Ferry Lake	11010014	24
AR0043940	West Side School Dist #4	Trib/Greers Ferry Lake	11010014	13
AR0044580	Fairfield Bay-Lynn Creek WWTP	Lynn CR, Greers Ferry Lake	11010014	14
AR0044920	Diamond Bluff Estates	East Wildcat Hollow/Greers Ferry/White	11010014	15
AR0046078	Fairfield Bay-Grand Isle	Hooten Hollow CR, Greers Ferry Lake	11010014	16
AR0048747	Clinton, City of-West WWTP	Trib, South Fork Little Red R, Greers Ferry Lake	11010014	17
AR0048836	Clinton, City of-East WWTP	Trib, South Fork Little Red R, Greers Ferry Lake	11010014	18
AR0049093	Vulcan Materials Co-Judsonia	Trib, Alder CR, Little Red R	11010014	21
AR0049301	Vulcan Materials Co-Judsonia	Trib, Alder CR, d R	11010014	
AR0049859	Letona, City of	Trib, Big CR, Little Red R, White R	11010014	19

Table A-159: WHI0043 Middle Fork Little Red River Near Shirley

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	64	8.18	4.10	17.40	2.52
BOD_5 (mg/L)	55	0.66	0.06	2.05	0.47
pH (standard units)	64	7.16	6.31	8.53	0.43
Total Organic Carbon (mg/L)	63	2.44	1.18	6.04	1.04
Ammonia as N (mg/L)	67	0.01	0.01	0.11	0.02
$NO_2 + NO_3$ as N (mg/L)	68	0.07	0.01	0.55	0.10
Orthophosphate as P (mg/L)	55	0.01	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	68	0.04	0.01	0.150	0.03
Total Hardness (mg/L)	21	43.33	32.00	114.0	17.86
Chloride (mg/L)	68	2.38	1.55	5.17	0.62
Sulfate (mg/L)	68	5.59	2.58	14.90	2.15
Total Dissolved Solids (mg/L)	68	64.13	42.50	177.00	18.62
Total Suspended Solids (mg/L)	68	6.03	1.00	62.00	10.55
Turbidity (NTU)	68	10.27	2.03	95.20	15.74

Table A-160: WHI0059 Little Red River Downstream of Searcy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	8.15	4.89	12.50	2.02
BOD_5 (mg/L)	57	0.68	0.16	2.71	0.52
pH (standard units)	49	6.96	5.53	8.24	0.61
Total Organic Carbon (mg/L)	55	2.78	1.72	6.08	0.96
Ammonia as N (mg/L)	58	0.04	0.01	0.00	0.06
$NO_2 + NO_3$ as N (mg/L)	59	0.24	0.04	1.26	0.20
Orthophosphate as P (mg/L)	53	0.03	0.01	0.21	0.04
Total Phosphorus as P (mg/L)	58	0.06	0.01	0.22	0.05
Total Hardness (mg/L)	24	41.25	25.00	169.00	44.16
Chloride (mg/L)	59	2.88	1.80	6.79	1.03
Sulfate (mg/L)	59	4.79	3.79	7.50	0.86
Total Dissolved Solids (mg/L)	59	52.88	29.00	186.00	38.47
Total Suspended Solids (mg/L)	59	10.50	1.00	87.00	13.16
Turbidity (NTU)	59	13.26	2.60	81.00	12.21

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SEGMENT 4F WHITE RIVER FROM MOUTH OF BLACK RIVER TO MOUTH OF BUFFALO RIVER

Segment 4F includes Baxter, Fulton, Izard, Stone, Independence and Sharp counties. The segment encompasses a 125-mile reach of the White River and its major tributaries - Polk Bayou, Sylamore Creek, Salado Creek, Hicks Creek, North Fork River, and Bennett's River.

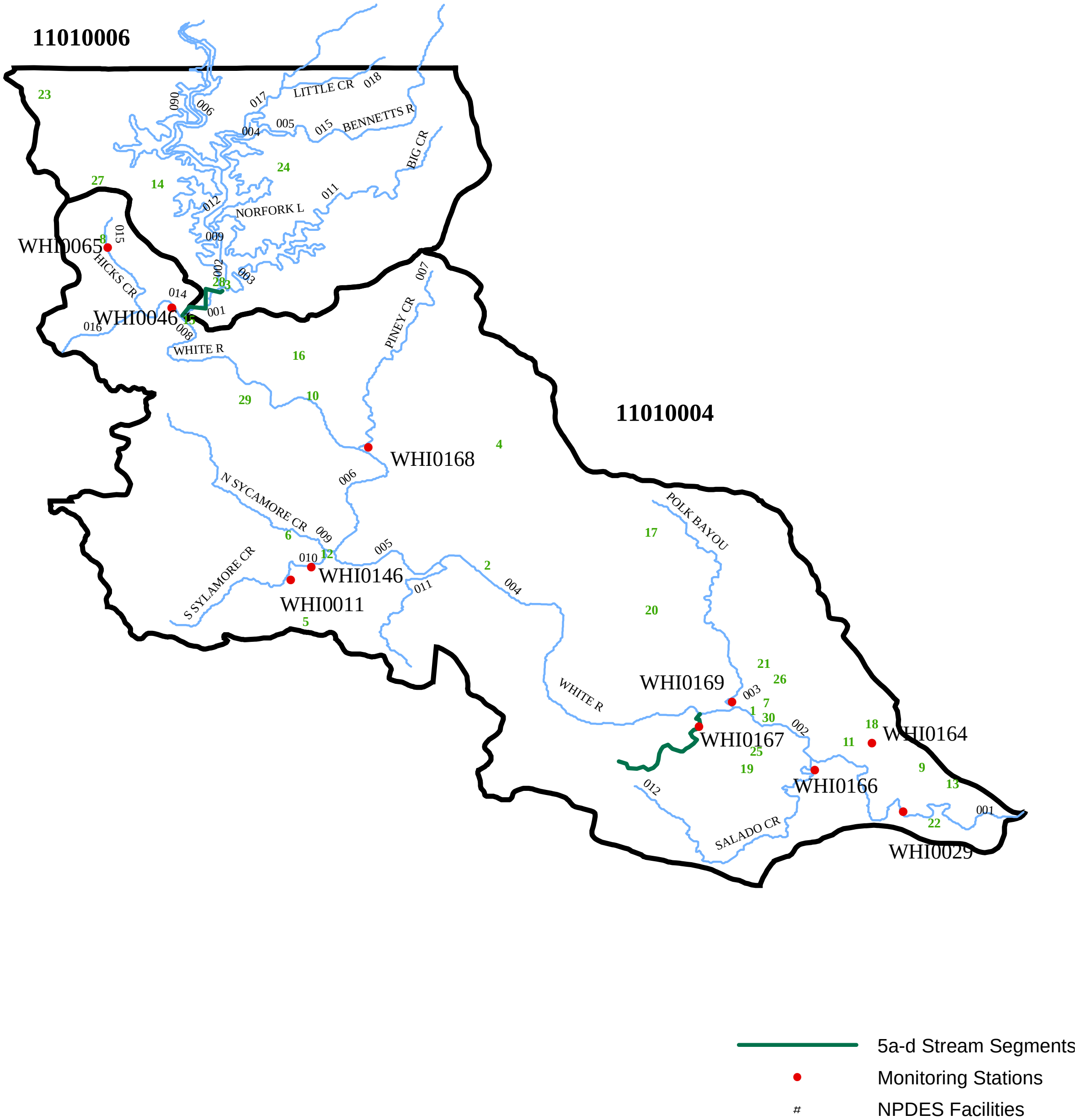
Summary of Water Quality Conditions

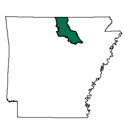
Waters within this segment have been designated for fish and wildlife propagation, primary and secondary contact recreation, and domestic, agricultural, and industrial water supply uses. Outstanding state or national resource waters total 19.1 miles within the segment. Use support assessments were made on 277.1 miles of streams.

The 9.1 miles of Hicks Creek did not meet the primary contact recreation use because of high pathogen concentrations. The source of the contaminant is a municipal point source discharge. Additional point source controls will be implemented to address this problem.

The stream segment of the North Fork River below Lake Norfork was listed because of low dissolved oxygen concentrations. The source is from the hydropower facility located at the dam. Actions to correct this problem are currently being discussed.

Figure A-29: Planning Segment 4F





(Segment 4F)

Table A-161: Planning Segment 4F—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-4F																										
White River	11010004	-001	26.7	WHI0029	M	S	S	S	S	S	S									1				FISH CONSUMPTION	277.1	0.0
White River	11010004	-002	8.2		E	S	S	S	S	S	S									1				AQUATIC LIFE	257.6	19.5
Poke Bayou	11010004	-003	23.4	WHI0169	M	S	S	S	S	S	S									3				PRIMARY CONTACT	268.0	9.1
White River	11010004	-004	32.6		E	S	S	S	S	S	S									1				SECONDARY CONTACT	277.1	0.0
White River	11010004	-005	9.6		E	S	S	S	S	S	S									1				DRINKING SUPPLY	277.1	0.0
White River	11010004	-006	12.5		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	277.1	0.0
White River	11010004	-008	23.6		E	S	S	S	S	S	S									1						
Piney Creek	11010004	-007	19.7	WHI0168	M	S	S	S	S	S	S									3						
North Sylamore	11010004	-009	18.4		E	S	S	S	S	S	S									1						
South Sylamore	11010004	-010	16.0	WHI0011	M	S	S	S	S	S	S									1						
Rocky Bayou	11010004	-011	13.5		E	S	S	S	S	S	S									1						
Salado Creek	11010004	-012	27.4	WHI0166	M	S	S	S	S	S	S									1						
North Sylamore	11010004	-013	0.7		E	S	S	S	S	S	S									1						
White River	11010004	-014	4.7	WHI0046	M	S	N	S	S	S	S	UN				Temp				5e						
Hicks Creek	11010004	-015	9.1	WHI0065	M	S	S	N	S	S	S	MP				PA				4b						
White River	11010004	-016	6.8		E	S	S	S	S	S	S									1						
Greenbrier Creek	11010004	-017	10.6	WHI0167	M	S	N	S	S	S	S	UN				DO				5d						
Big Creek	11010004	-018	9.4	WHI0164	M	S	S	S	S	S	S									1						
North Fork River	11010006	-001	4.2	USGS	M	S	N	S	S	S	S	HP				DO				5a						
Big Creek	11010006	-011	18.4		U															3						
Bennetts River	11010006	-015	15.3		U															3						
Bennetts River	11010006	-017	3.0		U															3						
Bennetts River	11010006	-019	12.7		U															3						
Little Creek	11010006	-018	7.8		U															3						
TOTAL MILES	334.3																									
MILES UNASSESSED	57.2																									
MILES EVALUATED	125.9																									
MILES MONITORED	151.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0029	White River at Oil Trough	Y	1	A
WHI0169	Poke Bayou near Batesville		1	R
WHI0168	Piney Creek on county road near Boswell		1	R
WHI0011	South Sylamore Creek below Lick Fork Creek		1	A
WHI0166	Salado Creek at Highway 14 near Salado		1	R
WHI0046	White River		1	A
WHI0065	Hicks Creek below Mountain Home		1	A
WHI0167	Greenbrier Creek at Highway 25 near Batesville		1	R
WHI0164	Big Creek at Highway 394 near Magness		1	R

Table A-162: Segment 4F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0001589	Galloway Sand & Gravel	White R	11010004	1
AR0001783	Baxter Healthcare Corp-Walker	Walker CR Trib, Pigeon CR, Norfork Lake	11010006	27
AR0001899	Unimin Corp-Guion Plant	Rocky Bayou (1) & Backwater Slough (2)	11010004	2
AR0002437	USDIBSFW-Norfork Nat'l Fish Hat	Dry Run CR,N Fork ,White R	11010006	3
AR0020036	Melbourne, City of	Mill CR, Piney CR, White R	11010004	4
AR0020117	Mountain View, City of	Hughes CR/Sylamore CR	11010004	5
AR0020664	USDAFS-Blanchard Springs	North Sylamore CR, South Sylamore CR, White R	11010004	6
AR0020702	Batesville, City of	White R	11010004	7
AR0021211	Mountain Home, City of	Hicks CR, Big CR, White R,	11010004	8
AR0021229	Newark, City of	White River	11010004	9
AR0034517	USDIBSFW-Norfork Nat'l Fish Hat	Dry CR/North Fork R	11010006	28
AR0034606	Calico Rock, City of	White R	11010004	10
AR0035386	Eastman Chemical Co	Ditch, White R	11010004	11
AR0036081	Holiday Mountain Resort	Sylamore CR	11010004	12
AR0037451	Entergy AR, Inc-Independence	White R	11010004	13
AR0042226	Rolling Meadows Mobile Home Es	Panther CR Trib	11010004	14
AR0043036	Norfork, City of	Town CR/White R	11010004	15
AR0044016	AR Dept of Correction-Izard Co	Trib-Moccasin CR	11010004	16
AR0044113	Calvary Bible School	Mill CR/White R	11010004	29
AR0045357	Mount Pleasant Housing Auth	Barren Fork CR, Polk Bayou, White R	11010004	17
AR0046680	Sulphur Rock, City of	Big CR	11010004	18
AR0046779	Southside School Dist #3	East Branch/Double CR, Caney CR	11010004	19
AR0047031	Cushman Housing Auth	Trib/Spring CR	11010004	20
AR0047406	Midwest Lime Co	Ditch/Miller CR/Poke Bayou/White R/AR	11010004	21
AR0047597	Oil Trough, City of	White R	11010004	22
AR0047970	Rolling Hills Nursing Center	Ditch, Double BR, Caney CR, Salado CR	11010004	30
AR0048631	RLH Landfill #3	Hutch CR Trib, Pigeon CR, Lake Norfork	11010006	23
AR0048798	Ozark Car Wash	Lake Norfork Trib	11010006	24
AR0048992	AR Hwy Dept-District 5 HQ	Double Branch, Caney CR, Salado CR	11010006	25
AR0049069	Cushman Saw Mill Inc	CR Ditch, Hwy 25 Ditch, Pfeifer CR	11010004	26

Table A-163: WHI0011 South Sylamore Creek Below Lick Fork Creek

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	8.54	4.39	13.80	2.23
BOD_5 (mg/L)	42	0.45	-0.05	3.15	0.54
pH (standard units)	55	7.79	6.36	8.80	0.45
Total Organic Carbon (mg/L)	52	1.67	0.98	5.19	0.81
Ammonia as N (mg/L)	58	0.01	0.01	0.05	0.01
$NO_2 + NO_3$ as N (mg/L)	59	0.61	0.06	1.54	0.33
Orthophosphate as P (mg/L)	58	0.04	0.02	0.10	0.02
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.49	0.08
Total Hardness (mg/L)	23	137.00	74.00	226.00	24.72
Chloride (mg/L)	59	5.43	2.03	8.34	1.39
Sulfate (mg/L)	59	9.54	3.92	15.60	2.13
Total Dissolved Solids (mg/L)	59	167.03	117.50	226.00	15.43
Total Suspended Solids (mg/L)	59	16.59	1.00	636.00	87.02
Turbidity (NTU)	59	10.66	1.00	354.00	47.60

Table A-164: WHI0029 White River at Oil Trough, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	8.69	5.56	12.60	1.78
BOD_5 (mg/L)	50	0.53	0.13	1.11	0.25
pH (standard units)	50	7.87	7.00	8.65	0.36
Total Organic Carbon (mg/L)	50	2.38	1.68	3.76	0.44
Ammonia as N (mg/L)	54	0.02	0.01	0.69	0.09
$NO_2 + NO_3$ as N (mg/L)	55	0.27	0.01	0.49	0.11
Orthophosphate as P (mg/L)	46	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	54	0.05	0.02	0.36	0.06
Total Hardness (mg/L)	22	144.95	121.00	163.00	11.27
Chloride (mg/L)	55	5.82	3.39	7.03	0.86
Sulfate (mg/L)	55	7.59	5.97	10.12	0.95
Total Dissolved Solids (mg/L)	55	166.68	132.00	202.00	12.45
Total Suspended Solids (mg/L)	55	8.26	1.50	35.50	6.89
Turbidity (NTU)	55	8.35	1.80	41.30	7.34

Table A-165: WHI0046 White River Near Norfork, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	10.54	7.76	13.70	1.34
BOD_5 (mg/L)	55	0.87	0.17	4.47	0.65
pH (standard units)	58	8.05	7.23	8.45	0.22
Total Organic Carbon (mg/L)	55	2.59	1.49	5.58	0.69
Ammonia as N (mg/L)	57	0.01	0.01	0.06	0.01
$NO_2 + NO_3$ as N (mg/L)	57	0.25	0.01	0.49	0.10
Orthophosphate as P (mg/L)	47	0.03	0.01	0.37	0.06
Total Phosphorus as P (mg/L)	58	0.06	0.01	0.45	0.08
Total Hardness (mg/L)	23	130.09	105.00	143.00	9.41
Chloride (mg/L)	58	6.09	3.53	9.04	1.28
Sulfate (mg/L)	58	7.00	5.19	7.95	0.59
Total Dissolved Solids (mg/L)	56	155.60	124.00	180.00	12.30
Total Suspended Solids (mg/L)	58	5.99	1.00	150.00	20.90
Turbidity (NTU)	58	7.40	0.60	173.00	23.66

Table A-166: WHI0065 Hicks Creek Downstream of Mt. Home, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	11.00	6.70	14.00	1.85
BOD_5 (mg/L)	57	0.68	0.16	2.71	0.52
pH (standard units)	57	8.22	7.15	8.69	0.26
Total Organic Carbon (mg/L)	55	2.78	1.72	6.08	0.96
Ammonia as N (mg/L)	56	0.01	0.01	0.04	0.01
$NO_2 + NO_3$ as N (mg/L)	56	2.54	0.56	4.42	0.98
Orthophosphate as P (mg/L)	53	0.03	0.01	0.21	0.04
Total Phosphorus as P (mg/L)	57	1.40	0.02	3.21	0.84
Total Hardness (mg/L)	23	208.09	109.00	267.00	38.40
Chloride (mg/L)	57	65.48	5.95	290.00	48.47
Sulfate (mg/L)	57	20.97	5.34	27.09	4.41
Total Dissolved Solids (mg/L)	55	349.75	148.00	510.00	74.87
Total Suspended Solids (mg/L)	57	3.70	1.00	32.70	5.94
Turbidity (NTU)	57	7.30	0.70	65.90	14.04

SEGMENT 4G BLACK RIVER, STRAWBERRY RIVER, AND TRIBUTARIES

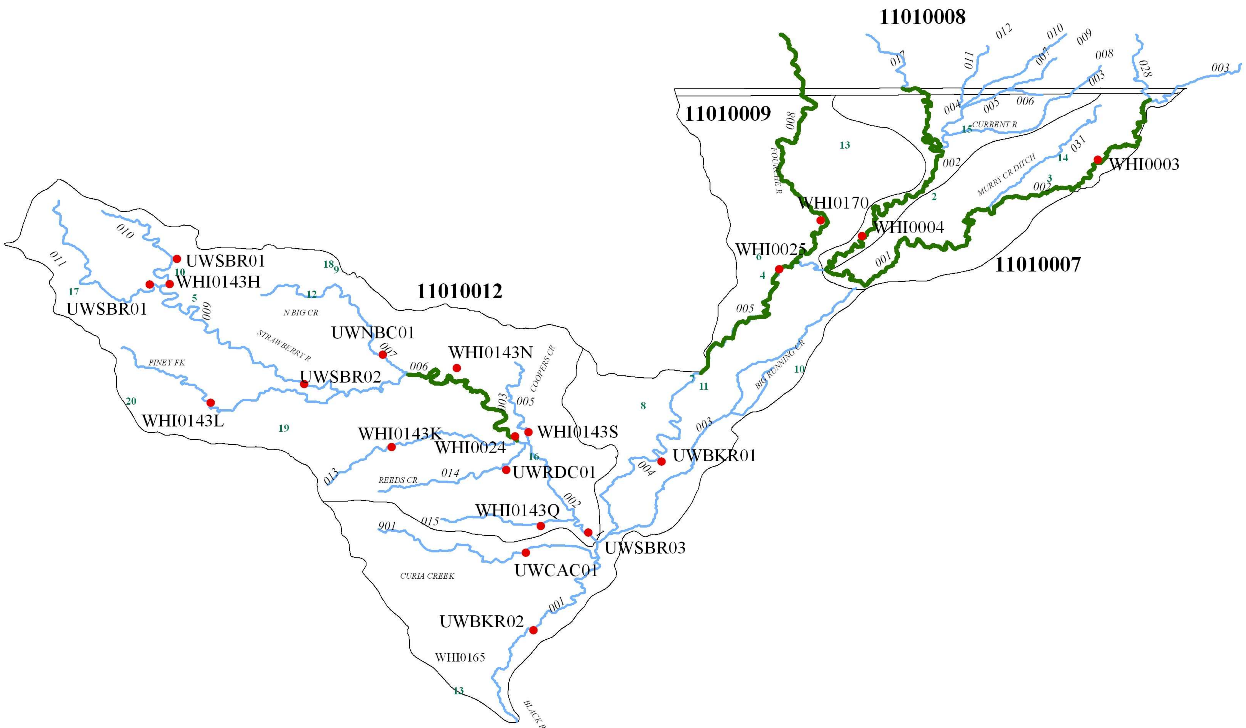
Segment 4G includes portions of Izard, Sharp, Independence, Lawrence, Randolph, Clay and Fulton counties in the northeast corner of the State. This segment encompasses a 121-mile reach of the Black River to the Missouri state line, and its major tributaries - the Strawberry River and Current River.

Summary of Water Quality Conditions

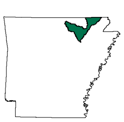
Fish and wildlife propagation, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies are the designated uses for all waters within this segment. Also, 112.2 miles of these streams are designated as outstanding state or national resource waters. The water quality monitoring stations allowed for the monitored assessment of 389.5 miles of streams in the segment and the evaluation of 51.2 miles.

Almost 40 miles of extraordinary resource waters in this segment were assessed as not supporting aquatic life uses due to excessive turbidity levels. Trend data from the monitoring station on the Strawberry River demonstrates these excessive turbidity levels have occurred routinely over the last five to ten years. Concurrently, the total suspended solids and the total phosphorus levels show peaking values much above normal. This is most likely from agriculture activities probably associated with pasturing and animal grazing to the edge of the stream bank. A TMDL was developed in 2006 addressing the silt issue.

Figure A-30: Planning Segment 4G



5a-d Stream Segments
Monitoring Stations
NPDES Facilities



(Segment 4G)

Table A-167: Planning Segment 4G—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-4G																										
Black River	11010007	-001	24.2		E	S	N	S	S	S	S	AG				DO				5c				FISH CONSUMPTION	440.7	0
Black River	11010007	-002	22.7	WHI0003	M	S	N	S	S	S	S	AG				DO				5c				AQUATIC LIFE	238.1	202.6
Murray Creek	11010007	-031	15.2		U															3				PRIMARY CONTACT	440.7	0
Current River	11010008	-001	23.6	WHI0004	M	S	N	S	S	S	S	SE	AG			SI	DO			5a	5c			SECONDARY CONTACT	440.7	0
Current River	11010008	-017	12.0		E	S	N	S	S	S	S	SE	AG			SI	DO			5a	5c			DRINKING SUPPLY	440.7	0
Little Black	11010008	-002	2.5		U															3				AGRI & INDUSTRY	440.7	0
Byrnes Ditch	11010008	-003	16.2		U															3						
Little Black	11010008	-004	3.7		U															3						
Indian Creek	11010008	-005	4.1		U															3						
Black River	11010009	-001	25.8	UWBKR02	M	S	S	S	S	S	S									1						
Black River	11010009	-002	1.2		E	S	S	S	S	S	S									1						
Black River	11010009	-004	27.4	UWBKR01	M	S	S	S	S	S	S									1						
Black River	11010009	-005	17.5	WHI0025	M	S	N	S	S	S	S	AG				DO				5c						
Black River	11010009	-007	3.8		U															3						
Big Running C.	11010009	-003	36.0		U															3						
Fourche River	11010009	-008	25.0	WHI0170	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-001	4.4		E	S	S	S	S	S	S									1						
Strawberry R.	11010012	-002	9.4	UWSBR03	M	S	N	S	S	S	S	SE				SI				4a						
Coopers Creek	11010012	-003	11.8	WHI0143S	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-004	0.3		E	S	N	S	S	S	S	SE				SI				4a						
Strawberry R.	11010012	-005	0.7		E	S	N	S	S	S	S	SE				SI				4a						
Strawberry R.	11010012	-006	19.0	WHI0024	M	S	N	S	S	S	S	SE	AG			SI	DO			4a	5d					
N. Big Creek	11010012	-007	20.8	UWNBC01	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-008	8.4		E	S	N	S	S	S	S	SE				SI				4a						
Strawberry R.	11010012	-009	28.4	UWSBR02	M	S	N	S	S	S	S	SE				SI				4a						
L. Strawberry R.	11010012	-010	16.0	WHI0143H+	M	S	N	S	S	S	S	SE				SI				4a						
Strawberry R.	11010012	-011	20.4	UWSBR01	M	S	N	S	S	S	S	SE				SI				4a						
Piney Fork	11010012	-012	26.1	WHI0143L+	M	S	S	S	S	S	S									1						
S. Big Creek	11010012	-013	19.3	WHI0143J+	M	S	S	S	S	S	S									1						
Reeds Creek	11010012	-014	15.0	UWRDC01	M	S	S	S	S	S	S									1						
Mill Creek	11010012	-016	9.9	WHI0143N	M	S	S	S	S	S	S									1						
Caney Creek	11010012	-015	11.6	WHI0143Q&R	M	S	S	S	S	S	S									1						
Curia Creek	11010009	-901	18.0	UWCAC01	M	S	S	S	S	S	S									1						
Data Creek	11010009	-902	21.8	WHI0165	M	S	S	S	S	S	S									1						
TOTAL MILES	522.2																									
MILES UNASSESSED	81.5																									
MILES EVALUATED	51.2																									
MILES MONITORED	389.5																									

Table A-167 Continued: Planning Segment 4G—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0003	Black River at Highway 63 east of Corning	Y	1	A
WHI0004	Current River near Pocahontas	Y	1	A
UWBKR02	Black River at Highway 37 east of Cord		1	R
UWBKR01	Black River east of Highway 361 north of Strawberry		2	R
WHI0025	Black River at Pocahontas	Y	1	A
WHI0170	Fourche Creek at Highway 166 north of Pocahontas		1	R
UWSBR03	Strawberry River at Highway 361 near Saffell		1	R
WHI0143S	Cooper Creek at county road east of Highway 115 south of Smithville		1*	S
WHI0024	Strawberry River south of Smithville	Y	1	A
UWNBC01	North Big Creek off Highway 354 east of Center		1	R
UWSBR02	Strawberry River at Highway 167 at Evening Shade		1	R
WHI0143H+	Little Strawberry River at Highway 354 east of Wiseman		1*	S
UWSBR01	Strawberry River off Highway 354 near Wiseman		1	R
WHI0143L+	Piney Fork Creek at county road west of Zion		2	S
WHI0143J+	South Big Creek at Highway 117 near Jesup		2	S
UWRDC01	Reeds Creek at Highway 117 north of Strawberry		1	R
WHI0143N	Mill Creek on Strawberry Road south of Sitka		1*	S
WHI0143Q+	Caney Creek on county road 346 near Saffell		1*	S
UWCAC01	Curia Creek at Highway 25 north of Dowdy		1	R
WHI0165	Data Creek on Highway 25 near Mt. Zion		1	S

* Updated bacteria data only.

Table A-168: Segment 4G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0022110	Cave City, City of	Curia CR/Black R	11010009	
AR0022209	Reyno, City of	Murray CR Ditch/Black R/White R	11010007	2
AR0033979	Corning, City of	Black R	11010007	3
AR0034835	Pocahontas, City of	Black R	11010009	4
AR0035254	Horseshoe Bend, City of-White Oak	Little Strawberry R Trib, Strawberry R	11010012	5
AR0036820	Maclean-Esna	Mansker CR Trib, Black R	11010009	6
AR0037508	Black Rock, City Water & Sewer	Trib/Black R/White R	11010009	7
AR0038199	AR Parks & Tourism-Lake Charles	Lake Charles	11010009	8
AR0038326	Allegheny Wastewater Assn	Trib, Worthington CR, Hackney CR	11010012	9
AR0039608	Horseshoe Bend, City of-Paradise Acres	Hubble Branch, Little Strawberry R	11010012	10
AR0040355	Portia, City of	Black R	11010009	11
AR0040533	Deer Run Park Resort	Deer Run Lake, Mill CR, Piney Fork	11010012	19
AR0041742	Ash Flat, City of	Trib, N Big CR, Strawberry R, Black R	11010012	12
AR0043834	Maynard, City of	Lemmons-Big CRs/Fourche-Black/White	11010009	13
AR0047911	J.W. Black Lumber Co	Trib, Corning Lake	11010007	14
AR0048071	Success, Town of	Trib, L.Black R, Current R, Black R	11010008	15
AR0048488	Western Lawrence Co WWT Dist	Strawberry R Trib	11010012	16
AR0049573	Cooper’s Hawk Subdivision	Trib, Long CR, Piney Fork, Strawberry R	11010012	20
AR0049701	Oxford, City of	Sandy CR, Strawberry R, Black R	11010012	17
AR0050261	Highland, City of-Wastewater T	Trib, Worthington CR, Hackner CR	11010012	18

Table A-169: WHI0003 Black River Near Corning, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	61	6.95	3.29	11.50	2.07
BOD_5 (mg/L)	74	1.20	0.20	4.27	0.71
pH (standard units)	62	7.59	5.36	9.23	0.66
Total Organic Carbon (mg/L)	71	3.16	1.18	11.87	2.01
Ammonia as N (mg/L)	61	0.03	0.01	0.42	0.06
$NO_2 + NO_3$ as N (mg/L)	60	0.22	0.01	3.48	0.45
Orthophosphate as P (mg/L)	76	0.04	0.01	0.33	0.05
Total Phosphorus as P (mg/L)	60	0.09	0.02	0.59	0.08
Total Hardness (mg/L)	25	111.25	30.00	163.00	33.98
Chloride (mg/L)	61	4.35	1.89	16.70	2.02
Sulfate (mg/L)	61	9.05	4.65	14.05	1.94
Total Dissolved Solids (mg/L)	60	141.81	42.00	196.00	25.80
Total Suspended Solids (mg/L)	60	25.73	1.00	372.00	46.55
Turbidity (NTU)	61	30.74	1.20	260.00	33.90

Table A-170: WHI0004 Current River Near Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	7.49	4.31	16.40	2.19
BOD_5 (mg/L)	53	0.79	0.05	2.08	0.37
pH (standard units)	60	7.78	5.29	9.30	0.71
Total Organic Carbon (mg/L)	51	1.93	0.97	4.71	0.99
Ammonia as N (mg/L)	58	0.02	0.00	0.08	0.02
$NO_2 + NO_3$ as N (mg/L)	57	0.23	0.03	0.49	0.12
Orthophosphate as P (mg/L)	51	0.02	0.01	0.12	0.02
Total Phosphorus as P (mg/L)	57	0.04	0.01	0.17	0.03
Total Hardness (mg/L)	21	156.37	107.00	184.00	21.73
Chloride (mg/L)	58	3.15	1.84	5.79	0.62
Sulfate (mg/L)	58	4.34	3.07	9.07	0.86
Total Dissolved Solids (mg/L)	57	166.96	115.00	215.00	20.31
Total Suspended Solids (mg/L)	57	12.02	1.00	95.00	13.70
Turbidity (NTU)	58	12.15	1.20	51.50	11.07

Table A-171: WHI0024 Strawberry River S. of Smithville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	66	8.50	4.51	13.30	2.06
BOD_5 (mg/L)	66	0.70	0.00	4.08	0.58
pH (standard units)	68	7.91	7.05	8.68	0.34
Total Organic Carbon (mg/L)	67	2.65	1.05	19.50	2.52
Ammonia as N (mg/L)	71	0.02	0.01	0.40	0.05
NO_2 + NO_3 as N (mg/L)	72	0.18	0.01	0.63	0.13
Orthophosphate as P (mg/L)	57	0.02	0.01	0.27	0.04
Total Phosphorus as P (mg/L)	73	0.06	0.02	0.73	0.11
Total Hardness (mg/L)	38	194.12	101.00	241.00	35.08
Chloride (mg/L)	73	3.12	1.72	5.78	0.75
Sulfate (mg/L)	73	4.94	3.30	7.88	1.02
Total Dissolved Solids (mg/L)	73	204.29	141.00	237.00	23.13
Total Suspended Solids (mg/L)	73	27.21	1.00	610.00	75.26
Turbidity (NTU)	73	15.28	1.70	103.00	19.05

Table A-172: WHI0025 Black River at Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.01	4.02	11.90	1.87
BOD_5 (mg/L)	55	0.93	0.13	2.58	0.45
pH (standard units)	59	7.72	6.12	9.32	0.52
Total Organic Carbon (mg/L)	54	2.69	1.02	7.30	1.46
Ammonia as N (mg/L)	58	0.02	0.01	0.07	0.02
NO_2 + NO_3 as N (mg/L)	57	0.19	0.01	0.63	0.11
Orthophosphate as P (mg/L)	58	0.02	0.01	0.08	0.01
Total Phosphorus as P (mg/L)	58	0.06	0.02	0.16	0.03
Total Hardness (mg/L)	21	142.90	77.00	226.00	34.23
Chloride (mg/L)	58	3.93	1.69	25.06	2.96
Sulfate (mg/L)	58	6.04	3.82	27.58	3.03
Total Dissolved Solids (mg/L)	57	158.11	98.00	242.00	23.54
Total Suspended Solids (mg/L)	57	18.11	1.50	64.00	10.78
Turbidity (NTU)	58	22.15	3.90	67.00	12.36

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SEGMENT 4H SPRING RIVER, SOUTH FORK SPRING RIVER, AND ELEVEN POINT RIVER

Segment 4H, in north central Arkansas, includes portions of Fulton, Sharp and Randolph counties. The segment encompasses the entire 46-mile length of the Spring River and its major tributaries, the South Fork Spring River, the Eleven Point River, Myatt Creek and Martin's Creek.

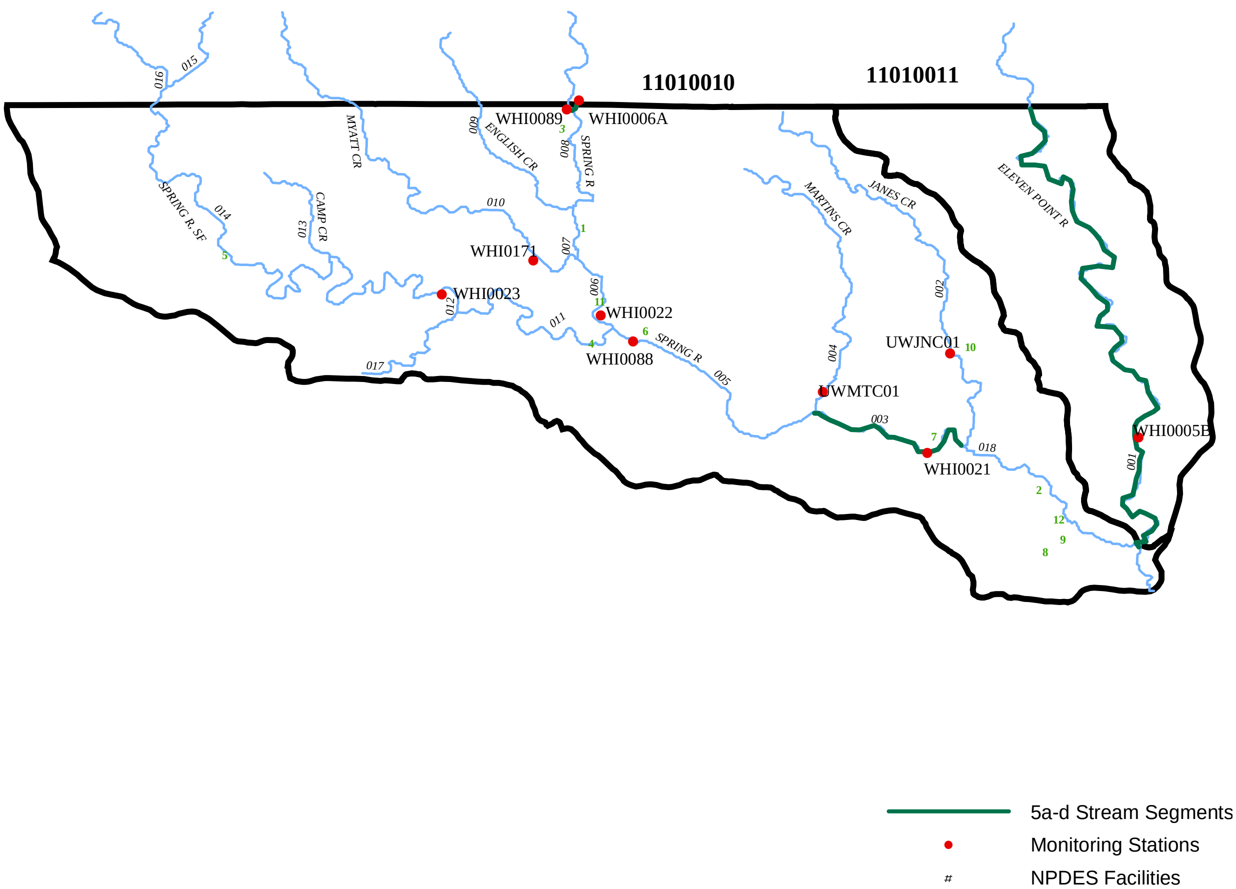
Summary of Water Quality Conditions

Designated uses for all waters within this segment include propagation of fish and wildlife, primary and secondary contact recreation, and domestic, agriculture, and industrial water supplies. Additionally, about 74 percent of these waters are designated as outstanding state or national resource waters. Approximately 217 miles of the waters were assessed from seven permanent and three temporary monitoring stations. Of that, 56.7 miles were evaluated and 160.2 were monitored.

The Eleven Point, Warm Fork Spring, and Spring Rivers were listed as not supporting the aquatic life use because of low dissolved oxygen concentrations. In addition, the Warm Fork Spring River was listed as not supporting the industrial and agriculture water supply use because of elevated total dissolved solids. The causes are unknown at this time.

Two segments of the Spring River were listed for temperature. The in-stream water temperature in the lower portion of segment 006 and in segment 007 routinely goes above 20 degrees Celsius during the hotter times of the year. This is a naturally occurring event. The 20 degrees Celsius water temperature standard was placed on these stream segments to protect the non-native trout fishery.

Figure A-31: Planning Segment 4H



(Segment 4H)

Table A-173: Planning Segment 4H—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-4H																										
Spring River	11010010	-001	3.3		E	S	S	S	S	S	S									1				FISH CONSUMPTION	216.9	0
Janes Creek	11010010	-002	26.7	UWJNC01	M	S	S	S	S	S	S									1				AQUATIC LIFE	162	54.9
Spring River	11010010	-003	9.4	WHI0021	M	S	N	S	S	S	S	UN	RE			DO	SI			5c	5d			PRIMARY CONTACT	216.9	0
Martins Creek	11010010	-004	19.0	UWMTC01	M	S	S	S	S	S	S									1				SECONDARY CONTACT	216.9	0
Spring River	11010010	-005	13.2	WHI0088	M	S	S	S	S	S	S									1				DRINKING SUPPLY	216.9	0
Spring River	11010010	-006	5.3	WHI0022	M	S	N	S	S	S	S	UN				Temp				5e				AGRI & INDUSTRY	213.8	3.1
Spring River	11010010	-007	4.0		E	S	N	S	S	S	S	UN				Temp				5e						
Warm Fork Spring R.	11010010	-008t	3.1	WHI006A	M	S	N	S	S	S	N	UN	UN			DO	TDS			5d	5d					
Spring River	11010010	-008	8.8	WHI0089	M	S	S	S	S	S	S									1						
English Creek	11010010	-009	6.5		U															3						
Myatt Creek	11010010	-010	26.0	WHI0171	M	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-011	13.4		E	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-012	15.6	WHI0023	M	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-014	24.0		E	S	S	S	S	S	S									1						
Camp Creek	11010010	-013	7.0		U															3						
Wild Horse C.	11010010	-017	7.7		U															3						
Spring River	11010010	-018	12.0		E	S	S	S	S	S	S									1						
Eleven Point	11010011	-001	33.1	WHI0005B	M	S	N	S	S	S	S	AG				DO				5d						
TOTAL MILES	238.1																									
MILES UNASSESSED	21.2																									
MILES EVALUATED	56.7																									
MILES MONITORED	160.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWJNC01	Janes Creek at Highway 90 near Ravenden Springs		1	R
WHI0021	Spring River south of Ravenden	Y	1	A
UWMTC01	Martins Creek at Highway 63 near Williford		1	R
WHI0088	White River at Town Bridge in Hardy		1	A
WHI0022	Spring River at low water crossing near Hardy	Y	1	A
WHI0006A	Warm Fork Spring River near Thayer, Mo	Y	1	A
WHI0089	Mammoth Spring east bridge at spillway		1	A
WHI0171	Myatt Creek at Bakers Ford road near Saddle		1	R
WHI0023	South Fork of Spring River near Saddle	Y	1	A
WHI0005B	Eleven Point River near Pocahontas	Y	1	A

Table A-174: Segment 4H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0002879	AR Game & Fish Comm-Spring R	Spring R	11010010	1
AR0021628	Imboden, Town of	Wayland CR/Spring R/Black R	11010010	2
AR0023850	Mammoth Spring, City of	Spring R Trib, Spring R	11010010	3
AR0034282	Cherokee Village Sewer Inc	South Fork Spring R	11010010	4
AR0034789	Salem, City of	South Fork/Spring R	11010010	5
AR0037991	Hardy, City of	Spring R, Black R	11010010	6
AR0040312	Highland Square Coin Operated	Trib/Lake Mirandy	11010010	11
AR0041254	Ravenden, City of	Trib/Spring R/Black R/White RB	11010010	7
AR0046922	Vulcan Constr Materials-Black	Hwy 63 Ditch, Brushy CR,. . . , Black R	11010010	8
AR0047198	Martin Marietta Materials-Blac	Stennitt Creek	11010010	9
AR0048712	Ravenden Springs, Town of	Johns CR Trib, Janes CR, Spring R	11010010	10
AR0049107	Martin Marietta Materials-Cave	Spring R	11010010	12

Table A-175: WHI0005B Eleven Point River Near Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.30	3.91	11.30	1.79
BOD_5 (mg/L)	54	1.19	0.08	2.65	0.69
pH (standard units)	59	7.93	6.69	9.30	0.53
Total Organic Carbon (mg/L)	50	1.80	0.67	6.30	1.06
Ammonia as N (mg/L)	59	0.02	0.01	0.15	0.03
NO_2 + NO_3 as N (mg/L)	58	0.46	0.10	0.83	0.17
Orthophosphate as P (mg/L)	47	0.02	0.01	0.09	0.02
Total Phosphorus as P (mg/L)	58	0.04	0.01	0.15	0.03
Total Hardness (mg/L)	23	193.95	134.00	224.00	24.06
Chloride (mg/L)	59	2.86	1.49	4.34	0.51
Sulfate (mg/L)	59	3.40	2.53	4.44	0.49
Total Dissolved Solids (mg/L)	58	203.01	132.50	233.00	20.00
Total Suspended Solids (mg/L)	58	10.54	1.00	43.50	9.70
Turbidity (NTU)	59	11.81	1.20	57.60	13.29

Table A-176: WHI0006A Warm Fork of the Spring River Near Thayer, MO

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.08	3.00	13.40	2.64
BOD_5 (mg/L)	54	0.68	0.16	2.68	0.43
pH (standard units)	59	7.90	6.88	8.39	0.36
Total Organic Carbon (mg/L)	48	1.80	1.03	5.75	0.75
Ammonia as N (mg/L)	58	0.02	0.01	0.09	0.02
NO_2 + NO_3 as N (mg/L)	57	0.62	0.18	1.23	0.28
Orthophosphate as P (mg/L)	56	0.08	0.01	0.86	0.12
Total Phosphorus as P (mg/L)	58	0.10	0.02	0.89	0.12
Total Hardness (mg/L)	24	262.50	209.00	345.00	28.67
Chloride (mg/L)	58	6.57	1.76	25.38	4.06
Sulfate (mg/L)	58	5.15	2.67	53.45	6.56
Total Dissolved Solids (mg/L)	57	269.08	199.00	344.50	34.88
Total Suspended Solids (mg/L)	58	4.17	1.00	11.20	2.61
Turbidity (NTU)	58	6.36	1.00	44.00	7.55

Table A-177: WHI0021 Spring River S. of Ravenden, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.50	3.95	11.40	1.77
BOD_5 (mg/L)	56	0.83	0.13	4.56	0.66
pH (standard units)	59	7.96	6.03	8.83	0.54
Total Organic Carbon (mg/L)	53	2.19	1.05	11.80	1.90
Ammonia as N (mg/L)	59	0.02	0.01	0.25	0.03
NO_2 + NO_3 as N (mg/L)	58	0.47	0.11	2.23	0.35
Orthophosphate as P (mg/L)	51	0.08	0.01	2.40	0.34
Total Phosphorus as P (mg/L)	58	0.22	0.01	8.35	1.13
Total Hardness (mg/L)	24	204.87	65.00	270.00	57.22
Chloride (mg/L)	59	4.32	1.67	32.00	4.42
Sulfate (mg/L)	59	4.36	3.09	18.30	2.41
Total Dissolved Solids (mg/L)	58	230.83	144.00	261.00	22.48
Total Suspended Solids (mg/L)	58	11.36	1.00	200.00	26.03
Turbidity (NTU)	59	13.70	1.60	233.00	31.06

Table A-178: WHI0022 Spring River NW of Hardy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.39	7.10	12.90	1.46
BOD_5 (mg/L)	52	0.45	0.02	1.10	0.21
pH (standard units)	60	8.16	7.61	8.53	0.16
Total Organic Carbon (mg/L)	46	1.35	0.55	4.29	0.59
Ammonia as N (mg/L)	58	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	58	0.65	0.33	1.24	0.22
Orthophosphate as P (mg/L)	54	0.02	0.01	0.03	0.01
Total Phosphorus as P (mg/L)	58	0.04	0.02	0.15	0.02
Total Hardness (mg/L)	24	235.13	210.00	263.00	13.17
Chloride (mg/L)	59	3.89	1.94	8.11	0.97
Sulfate (mg/L)	59	3.86	2.99	7.14	0.73
Total Dissolved Solids (mg/L)	57	243.39	205.00	273.00	14.79
Total Suspended Solids (mg/L)	59	5.24	1.00	21.50	3.38
Turbidity (NTU)	59	5.97	1.20	33.80	5.69

Table A-179: WHI0023 South Fork Spring River Near Saddle, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.34	5.18	13.80	2.22
BOD_5 (mg/L)	55	0.88	0.15	8.47	1.10
pH (standard units)	59	8.03	7.39	8.42	0.19
Total Organic Carbon (mg/L)	56	2.30	1.04	8.71	1.31
Ammonia as N (mg/L)	58	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	58	0.20	0.01	1.00	0.23
Orthophosphate as P (mg/L)	51	0.05	0.01	1.27	0.18
Total Phosphorus as P (mg/L)	59	0.07	0.02	1.03	0.14
Total Hardness (mg/L)	24	202.96	123.00	246.00	26.97
Chloride (mg/L)	59	3.95	2.09	5.42	0.66
Sulfate (mg/L)	59	3.47	2.19	6.61	0.82
Total Dissolved Solids (mg/L)	57	214.19	153.00	279.00	25.82
Total Suspended Solids (mg/L)	59	4.77	1.00	45.80	8.06
Turbidity (NTU)	59	7.00	1.10	56.00	11.30

Table A-180: WHI0088 Spring River at Town Bridge Crossing in Hardy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.52	7.14	12.60	1.68
BOD_5 (mg/L)	55	0.69	0.13	1.74	0.32
pH (standard units)	60	8.21	7.79	8.56	0.16
Total Organic Carbon (mg/L)	54	1.63	0.68	5.97	0.84
Ammonia as N (mg/L)	58	0.01	0.00	0.04	0.01
NO_2 + NO_3 as N (mg/L)	58	0.50	0.22	1.04	0.19
Orthophosphate as P (mg/L)	56	0.02	0.01	0.07	0.01
Total Phosphorus as P (mg/L)	59	0.05	0.02	0.38	0.05
Total Hardness (mg/L)	24	230.96	196.00	270.00	16.14
Chloride (mg/L)	59	4.14	2.45	27.20	3.12
Sulfate (mg/L)	59	4.10	2.99	25.70	2.91
Total Dissolved Solids (mg/L)	57	239.59	188.00	271.00	15.86
Total Suspended Solids (mg/L)	59	5.12	1.00	26.50	4.60
Turbidity (NTU)	59	7.06	1.40	58.20	9.19

Table A-181: WHI0089 Spring River at East Walk Bridge in Mammoth Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.04	5.86	9.90	0.76
BOD_5 (mg/L)	37	0.33	-0.05	1.03	0.24
pH (standard units)	60	7.40	6.64	8.32	0.26
Total Organic Carbon (mg/L)	23	1.04	0.21	1.95	0.44
Ammonia as N (mg/L)	58	0.01	0.01	0.01	0.001
NO_2 + NO_3 as N (mg/L)	58	1.09	0.58	1.74	0.31
Orthophosphate as P (mg/L)	59	0.03	0.01	0.09	0.011
Total Phosphorus as P (mg/L)	59	0.04	0.02	0.16	0.026
Total Hardness (mg/L)	24	221.50	181.00	253.00	16.92
Chloride (mg/L)	59	4.11	2.87	7.46	0.84
Sulfate (mg/L)	59	3.77	2.96	4.91	0.47
Total Dissolved Solids (mg/L)	57	234.95	180.00	268.00	15.72
Total Suspended Solids (mg/L)	59	2.03	0.00	6.50	1.45
Turbidity (NTU)	59	5.03	1.00	37.10	5.26

SEGMENT 4I WHITE RIVER FROM CROOKED CREEK TO LONG CREEK

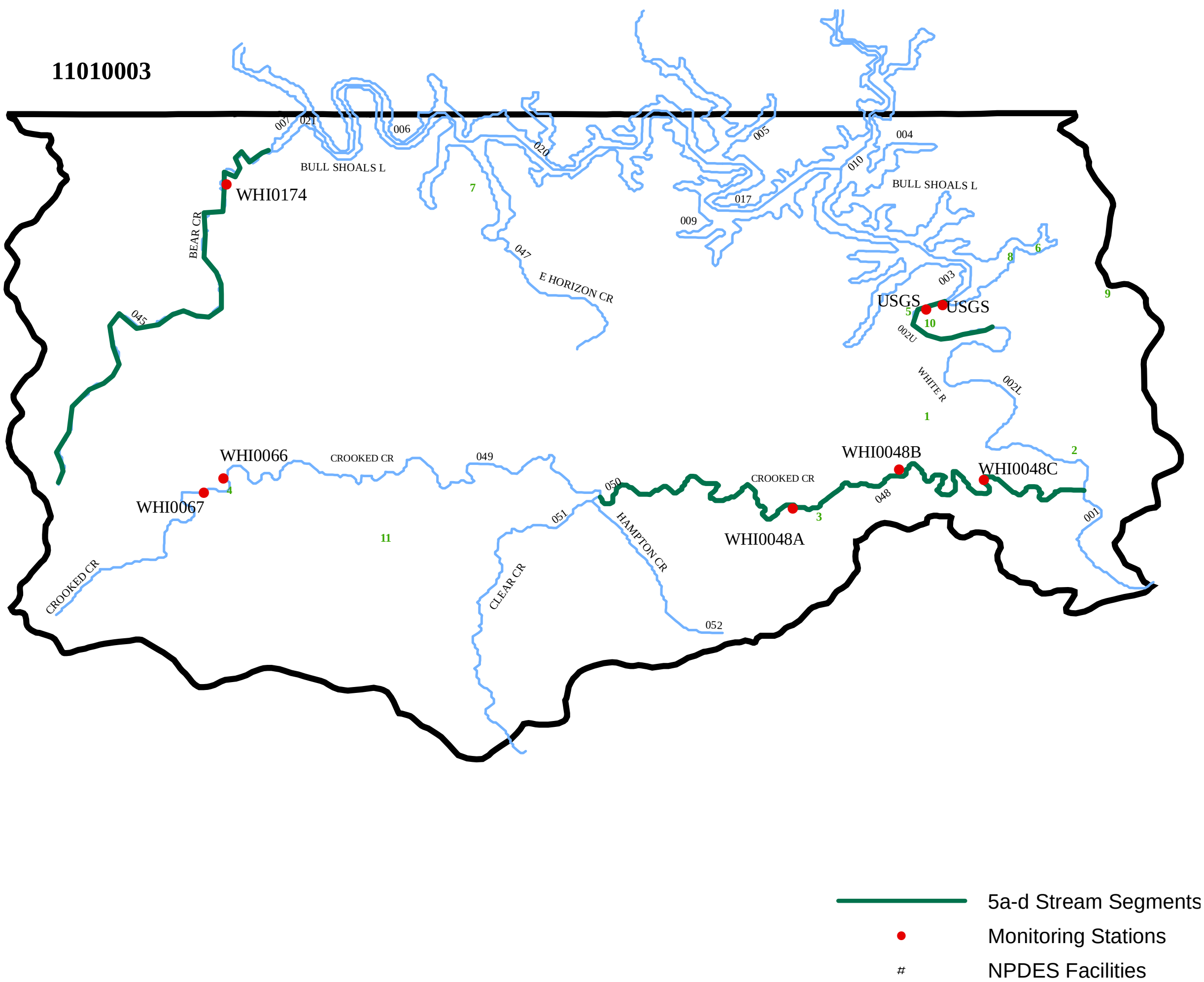
Segment 4I, located in north central Arkansas, includes portions of Boone, and Marion counties. This segment encompasses a 31-mile reach of the White River and Crooked Creek and its tributaries.

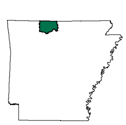
Summary of Water Quality Conditions

All waters within this segment are designated for fish and wildlife propagation, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. None of these waters, except Bull Shoals Reservoir, are designated as outstanding state or national resources. Five monitoring stations were used to assess 117.2 miles of stream, and 7.6 stream miles were evaluated.

Data from Crooked Creek above and below the City of Harrison sewage treatment plant demonstrates some elevated parameters from this discharge and also reflects urban area runoff during storm events.

Figure A-32: Planning Segment 4I





(Segment 4I)

Table A-182: Planning Segment 4I—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-4I																										
White River	11010003	-001	7.6		E	S	S	S	S	S	S									1				FISH CONSUMPTION	124.8	0
White River	11010003	002U	3.0	USGS	M	S	N	S	S	S	S	HP				DO				5a				AQUATIC LIFE	90.1	34.7
White River	11010003	002L	20.4	USGS	M	S	S	S	S	S	S									1				PRIMARY CONTACT	124.8	0
Bear Creek	11010003	-045	25.9	WHI0174	M	S	S	S	S	N	S	UN				Be				5d				SECONDARY CONTACT	124.8	0
E. Horizon C.	11010003	-047	8.9		U															3				DRINKING SUPPLY	67.2	57.6
Crooked Creek	11010003	-048	31.7	WH00I48A+	M	S	N	S	S	N	S	RE	UN			Temp	TDS			5a	5e			AGRI & INDUSTRY	124.8	0
Crooked Creek	11010003	-049	36.2	WHI0066+	M	S	S	S	S	S	S	UN	UN	UN		TDS	Cl	Be		5e	5e	5e				
Clear Creek	11010003	-050	0.4		U															3						
Clear Creek	11010003	-051	17.6		U															3						
Hampton Creek	11010003	-052	9.1		U															3						
TOTAL MILES	160.8																									
MILES UNASSESSED	36.0																									
MILES EVALUATED	7.6																									
MILES MONITORED	117.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0174	Bear Creek at Highway 14 east of New Hope		1	A
WHI0148A	Crooked Creek at Highway 14 near Yellville	Y	1	A
WHI0148B	Crooked Creek south of Flippin		1	A
WHI0148C	Crooked Creek at Highway 101 near Rea Valley		1	A
WHI0066	Crooked Creek below Harrison		1	A
WHI0067	Crooked Creek above Harrison		1	A

Table A-183: Segment 4I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021717	Flippin, City of	Fallen Ash CR, White R	11010003	1
AR0033545	Cotter-Gassville, Towns Of	White R	11010003	2
AR0034037	Yellville, City of	Crooked Creek, White R	11010003	3
AR0034321	Harrison, City of	Crooked CR, White R	11010003	4
AR0036439	Baxter Healthcare Corp-Bruce C	Trib, Bruce CR, White R	11010003	9
AR0037028	Bull Shoals, City of	White R	11010003	5
AR0037052	AR Parks & Tourism-Bull Shoals	White R	11010003	10
AR0037435	Holiday Shores Resort	Bull Shoals Lake Trib	11010003	6
AR0043753	Sugarloaf Wastewater Dist	East Sugarloaf CR, Bull Shoals Lake	11010003	7
AR0045390	Holtby's Inc	Trib/Meek CR	11010003	11
AR0048518	Laurence's Cedar Oaks Resort	Bull Shoals Lake	11010003	8

Table A-184: WHI0048A Crooked Creek at Yellville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.19	4.57	13.50	2.16
BOD_5 (mg/L)	52	0.68	0.06	2.25	0.38
pH (standard units)	54	8.15	7.49	8.44	0.18
Total Organic Carbon (mg/L)	47	1.85	1.00	6.72	0.90
Ammonia as N (mg/L)	53	0.01	0.01	0.08	0.01
$NO_2 + NO_3$ as N (mg/L)	53	0.78	0.01	2.20	0.62
Orthophosphate as P (mg/L)	45	0.04	0.01	0.76	0.11
Total Phosphorus as P (mg/L)	54	0.06	0.01	0.77	0.10
Total Hardness (mg/L)	23	168.87	130.00	247.00	25.56
Chloride (mg/L)	54	8.70	3.77	36.10	4.26
Sulfate (mg/L)	54	6.76	4.36	19.30	2.08
Total Dissolved Solids (mg/L)	52	196.66	159.00	343.00	26.92
Total Suspended Solids (mg/L)	54	8.58	1.00	126.00	17.69
Turbidity (NTU)	54	8.32	0.80	102.00	15.43

Table A-185: WHI0048B Crooked Creek 2 Miles South of Flippin

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	31	10.67	6.51	13.70	2.08
BOD_5 (mg/L)	29	0.86	0.28	2.00	0.46
pH (standard units)	31	8.20	7.37	8.48	0.21
Total Organic Carbon (mg/L)	27	1.91	1.01	4.66	0.89
Ammonia as N (mg/L)	31	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	30	1.05	0.12	1.97	0.51
Orthophosphate as P (mg/L)	23	0.02	0.01	0.11	0.02
Total Phosphorus as P (mg/L)	31	0.04	0.01	0.16	0.03
Total Hardness (mg/L)	12	168.08	109.00	197.00	27.03
Chloride (mg/L)	31	6.92	2.61	10.06	1.54
Sulfate (mg/L)	31	6.24	4.77	8.58	1.03
Total Dissolved Solids (mg/L)	30	445.05	134.00	7701.50	1370.69
Total Suspended Solids (mg/L)	31	8.08	1.00	111.00	19.93
Turbidity (NTU)	31	6.94	1.20	57.90	12.05

Table A-186: WHI0048C Crooked Cr. at Hwy 101 2 Mi. N of Rea Valley (AKA UWCKC02)

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	32	10.22	5.99	13.10	2.20
BOD_5 (mg/L)	31	1.69	0.27	6.45	1.29
pH (standard units)	32	8.24	7.78	8.59	0.22
Total Organic Carbon (mg/L)	30	3.01	1.10	6.82	1.69
Ammonia as N (mg/L)	32	0.01	0.01	0.02	0.003
NO_2 + NO_3 as N (mg/L)	31	0.72	0.01	1.90	0.64
Orthophosphate as P (mg/L)	22	0.02	0.01	0.08	0.02
Total Phosphorus as P (mg/L)	31	0.05	0.01	0.20	0.04
Total Hardness (mg/L)	13	167.85	124.00	193.00	23.49
Chloride (mg/L)	32	7.07	4.10	11.80	1.80
Sulfate (mg/L)	32	7.61	3.88	36.50	5.58
Total Dissolved Solids (mg/L)	31	199.44	145.00	281.00	28.75
Total Suspended Solids (mg/L)	32	7.85	1.00	62.20	11.48
Turbidity (NTU)	32	9.61	1.20	81.00	15.00

Table A-187: WHI0066 Crooked Cr. Downstream of Harrison, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	10.63	6.37	15.20	2.17
BOD_5 (mg/L)	56	0.78	0.01	2.91	0.52
pH (standard units)	58	7.67	6.51	8.52	0.39
Total Organic Carbon (mg/L)	56	2.01	1.03	4.13	0.56
Ammonia as N (mg/L)	60	0.03	0.01	0.46	0.06
NO_2 + NO_3 as N (mg/L)	60	2.49	1.22	5.08	0.82
Orthophosphate as P (mg/L)	60	0.16	0.02	0.54	0.14
Total Phosphorus as P (mg/L)	60	0.18	0.02	0.57	0.14
Total Hardness (mg/L)	23	167.39	122.00	209.00	20.71
Chloride (mg/L)	60	14.96	5.00	36.20	6.35
Sulfate (mg/L)	60	11.26	4.34	29.10	5.04
Total Dissolved Solids (mg/L)	60	224.86	133.00	274.00	31.52
Total Suspended Solids (mg/L)	60	5.54	1.00	59.20	7.94
Turbidity (NTU)	60	9.11	0.80	67.00	10.77

Table A-188: WHI0067 Crooked Cr. Upstream of Harrison, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.89	6.27	14.00	1.91
BOD_5 (mg/L)	53	0.61	0.05	1.94	0.43
pH (standard units)	58	7.36	6.05	8.57	0.46
Total Organic Carbon (mg/L)	53	1.70	1.02	4.05	0.68
Ammonia as N (mg/L)	60	0.01	0.01	0.09	0.02
NO_2 + NO_3 as N (mg/L)	60	1.62	0.02	2.33	0.34
Orthophosphate as P (mg/L)	54	0.02	0.01	0.10	0.01
Total Phosphorus as P (mg/L)	60	0.04	0.01	0.14	0.03
Total Hardness (mg/L)	23	169.83	121.00	210.00	23.39
Chloride (mg/L)	60	8.03	4.33	19.40	2.15
Sulfate (mg/L)	60	6.05	4.06	16.60	1.78
Total Dissolved Solids (mg/L)	60	203.88	118.00	246.00	26.34
Total Suspended Solids (mg/L)	60	4.86	1.00	28.50	5.20
Turbidity (NTU)	60	8.56	1.00	40.00	8.95

SEGMENT 4J BUFFALO RIVER AND TRIBUTARIES

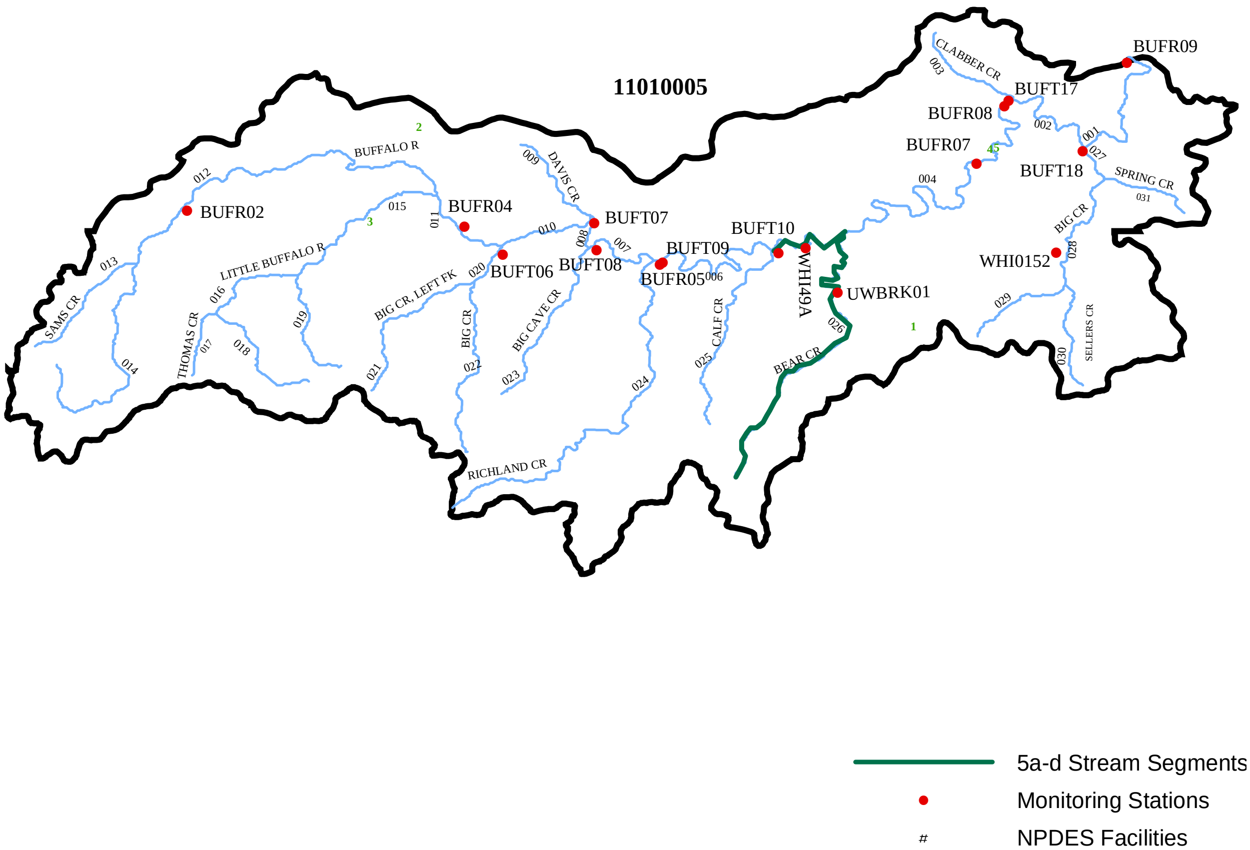
Segment 4J includes portions of Newton, Searcy, and Marion counties in north central Arkansas. This segment contains the entire 113-mile length of the Buffalo River and its major tributaries - Big Creek, Little Buffalo, Richland Creek, Water Creek, Bear Creek, and others.

Summary of Water Quality Conditions

Designated uses of waters in this segment include propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. Almost 48 percent of the stream miles are also designated as outstanding state or national resource waters. Only one routine monitoring station is located in this segment; however, over the past several years, a cooperative project with the Buffalo National River has added close to 60 sites on the Buffalo River, its tributaries, and watershed springs. This has allowed for the assessment of 264.1 stream miles and the evaluation of another 53 stream miles.

The main stem of the Buffalo River near Marshall had four critical season dissolved oxygen readings below the 6.0 mg/L standard. These occurred during the summer months of 2001 and 2002. No violations have occurred since.

Figure A-33: Planning Segment 4J



(Segment 4J)

Table A-189: Planning Segment 4J—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-4J																										
Buffalo River	11010005	-001	11.3	BUFR09	M	S	N	S	S	S	S	UN				TEMP				5e				FISH CONSUMPTION	317.1	0
Buffalo River	11010005	-002	8.7		M	S	S	S	S	S	S									1				AQUATIC LIFE	270.2	46.9
Clabber Creek	11010005	-003	7.3	BUFT17	M	S	S	S	S	S	S									1				PRIMARY CONTACT	317.1	0
Buffalo River	11010005	-004	27.8	BUFR07&08	M	S	S	S	S	S	S									1				SECONDARY CONTACT	317.1	0
Buffalo River	11010005	-005	6.9	WHI0049A	M	S	N	S	S	S	S	UN				DO				5c				DRINKING SUPPLY	317.1	0
Buffalo River	11010005	-006	13.7		M	S	S	S	S	S	S									1				AGRI & INDUSTRY	293.2	23.9
Buffalo River	11010005	-007	5.9	BUFR05	M	S	S	S	S	S	S									1						
Buffalo River	11010005	-008	2.6		M	S	S	S	S	S	S									1						
Davis Creek	11010005	-009	7.3	BUFT07	M	S	S	S	S	S	S									1						
Buffalo River	11010005	-010	6.2		M	S	S	S	S	S	S									1						
Buffalo River	11010005	-011	6.0	BUFR04	M	S	S	S	S	S	S									1						
Buffalo River	11010005	-012	25.8	BUFR02&03	M	S	S	S	S	S	S									1						
Sams Creek	11010005	-013	9.0		M	S	S	S	S	S	S									1						
Buffalo River	11010005	-014	18.2	BUFR01	M	S	S	S	S	S	S									1						
Little Buffalo	11010005	-015	11.6	BUFT05	M	S	S	S	S	S	S									1						
Little Buffalo	11010005	-016	6.6		E	S	S	S	S	S	S									1						
Thomas Creek	11010005	-017	5.2		U															3						
East Fork	11010005	-018	8.9		U															3						
Shop Creek	11010005	-019	8.6		U															3						
Big Creek	11010005	-020	3.2	BUFT06	M	S	S	S	S	S	S									1						
Big Creek Left Fk.	11010005	-021	11.7		E	S	S	S	S	S	S									1						
Big Creek	11010005	-022	13.7		E	S	S	S	S	S	S									1						
Big Cave Cr.	11010005	-023	13.0	BUFT08	M	S	S	S	S	S	S									1						
Richland Creek	11010005	-024	28.7	BUFT09	M	S	N	S	S	S	S	UN				Temp				4c						
Calf Creek	11010005	-025	15.0	BUFT10	M	S	S	S	S	S	S									1						
Bear Creek	11010005	-026	23.9	UWBRK01,+	M	S	S	S	S	S	N	MP				TDS				5d						
Big Creek	11010005	-027	2.6	BUFT18	M	S	S	S	S	S	S									1						
Big Creek	11010005	-028	9.4	WHI0152	M	S	S	S	S	S	S									1						
Big Creek	11010005	-029	7.1		E	S	S	S	S	S	S									1						
Sellers Creek	11010005	-030	8.1		E	S	S	S	S	S	S									1						
Spring Creek	11010005	-031	5.8		E	S	S	S	S	S	S									1						
TOTAL MILES	339.8																									
MILES UNASSESSED	22.7																									
MILES EVALUATED	53.0																									
MILES MONITORED	264.1																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
BFR09	Buffalo River near its mouth			USNPS
BUFT7	Clabber Creek			USNPS
BFR07	Buffalo River at Highway 14			USNPS
BFR08	Buffalo River at Rush			USNPS
WHI0049A	Buffalo River at Highway 65 near St. Joe	Y	1	A
BFR05	Buffalo River at Woolum			USNPS
BUFT07	Davis Creek			USNPS
BUFR04	Buffalo River at Hasty			USNPS
BUFR02	Buffalo River at Ponca			USNPS
BUFR03	Buffalo River near Pruitt			USNPS
BUFR01	Buffalo River at Wilderness Boundary			USNPS
BUFT05	Little Buffalo River			USNPS
BUFT06	Big Creek - Newton County			USNPS
BUFT08	Cave Creek			USNPS
BUFT09	Richland Creek			USNPS
BUFT10	Calf Creek			USNPS
UWBRK01	Bear Creek at Highway 65, 4 miles west of Marshall		1	R
BUFT18	Big Creek - Marion County			USNPS
WHI0152	Big Creek at Highway 14, west of Big Flat		1	R

Table A-190: Segment 4J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0034011	Marshall, City of	Forest CR, Bear CR, Buffalo R	11010005	1
AR0034088	Marble Falls Sid #1-Dogpatch	Trib, Mill CR	11010005	2
AR0034584	Jasper, City of	L Buffalo R/Buffalo R/White R	11010005	3
AR0034941	USDINPS-Buffalo Nat'l River-Buf	Buffalo R	11010005	4
AR0034959	USDINPS-Buffalo Nat'l River-Buf	Panther CR, Buffalo R	11010005	5

Table A-191: WHI0049A Buffalo River Near St. Joe, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	8.26	4.81	12.60	2.10
BOD_5 (mg/L)	43	0.45	-0.14	2.12	0.43
pH (standard units)	54	7.61	6.43	8.62	0.45
Total Organic Carbon (mg/L)	47	1.50	0.71	4.76	0.70
Ammonia as N (mg/L)	56	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	57	0.15	0.01	1.10	0.18
Orthophosphate as P (mg/L)	41	0.01	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	56	0.03	0.01	0.34	0.05
Total Hardness (mg/L)	22	98.00	54.00	131.00	21.76
Chloride (mg/L)	57	2.73	1.28	6.82	0.80
Sulfate (mg/L)	57	5.37	3.97	12.60	1.16
Total Dissolved Solids (mg/L)	57	124.23	83.00	161.00	19.16
Total Suspended Solids (mg/L)	57	3.94	1.00	90.80	12.15
Turbidity (NTU)	57	5.90	0.71	110.00	14.95

SEGMENT 4K UPPER WHITE RIVER AND KINGS RIVER

Segment 4K includes portions of Washington, Benton, Madison, Carroll, Boone, Newton, and Franklin counties in northwest Arkansas. This segment encompasses a 66-mile reach of the White River and its tributaries and an 85-mile reach of the Kings River and its tributaries. It also includes Long Creek and Yocum Creek.

Summary of Water Quality Conditions

All waters within this segment are designated for propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. Also, about 20 percent of these waters are designated as outstanding state or national resource waters. A total of 327.3 miles of streams were monitored for use support and an additional 138.7 miles were evaluated.

Aquatic life use was assessed as not supported in the West Fork of the White River and the White River down stream of the West Fork. The major cause was high turbidity levels and excessive silt loads (Figure A-35). A TMDL to address this issue was completed in 2006.

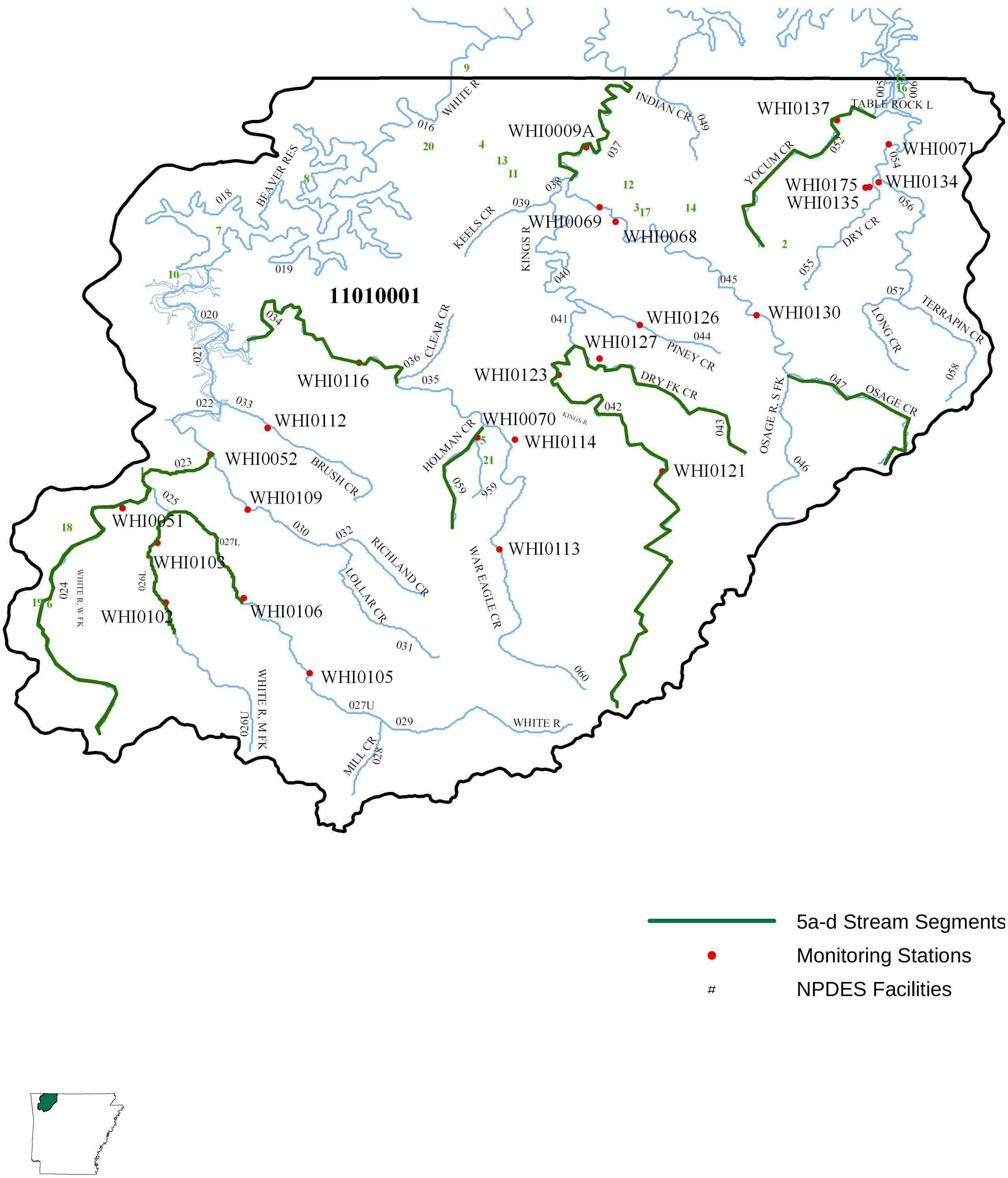
The Middle Fork White River and the White River occasionally failed to meet the dissolved oxygen standard of 6.0 mg/L. The exact cause of the impairment is unknown at this time.

Several stream segments in this planning segment were listed as not supporting the drinking water use because of beryllium concentrations. Additional monitoring and an investigation into the proper standard are needed.

A point source discharge to Holman Creek has impaired the drinking water use of the lower section of this stream by discharges of excessive levels of total dissolved solids. Additional investigations are needed to address this problem.

Total phosphorus levels in the Kings Rive and Osage Creek below the Berryville WWTP have decreased significantly over the past six years (Figure 1-36).

Figure A-34: Planning Segment 4K



(Segment 4K)

Table A-192: Planning Segment 4K—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-4K																										
White River	11010001	-022	8.3		U															3				FISH CONSUMPTION	466	0
White River	11010001	-023	6.2	WHI0052	M	S	N	S	S	S	S	SE	AG	AG	AG	SI	Cl	SO4	TDS	4a	5e	5e	5e	AQUATIC LIFE	407.3	58.7
West Fork	11010001	-024	27.2	WHI0051+	M	S	N	S	S	S	S	SE	UN	RC/AG		SI	SO4	TDS	DO	4a	5e	5e	5a	PRIMARY CONTACT	466	0
White River	11010001	-025	2.4		U															3				SECONDARY CONTACT	466	0
Middle Fork	11010001	-026U	13.8	WHI0102	M	S	S	S	S	S	S									1				DRINKING SUPPLY	331.9	134.1
Middle Fork	11010001	-026L	8.1	WHI0103	M	S	N	S	S	S	S	UN				DO				5d				AGRI & INDUSTRY	437.8	28.2
White River	11010001	-027U	6.6	WHI0105	M	S	S	S	S	S	S									1						
White River	11010001	-027L	17.2	WHI0106+	M	S	N	S	S	N	S	UN	UN			DO	Be			5d	5d					
Mill Creek	11010001	-028	6.1		E	S	S	S	S	S	S									1						
White River	11010001	-029	13.5		E	S	S	S	S	S	S									1						
Richland Cr.	11010001	-030	12.1	WHI0109	M	S	S	S	S	S	S									1						
Lollar Creek	11010001	-031	12.5		E	S	S	S	S	S	S									1						
Richland Cr.	11010001	-032	7.1		E	S	S	S	S	S	S									1						
Brush Creek	11010001	-033	13.5	WHI0112	M	S	S	S	S	S	S									1						
War Eagle Cr.	11010001	-034	22.2	WHI0116	M	S	S	S	S	N	S	UN				Be				5d						
War Eagle Cr.	11010001	-035	8.6		E	S	S	S	S	S	S									1						
Clear Creek	11010001	-036	6.7		E	S	S	S	S	S	S									1						
Kings River	11010001	-037	19.1	WHI0009A	M	S	S	S	S	S	N	MP				TDS				5b						
Kings River	11010001	-038	3.4	WHI0077	M	S	S	S	S	S	S									1						
Kings River	11010001	-040	17.9		E	S	S	S	S	S	S									1						
Kings River	11010001	-041	4.8	WHI0121	M	S	S	S	S	S	S									1						
Kings River	11010001	-042	39.5	WHI0123	M	S	S	S	S	N	S	UN	UN			Be	TDS			5d	5d					
Keels Creek	11010001	-039	7.3		E	S	S	S	S	S	S									1						
Dry Fork	11010001	-043	16.5	WHI0127	M	S	S	S	S	N	S	UN				Be				5d						
Piney Creek	11010001	-044	10.2	WHI0126	M	S	S	S	S	S	S									1						
Osage Creek	11010001	045U	25.6	WHI0068+	M	S	S	S	S	S	S									1						
Osage Creek	11010001	045L	5.0	WHI0069	M	S	S	S	S	S	S									1						
South Fork	11010001	-046	13.8		E	S	S	S	S	S	S									1						
Osage Creek	11010001	-047	13.4		E	S	S	S	S	N	S	UN				Be				5d						
Yocum Creek	11010001	-052	16.2	WHI0137	M	S	S	S	S	N	S	UN				Be				5d						
Long Creek	11010001	-054	8.4	WHI0071	M	S	S	S	S	S	S									1						
Dry Creek	11010001	-055	12.0		E	S	S	S	S	S	S									1						
Long Creek	11010001	-056	14.3	WHI0134+	M	S	S	S	S	S	S									1						
Long Creek	11010001	-057	8.6		E	S	S	S	S	S	S									1						
Terrapin Cr.	11010001	-058	11.2		E	S	S	S	S	S	S									1						
Holman Creek	11010001	-059	9.1	WHI0070	M	S	S	S	S	N	N	MP				TDS				5a						
War Eagle Cr.	11010001	-060	28.3	WHI0114	M	S	S	S	S	S	S									1						
TOTAL MILES	476.7																									
MILES UNASSESSED	10.7																									
MILES EVALUATED	138.7																									
MILES MONITORED	327.3																									

Table A-192 Continued: Planning Segment 4K—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0052	White River near Goshen	Y	1	A
WHI0098	West Fork White River at county road bridge below Dye Creek near West Fork		1	R
WHI0051	West Fork White River near Fayetteville	Y	1	A
WHI0102	Middle Fork White River at county road 32, I mile south of Sulphur City		1	R
WHI0103	Middle Fork White River west of Elkins	Y	1	A
WHI0106	White River near Durham		1	A
WHI0105	White River near Crosses		1	R
WHI0109	Richland Creek1 mile north of Tuttle		1	R
WHI0112	Brush Creek north of Highway 45 off Highway 303		1	R
WHI0116	War Eagle Creek at Highway 45, north of Hindsville	Y	1	A
WHI009A	Kings River north of Berryville	Y	1	A
WHI0077	Kings River below Berryville		1	R
WHI0121	Kings River at Highway 21		1	R
WHI0123	Kings River northeast of Alabam	Y	1	A
WHI0127	Dry Fork Creek west of Metalton		1	R
WHI0126	Piney Creek northwest of Metalton		1	R
WHI0068	Osage Creek above Berryville	Y	1	A
WHI0130	Osage Creek northeast of Metalton		1	R
WHI0069	Osage Creek below Berryville		1	A
WHI0137	Yocum Creek on county road 1.25 miles northwest of Highway 311		1	R
WHI0071	Long Creek below Denver	Y	1	A
WHI0134	Long Creek near Denver		1	R
WHI0175	Callens Branch near Denver		1	R
WHI0070	Holman Creek below Huntsville		1	A
WHI0113	War Eagle Creek at county road bridge west of Highway 23		1	R
WHI0114	War Eagle Creek at Highway 412		1	R

Table A-193: Segment 4K Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0020010	Fayetteville, City of	West Fork White R (1) & Mud CR-AR R(2)	11010001	1
AR0021741	Green Forest, City of	Trib, Dry CR, Long CR	11010001	2
AR0021792	Berryville, City of	Freeman Branch, Osage CR, Kings R	11010001	3
AR0021865	Eureka Springs, City of	Leatherwood CR	11010001	4
AR0022004	Huntsville, City of	Town Branch/Holman CR/War Eagle CR	11010001	5
AR0022373	West Fork, City of	West Fork White R	11010001	6
AR0033197	Heritage Bay Homeowners Assn	Beaver Lake	11010001	7
AR0036676	Lost Bridge Village W&S Dist	Beaver Lake	11010001	8
AR0037249	Holiday Island Sid	Table Rock Lake	11010001	9
AR0037320	Beaver Lodge, Inc	Monte NE Cove-Beaver Lake	11010001	10
AR0040118	Country Mountain Inn	Trib-Keels CR/Kings R	11010001	11
AR0044059	Carroll Electric Coop Corp	Trib, CR, King R	11010001	12
AR0044300	Teyar LLC	Leatherwood CR	11010001	13
AR0045667	Apac-Arkansas, Inc-West Fork	Trib/W FK/White R	11010001	19
AR0047619	Carroll County Stone, Inc	Trib, Warden Branch, Osage CR	11010001	14
AR0047988	Eureka Springs KOA Campground	Trib, Lake Leatherwood, White R	11010001	20
AR0048577	Beaver Lake Concrete	Town BR, Holman CR, War Eagle, Beaver	11010001	21
AR0048844	Outdoor Resorts of The Ozarks	Table Rock Lake, Impd, White R	11010001	15
AR0049191	Crickett Creek R Estates	Table Rock Lake	11010001	16
AR0049867	Bedford Falls Mobile Home Park	Trib, Osage CR, Kings R, Table Rock Lake	11010001	17
AR0050211	Kearney-National, Inc.	Ditch, Trib, W Fork White R, White R	11010001	18

Table A-194: WHI0009A Kings River N. of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	10.06	6.52	15.50	2.35
BOD_5 (mg/L)	52	0.72	0.04	1.82	0.38
pH (standard units)	56	7.83	6.01	8.78	0.55
Total Organic Carbon (mg/L)	52	2.01	1.06	3.92	0.59
Ammonia as N (mg/L)	57	0.01	0.01	0.06	0.01
NO_2 + NO_3 as N (mg/L)	57	0.56	0.01	1.92	0.52
Orthophosphate as P (mg/L)	56	0.22	0.01	2.33	0.37
Total Phosphorus as P (mg/L)	58	0.22	0.01	2.35	0.35
Total Hardness (mg/L)	21	123.33	77.00	171.00	18.79
Chloride (mg/L)	57	8.90	2.06	35.60	6.62
Sulfate (mg/L)	57	7.79	3.93	16.00	2.66
Total Dissolved Solids (mg/L)	58	161.43	84.00	297.00	40.17
Total Suspended Solids (mg/L)	58	7.01	1.00	96.00	16.50
Turbidity (NTU)	57	8.49	0.80	81.00	15.09

Table A-195: WHI0051 West Fork White River Near Fayetteville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.17	4.44	14.00	2.81
BOD_5 (mg/L)	53	0.95	0.10	3.38	0.70
pH (standard units)	54	7.50	6.17	8.58	0.41
Total Organic Carbon (mg/L)	55	2.82	1.07	6.12	1.26
Ammonia as N (mg/L)	60	0.02	0.01	0.06	0.02
NO_2 + NO_3 as N (mg/L)	59	0.48	0.02	2.01	0.42
Orthophosphate as P (mg/L)	43	0.02	0.01	0.05	0.01
Total Phosphorus as P (mg/L)	59	0.05	0.02	0.24	0.05
Total Hardness (mg/L)	23	96.61	74.00	156.00	19.92
Chloride (mg/L)	60	6.49	2.55	32.90	5.13
Sulfate (mg/L)	59	29.39	11.30	58.90	10.26
Total Dissolved Solids (mg/L)	59	142.49	88.00	217.00	33.31
Total Suspended Solids (mg/L)	60	15.61	1.00	98.00	17.92
Turbidity (NTU)	60	26.25	2.80	169.00	32.98

Table A-196: WHI0052 White River Near Goshen, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.29	5.36	13.40	2.28
BOD_5 (mg/L)	54	1.24	0.11	4.93	0.88
pH (standard units)	58	7.43	5.97	8.96	0.69
Total Organic Carbon (mg/L)	55	3.07	1.31	6.52	1.38
Ammonia as N (mg/L)	58	0.03	0.01	0.26	0.04
NO_2 + NO_3 as N (mg/L)	58	1.07	0.01	4.86	0.88
Orthophosphate as P (mg/L)	48	0.03	0.01	0.34	0.05
Total Phosphorus as P (mg/L)	59	0.07	0.02	0.42	0.07
Total Hardness (mg/L)	24	64.83	29.00	163.00	31.13
Chloride (mg/L)	58	10.27	1.68	49.89	11.50
Sulfate (mg/L)	58	23.78	5.41	105.00	22.33
Total Dissolved Solids (mg/L)	59	129.14	65.00	369.00	73.59
Total Suspended Solids (mg/L)	59	18.06	1.00	328.00	42.57
Turbidity (NTU)	59	27.00	0.74	312.00	42.09

Table A-197: WHI0068 Osage Creek Upstream of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.73	5.63	16.00	2.70
BOD_5 (mg/L)	54	0.69	-0.01	2.46	0.44
pH (standard units)	58	7.65	5.83	8.38	0.58
Total Organic Carbon (mg/L)	56	2.20	1.30	3.88	0.61
Ammonia as N (mg/L)	60	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	60	0.78	0.01	3.42	0.68
Orthophosphate as P (mg/L)	51	0.02	0.01	0.06	0.01
Total Phosphorus as P (mg/L)	60	0.04	0.01	0.11	0.02
Total Hardness (mg/L)	23	136.39	58.00	199.00	35.60
Chloride (mg/L)	60	5.80	1.87	8.37	1.40
Sulfate (mg/L)	60	7.93	3.77	15.80	1.90
Total Dissolved Solids (mg/L)	60	157.43	98.50	212.00	29.81
Total Suspended Solids (mg/L)	60	4.99	1.00	46.00	7.88
Turbidity (NTU)	60	8.47	1.30	65.00	11.23

Table A-198: WHI0069 Osage Creek Downstream of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.93	4.90	15.50	2.83
BOD_5 (mg/L)	55	0.83	0.04	1.95	0.47
pH (standard units)	54	7.80	6.12	8.79	0.67
Total Organic Carbon (mg/L)	52	3.07	1.44	7.28	1.27
Ammonia as N (mg/L)	55	0.02	0.01	0.20	0.03
NO_2 + NO_3 as N (mg/L)	55	0.97	0.01	3.86	0.74
Orthophosphate as P (mg/L)	55	0.80	0.02	7.64	1.14
Total Phosphorus as P (mg/L)	55	0.80	0.02	6.81	1.03
Total Hardness (mg/L)	20	142.60	87.00	185.00	26.09
Chloride (mg/L)	55	21.85	2.04	101.00	22.82
Sulfate (mg/L)	55	15.48	3.74	59.70	12.45
Total Dissolved Solids (mg/L)	55	236.82	102.50	644.50	109.85
Total Suspended Solids (mg/L)	55	7.22	1.00	97.80	16.04
Turbidity (NTU)	55	9.02	1.40	80.00	14.09

Table A-199: WHI0070 Holman Creek Downstream of Huntsville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.87	4.66	16.20	2.84
BOD_5 (mg/L)	57	1.13	0.03	14.43	1.94
pH (standard units)	58	7.77	6.40	9.00	0.50
Total Organic Carbon (mg/L)	56	3.22	1.38	9.28	1.48
Ammonia as N (mg/L)	60	0.08	0.01	2.65	0.35
NO_2 + NO_3 as N (mg/L)	60	3.07	0.01	14.31	2.63
Orthophosphate as P (mg/L)	58	1.83	0.01	8.47	1.96
Total Phosphorus as P (mg/L)	60	2.04	0.04	8.49	2.11
Total Hardness (mg/L)	23	130.83	41.00	234.00	46.53
Chloride (mg/L)	58	88.29	0.75	312.00	78.03
Sulfate (mg/L)	60	17.22	0.88	26.30	4.95
Total Dissolved Solids (mg/L)	60	324.94	97.00	792.00	180.97
Total Suspended Solids (mg/L)	60	15.78	1.00	727.00	93.63
Turbidity (NTU)	60	21.29	0.70	863.00	111.28

Table A-200: WHI0071 Long Creek Downstream of Denver, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	10.39	7.27	14.60	2.15
BOD_5 (mg/L)	53	0.67	0.04	2.60	0.46
pH (standard units)	57	7.80	6.67	8.55	0.45
Total Organic Carbon (mg/L)	55	1.78	1.11	3.79	0.52
Ammonia as N (mg/L)	59	0.01	0.01	0.03	0.007
NO_2 + NO_3 as N (mg/L)	59	1.74	0.57	3.31	0.62
Orthophosphate as P (mg/L)	59	0.27	0.09	0.56	0.15
Total Phosphorus as P (mg/L)	59	0.27	0.10	0.60	0.13
Total Hardness (mg/L)	23	155.35	106.00	215.00	30.00
Chloride (mg/L)	59	13.34	4.13	23.67	5.27
Sulfate (mg/L)	59	9.97	5.88	17.00	2.32
Total Dissolved Solids (mg/L)	59	206.52	135.00	262.00	30.15
Total Suspended Solids (mg/L)	59	3.59	1.00	34.50	4.98
Turbidity (NTU)	59	6.33	1.10	33.00	6.77

Table A-201: WHI0103 Middle Fork White River off Co. Rd. 2 Mi. SW of Elkins, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.69	4.35	15.16	2.63
BOD_5 (mg/L)	44	0.50	0.05	2.57	0.41
pH (standard units)	54	7.52	5.47	11.30	0.75
Total Organic Carbon (mg/L)	47	1.46	0.72	3.69	0.62
Ammonia as N (mg/L)	60	0.01	0.01	0.05	0.01
NO_2 + NO_3 as N (mg/L)	59	0.78	0.07	3.78	0.70
Orthophosphate as P (mg/L)	42	0.01	0.01	0.05	0.01
Total Phosphorus as P (mg/L)	60	0.03	0.00	0.36	0.05
Total Hardness (mg/L)	23	51.74	36.00	66.00	8.82
Chloride (mg/L)	60	3.17	1.42	4.50	0.61
Sulfate (mg/L)	59	7.64	3.91	17.50	2.49
Total Dissolved Solids (mg/L)	59	78.08	51.00	109.00	13.67
Total Suspended Solids (mg/L)	60	3.29	1.00	65.80	8.40
Turbidity (NTU)	60	8.17	0.60	82.00	13.69

Table A-202: WHI0106 White River off Co. Rd. at Durham - Adjacent to Hwy 16

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.75	4.03	14.60	2.39
BOD_5 (mg/L)	47	0.58	0.00	1.86	0.46
pH (standard units)	53	7.22	4.78	8.52	0.62
Total Organic Carbon (mg/L)	39	1.65	0.64	5.24	0.93
Ammonia as N (mg/L)	60	0.01	0.01	0.10	0.01
NO_2 + NO_3 as N (mg/L)	59	0.40	0.01	2.08	0.38
Orthophosphate as P (mg/L)	38	0.01	0.01	0.08	0.01
Total Phosphorus as P (mg/L)	59	0.04	0.02	0.30	0.04
Total Hardness (mg/L)	23	42.26	25.00	153.00	39.21
Chloride (mg/L)	60	2.15	1.36	3.19	0.50
Sulfate (mg/L)	59	6.48	3.04	82.60	10.56
Total Dissolved Solids (mg/L)	59	48.20	26.50	190.00	23.11
Total Suspended Solids (mg/L)	60	5.52	1.00	76.50	11.33
Turbidity (NTU)	60	14.07	1.00	120.00	21.17

Table A-203: WHI0116 War Eagle Creek at Hwy 45

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.08	5.62	14.00	2.37
BOD_5 (mg/L)	53	0.66	0.00	2.25	0.49
pH (standard units)	56	7.44	6.13	8.44	0.62
Total Organic Carbon (mg/L)	52	1.95	1.17	4.73	0.82
Ammonia as N (mg/L)	57	0.01	0.01	0.06	0.01
NO_2 + NO_3 as N (mg/L)	57	1.25	0.42	2.67	0.50
Orthophosphate as P (mg/L)	56	0.04	0.01	0.22	0.04
Total Phosphorus as P (mg/L)	58	0.07	0.02	0.24	0.04
Total Hardness (mg/L)	22	90.09	43.00	144.00	29.16
Chloride (mg/L)	57	13.19	2.53	45.30	9.56
Sulfate (mg/L)	57	6.30	4.26	10.49	1.29
Total Dissolved Solids (mg/L)	58	134.07	73.00	224.00	40.61
Total Suspended Solids (mg/L)	58	6.24	1.00	57.20	8.60
Turbidity (NTU)	58	11.53	1.40	63.00	14.25

Table A-204: WHI0123 Kings River at Co. Rd. Bridge 3 Mi. NE of Alabam

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	9.30	5.01	14.00	2.28
BOD_5 (mg/L)	54	0.74	-0.03	2.34	0.53
pH (standard units)	59	7.64	6.05	9.06	0.62
Total Organic Carbon (mg/L)	57	1.94	1.11	4.24	0.79
Ammonia as N (mg/L)	61	0.01	0.01	0.06	0.01
NO_2 + NO_3 as N (mg/L)	61	0.70	0.19	6.02	0.76
Orthophosphate as P (mg/L)	47	0.06	0.00	1.67	0.24
Total Phosphorus as P (mg/L)	61	0.06	0.01	1.71	0.22
Total Hardness (mg/L)	24	94.54	25.00	311.00	56.59
Chloride (mg/L)	61	4.00	2.02	11.00	1.29
Sulfate (mg/L)	61	5.27	3.01	20.80	2.24
Total Dissolved Solids (mg/L)	61	125.91	66.00	755.00	86.84
Total Suspended Solids (mg/L)	61	3.70	1.00	21.00	3.33
Turbidity (NTU)	61	8.06	1.20	39.30	8.64

Figure A-35: West Fork White River (WHI0051) Turbidity

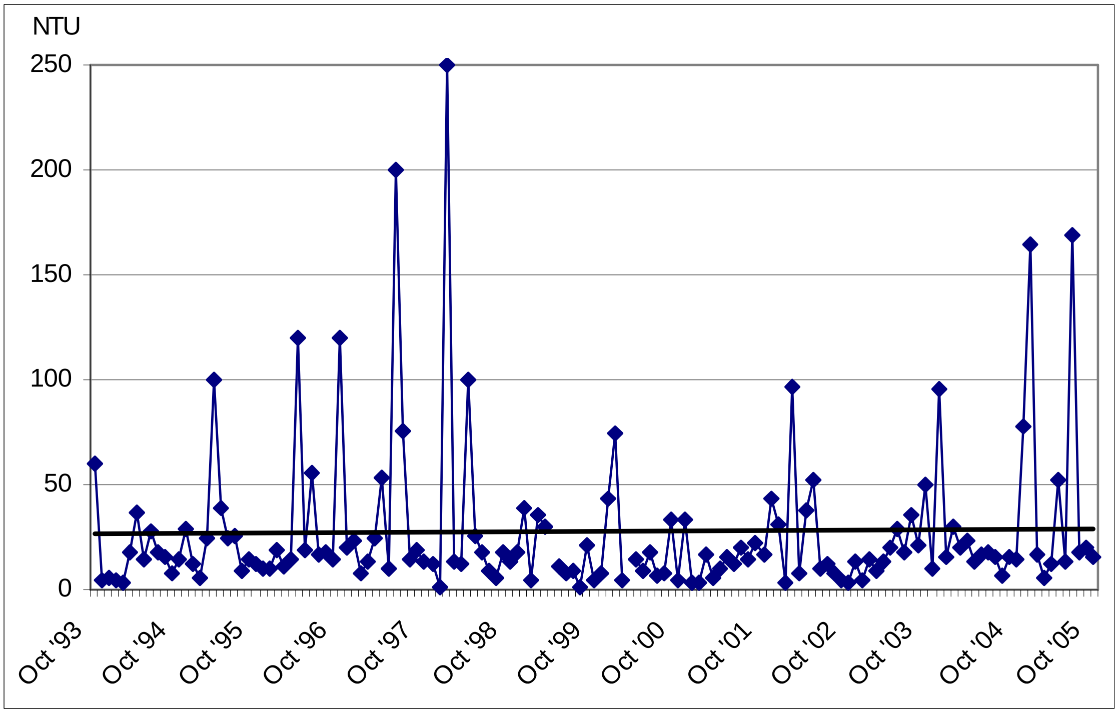
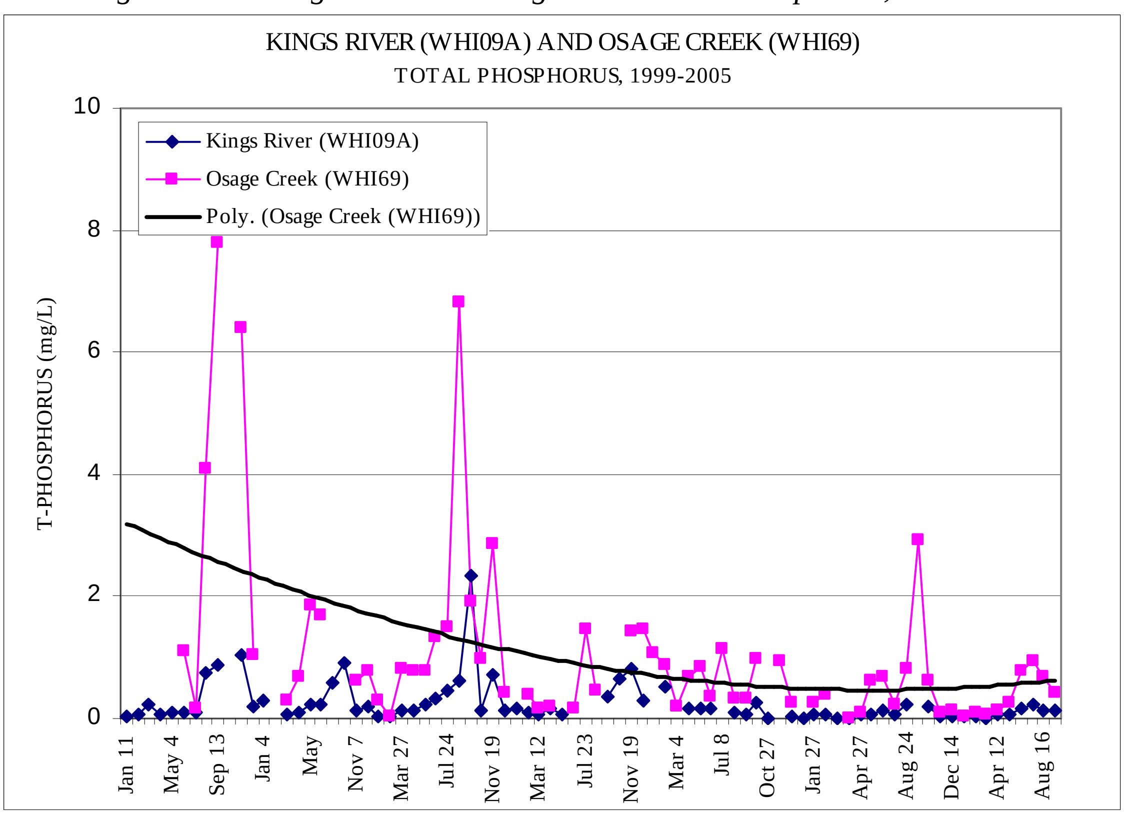


Figure A-36: Kings River and Osage Creek Total Phosphorus, 1999-2005



SEGMENTS 5A, 5B, 5C ST. FRANCIS RIVER BASIN

Segment 5A is located on the east central edge of Arkansas and covers parts of Crittenden, St. Francis, Lee, Poinsett, Craighead, Greene, Mississippi, Clay and Cross counties. This segment contains the St. Francis River and its principal tributaries Fifteen Mile Bayou, Blackfish Bayou, and Tyronza River.

Segment 5B is located in northeast Arkansas and covers parts of Craighead, Poinsett, Cross, St. Francis and Lee counties. This segment includes the entire 98-mile length of the L'Anguille River. The principal tributaries are Brushy Creek, First Creek, Second Creek, and Larkin Creek.

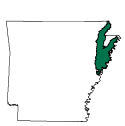
Segment 5C is located in the northeast corner of Arkansas and covers parts of Craighead, Mississippi, and Poinsett, counties. This segment includes the Little River Basin and Pemiscot Bayou.

Summary of Water Quality Conditions

The waters within these segments have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. These three segments are discussed as one unit due to the consistent nature of the water quality. The overriding impact of land use on water quality can be seen in this segment. This basin contains 933.1 stream miles of which approximately 14 percent are designated as outstanding resources. Approximately 74 percent of the waters within this basin were assessed; 482.8 miles were monitored and 204.1 miles evaluated. The assessment concludes that essentially all of the streams within these segments have high turbidity and silt loads carried into the streams from row crop agriculture activities. This condition was encouraged by the drainage of lowland areas and by ditching and the channelization of streams to facilitate the runoff. The continuation of such activities and the continuous maintenance dredging of the ditches and streams aggravates and further deteriorates the conditions.

Because of the very high levels of turbidity during high flows and consistently elevated values during other flows, the entire length of the L'Anguille River was assessed as not supporting the aquatic life uses. A TMDL has been completed for siltation/turbidity in the L'Anguille River basin.

Figure A-37: Planning Segment 5A



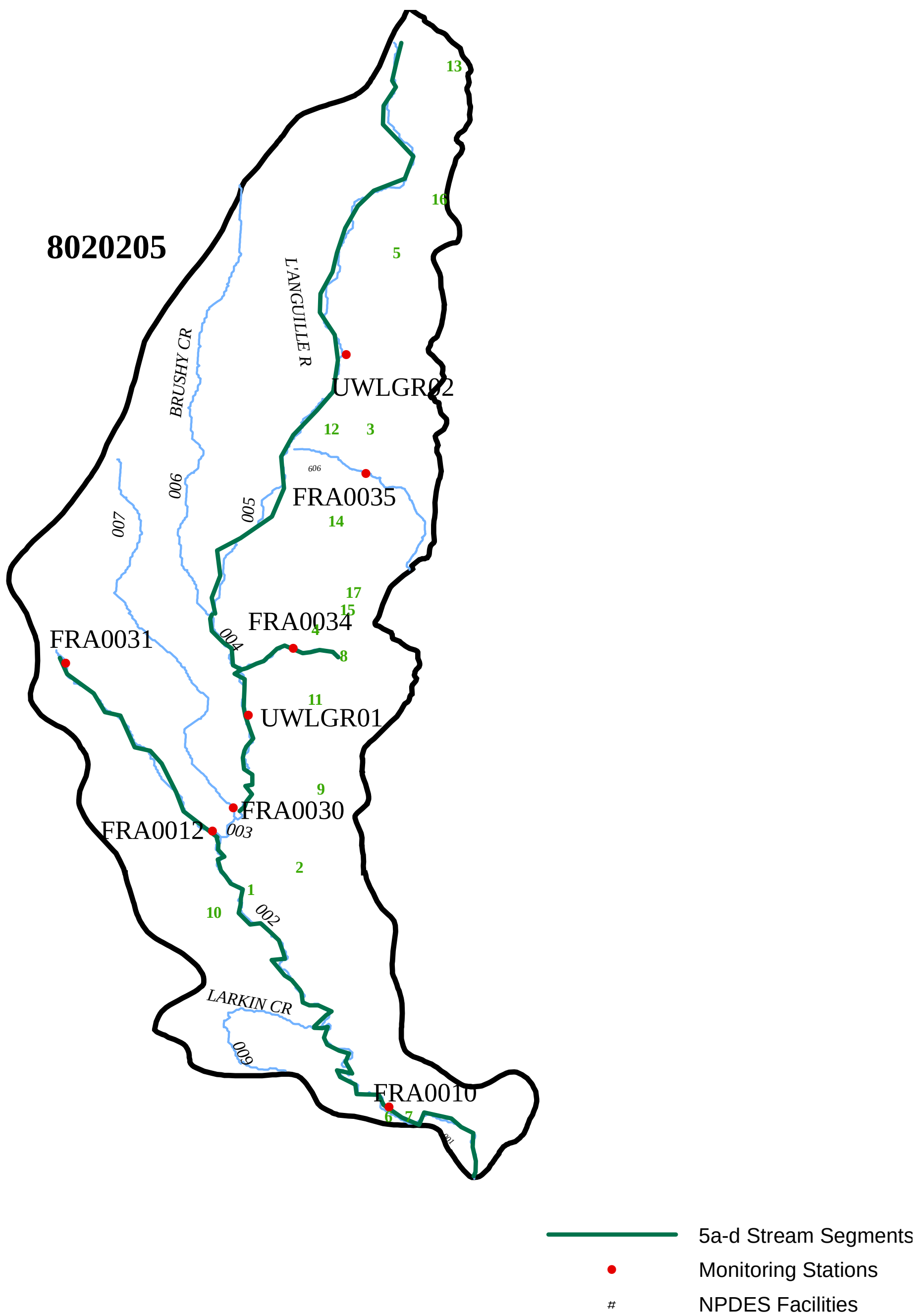
(Segment 5A)

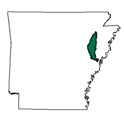
Table A-205: Planning Segment 5A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-5A																										
St. Francis R.	8020203	-001	11.9		E	S	S	S	S	S	S									1				FISH CONSUMPTION	368.8	0
St. Francis R.	8020203	-002	25.5		E	S	S	S	S	S	S									1				AQUATIC LIFE	255.7	113.1
Blackfish Bayou	8020203	-003	2.4		E	S	S	S	S	S	S									1				PRIMARY CONTACT	368.8	0
Frenchmans B.	8020203	-004	14.5		E	S	S	S	S	S	S									1				SECONDARY CONTACT	368.8	0
Blackfish Bayou	8020203	-005	2.6		E	S	S	S	S	S	S									1				DRINKING SUPPLY	346	22.8
Fifteen Mile B.	8020203	-006	38.4	FRA0028	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	368.8	0
Ten Mile Bayou	8020203	-006t	17.3	FRA0029	M	S	N	S	S	S	S	AG				DO				5e						
Blackfish Bayou	8020203	-007	16.1	FRA0027	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-008	55.9	FRA0013	M	S	N	S	S	S	S	AG				CL				5d						
St. Francis R.	8020203	-009	17.1		E	S	N	S	S	S	S	AG				CL				5d						
Tyronza River	8020203	-010	31.0	FRA0032	M	S	S	S	S	S	S									1						
Big Creek	8020203	-011	15.8		E	S	S	S	S	S	S									1						
Tyronza River	8020203	-012	50.0	FRA0033	M	S	s	S	S	S	S									1						
St. Francis R.	8020203	-013	47.5	FRA0036	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-014	22.8	FRA0008	M	S	N	S	S	N	S	UN	UN	AG	UN	DO	Cu	Cl	Be	5c	5d	5d	5d			
St. Francis R.	8020203	-015	90.8		U															3						
Eightmile Ditch	8020203	-018	17.8		U															3						
Eightmile Ditch	8020203	-019	12.8		U															3						
Village Creek	8020203	-020	9.0		U															3						
Whiteness Cr.	8020203	-021	33.6		U															3						
Big Boy Creek	8020203	-022	24.2		U															3						
Whiteness Cr.	8020203	-023	15.0		U															3						
TOTAL MILES	572.0																									
MILES UNASSESSED	203.2																									
MILES EVALUATED	89.8																									
MILES MONITORED	279.0																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA0028	15 Mile Bayou at Simsboro Road near Proctor		1	R
FRA0029	10 Mile Bayou at Highway 147 near Edmondson		1	R
FRA0027	Blackfish Bayou at Highway 50 near Woldwood		1	R
FRA0013	St. Francis River at Highway 50 near Forrest City	Y	1	A
FRA0032	Tyronza River at Highway 184 near Earl		1	R
FRA0033	Tyronza River at Highway 133 near Tyronza		1	R
FRA0036	St. Francis River at Highway 140 at Marked Tree		1	R
FRA0008	St. Francis River at Highway 18 near Lake City	Y	1	A

Figure A-38: Planning Segment 5B





(Segment 5B)

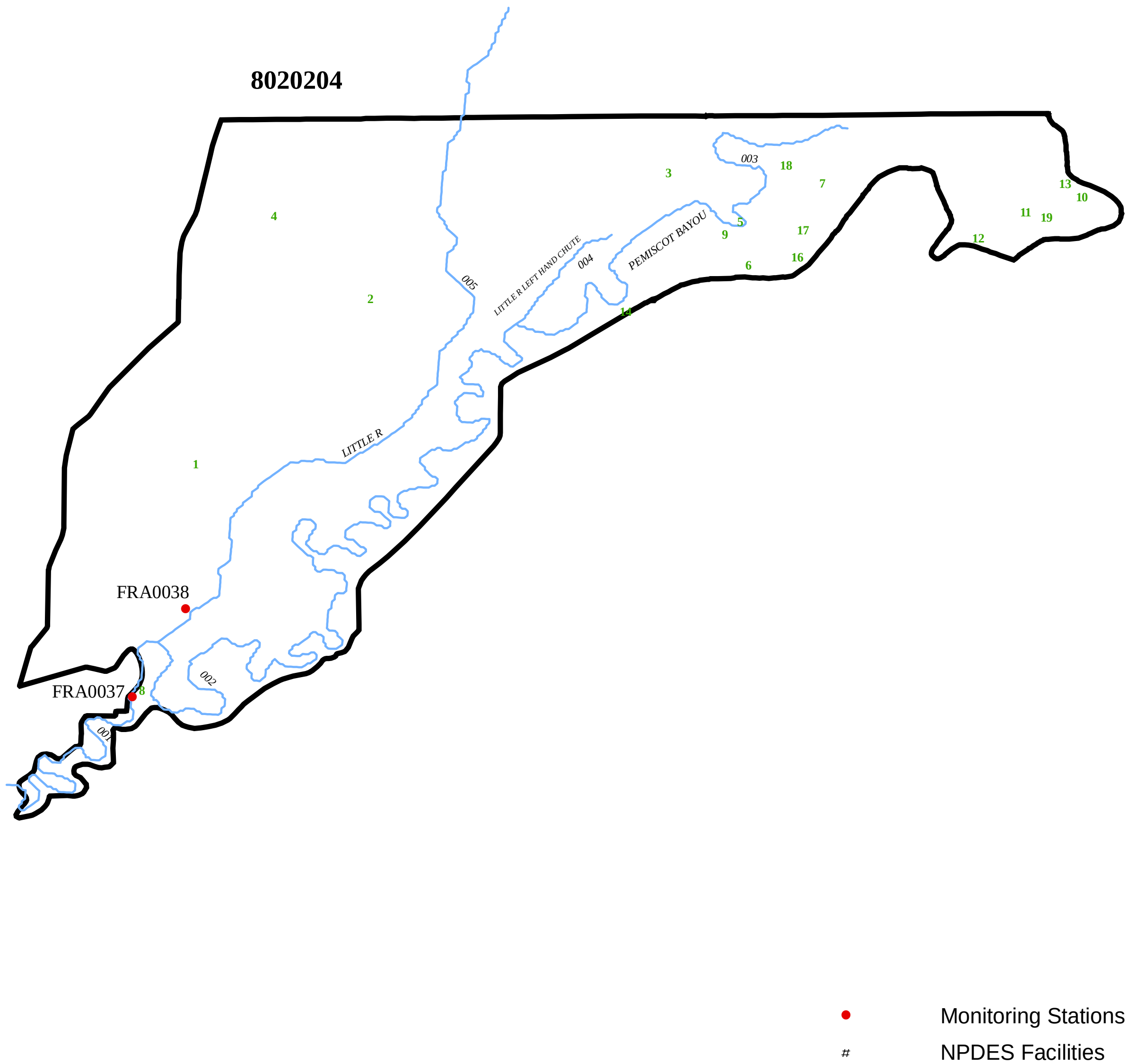
Table A-206: Planning Segment 5B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-5B																										
L'Anguille R.	8020205	-001	19.7	FRA0010	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	TDS	CL	DO	4a	5a	5a	5e	FISH CONSUMPTION	165.1	0
L'Anguille R.	8020205	-002	16.8		E	S	N		S	S	N	AG	AG	AG	AG	SI	TDS	CL	DO	4a	5a	5a	5e	AQUATIC LIFE	50.3	114.8
L'Anguille R.	8020205	-003	1.8		E	S	N		S	S	N	AG	AG	AG	AG	SI	TDS	CL	DO	4a	5a	5a	5e	PRIMARY CONTACT	146.5	0
Caney Creek	8020205	-901	9.0	FRA0034	M	S	S	S	S	S	N	AG	AG	AG		CL	SO4	TDS		5d	5d	5d		SECONDARY CONTACT	165.1	0
L'Anguille R.	8020205	-004	16.0	UWLGR01	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	DO	MN*	Pb	4a	5e	5a	5d	DRINKING SUPPLY	165.1	0
L'Anguille R.	8020205	-005	44.1	UWLGR02	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	DO	MN*	Pb	4a	5e	5a	5d	AGRI & INDUSTRY	57.7	107.4
Prairie Creek	8020205	-902	13.4	FRA0035	M	S	S	S	S	S	S									1						
Brushy Creek	8020205	-006	30.7		U															3						
First Creek	8020205	-007	27.9	FRA0030	M	S	S	S	S	S	S									1						
Second Creek	8020205	-008	16.4	FRA0012+	M	S	N	S	S	S	S	AG				DO				5c						
Larkin Creek	8020205	-009	12.3		U															3						
TOTAL MILES	208.1																									
MILES UNASSESSED	43.0																									
MILES EVALUATED	18.6																									
MILES MONITORED	146.5																									

MN = Chlorides, Sulfates, and Total Dissolved Solids

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA0010	L'Anguille River at Highway 50 near Marianna	Y	1	A
FRA0034	Caney Creek at Highway 305 near Wynne		1	R
UWLGR01	L'Anguille River at Highway 306 near Wynne		1	A
UWLGR02	L'Anguille River at Highway 214 west of Whitehall		1	A
FRA0035	Prairie Creek at Highway 1 north of Vanndale		1	R
FRA0030	First Creek near Horton		1	R
FRA0012	Second Creek on county road north of Palestine	Y	1	A
FRA0031	Second Creek at Highway 284 near Penrose		1	R

Figure A-39: Planning Segment 5C



(Segment 5C)

Table A-207: Planning Segment 5C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4	USE	SUPPORT	NOT SUPPORT
SEG-5C																										
Little River Left	8020204	-001	20.3	FRA0037	M	S	S	S	S	S	S									1				FISH CONSUMPTION	153.0	0.0
Little River	8020204	-002	61.7		E	S	S	S	S	S	S									1				AQUATIC LIFE	153.0	0.0
Pemiscot Bayou	8020204	-003	28.0		E	S	S	S	S	S	S									1				PRIMARY CONTACT	153.0	0.0
Little River	8020204	-004	6.0		E	S	S	S	S	S	S									1				SECONDARY CONTACT	153.0	0.0
Little River Right	8020204	-005	37.0	FRA0038	M	S	S	S	S	S	S									1				DRINKING SUPPLY	153.0	0.0
TOTAL MILES	153.0																							AGRI & INDUSTRY	153.0	0.0
MILES UNASSESSED	0.0																									
MILES EVALUATED	95.7																									
MILES MONITORED	57.3																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA00037	Left Hand Chute of Little River at Highway 140 near Lepanto		1	R
FRA00038	Right Hand Chute of Little River at Highway 135 at Riverdale		1	R

Table A-208: Segment 5A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0021547	Hughes, City of	Crooked Bayou/Millseed Lake/Frenchman Bayou	8020203	1
AR0021911	Rector, City of	Post Oak CR, Big Slough Ditch	8020203	2
AR0021954	Turrell, City of	Big CR/Tyronza R/St Francis R	8020203	3
AR0021971	Marion, City of	15-Mile Bayou	8020203	4
AR0022152	Joiner, City of	Ditch 4&7/Frenchman's Bayou	8020203	5
AR0022195	Crawfordsville, City of	Alligator Bayou	8020203	6
AR0033430	Marked Tree, City of-Pond #2	St Francis R	8020203	7
AR0033472	Piggott, City of	Big Slough Ditch, St Francis R	8020203	8
AR0033766	Paragould, City Light & Water	Ditch, 8-Mile CR, St Francis R	8020203	11
AR0033588	Parkin, City of	St Francis R	8020203	9
AR0033651	Monette, City of	Little Ditch #3	8020203	10
AR0034134	Lake City, City of	Purcell Slough (DT 9)	8020203	12
AR0034304	Earle, City of	Tyronza R	8020203	13
AR0034312	Bay, City of	Ditch #6/Main Ditch	8020203	14
AR0034754	Keiser, City of	Ditch #31, Tyronza R	8020203	15
AR0035602	Trumann, City of-WWTP	Ditch #60	8020203	16
AR0035629	Marmaduke, City of	Big Slough Ditch	8020203	17
AR0035637	Tyronza, City of	Tyronza R	8020203	18
AR0036790	Garlock Rubber Technologies	Johnson Creek Trib	8020203	19
AR0036897	USA-COE W.G.Huxtable Pump Plan	St. Francis R	8020203	20
AR0037010	Voss Truck Port	Ditch, Ten Mile Bayou	8020203	51
AR0037893	Madison, City of	St. Francis R	8020203	21
AR0037974	Brookland, City of	Maple Slough Ditch/St Francis R	8020203	22
AR0038202	AR Parks & Tourism-Village Cr	Village CR, Clark Corner Cutoff	8020203	23
AR0039047	Dyess, City of	Tyronza R	8020203	24
AR0042196	Nimmons, City of	Ditch, Hampton Slough	8020203	25
AR0043087	Widener, City of	St. Francis R	8020203	26
AR0043320	Greenway, City of	Big Slough Ditch Trib	8020203	27
AR0043401	Jonesboro City Water & Light-East Plant	Whiteman's CR	8020203	28
AR0043591	St Francis, City of	St Francis R	8020203	29
AR0044024	Best Holiday Trav-L-Park	Ditch, 15-Mile Bayou, St Francis R	8020203	30
AR0044237	Burdette, Town of	Ditch #24,#6,Tyronza R, St. Francis R	8020203	31
AR0044521	Heritage Hills MHP	Trib-Lateral #1	8020203	32
AR0044661	Edmondson, City of	15-Mi Bayou, Blackfish Bayou	8020203	33
AR0044695	Super 8 Motel	Shell Lake, Blackfish Bayou	8020203	34

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0044890	Nimocks Oil Company, Inc.	Trib,15-Mile Bayou	8020203	35
AR0045021	Gilmore, City of	Little Cypress Ditch, Big CR, Gibson Bayou	8020203	36
AR0045403	Truck Centers of America	Ditch #22,5A-St Francis R	8020203	37
AR0045578	AR Dept of Correction-East AR	St. Francis R (Near Alligator Bayou)	8020203	38
AR0045837	Oak Grove Heights, City of	Trib/Locust CR	8020203	39
AR0045918	Parker Hannifin Corp	Ditch #14 Trib, Ditch #10	8020203	52
AR0045934	Birdsong, Town of	Snake Lake, Lamb Bayou, Ditch#1,..., CR	8020203	40
AR0046272	Bassett, City of	Ditch #5 Trib	8020203	41
AR0046761	Mapco Express, Inc-3155 Heth	Trib/North Blackfish Bayou	8020203	42
AR0047490	Flash Market	RR Ditch,15-Mi Bayou	8020203	43
AR0048151	Jeannette, City of	Blackfish Bayou, St Francis R	8020203	44
AR0049531	Horseshoe Lake, City of-WWTF	Mississippi R	8020203	45
AR0049638	Agee’s Sand & Gravel	Village CR	8020203	46
AR0049662	Decker Ridge POA	Ditch, Decker Bayou, Fifteen Mile Bayou, St Francis	8020203	47
AR0049841	Crowley’s Ridge College	Trib, Eight Mile CR, St Francis R	8020203	48
AR0050121	Miltenberger Oil Co (Jump-Stop	Ditch, Ditch #11, Fifteen Mile Bayou, St Francis R	8020203	49
AR0050164	Mapco Express #3058	Sewer Drain, Trib, Mississippi R	8020203	50

Table A-209: Segment 5B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0000370	Entergy AR, Inc-Hamilton Moses	Trib, L’anguille R	8020205	1
AR0020087	Forrest City, City of-WWTP	Trib, L’anguille R	8020205	2
AR0021393	Cherry Valley, City of	Copper CR, Wolf CR, L’anguille R	8020205	3
AR0021903	Wynne, City of	Ditch, CR, L’angille R	8020205	4
AR0022632	Mueller Ind, Inc	Turkey CR, L’anguille R	8020205	
AR0033863	Harrisburg, City of	Town CR, Ltrl T, Hollow Branch, L’anguille	8020205	5
AR0034142	Marianna, City of-Pond B	L’anguille R/St Francis R	8020205	6
AR0034169	Marianna, City of-Pond A	L’anguille R/St Francis R	8020205	7
AR0034720	Hickory Ridge, City of	Bayou DeView	8020205	
AR0038679	Andrews Trailer Pk	Bear & Caney CR/ L’anguille R	8020205	8
AR0038806	Forrest City Schools-Caldwell	Big Telico CR/So. Hwys 1 & 261 Intr	8020205	9
AR0039365	Palestine, City of	Trib-Coffee CR/L’anguille R	8020205	10
AR0041394	Polyone Corp	Turkey CR, Indian CR, L’anguille R	8020205	17
AR0043192	Colt, City of	Taylor CR Ditch/L’anguille R	8020205	11
AR0044041	Cross Co School Dist #7	Cooper CR, L’anguille R	8020205	12
AR0048658	Hunter Glen Subdivision	CR, Ditch #1, Mulligan Ltrl, L’Anguille	8020205	13
AR0049409	Vanndale Birdeye Water	Languille R	8020205	14
AR0049476	Mueller Copper Tube Products	Ditch, Indian CR, Languille R	8020205	15
AR0049719	Drum Sand & Gravel	Trib, L’Anguille R, St Francis R	8020205	16

Table A-210: Segment 5C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Map Number
AR0020028	Caraway, City of	Ditch/Asher & #4 Ditch	8020204	1
AR0021881	Manila, City of	Ditch #81/Little R	8020204	2
AR0021962	Gosnell, City Of	Ditch 29/Pemiscot Bayou	8020204	3
AR0022012	Leachville, City of	Honey Cypress DT 2/Buffalo	8020204	4
AR0022560	Blytheville, City of-West WWTF	Ditch 27	8020204	5
AR0022578	Blytheville, City of-South WWP	Ditch, Ditch 17,6,1	8020204	6
AR0022586	Blytheville, City of-North Tre	Ditch, Ditch #30,Ditch #27,L Chute Little	8020204	7
AR0023841	Lepanto, City of-Board of Pub	Left Hand Chute, Little R	8020204	8
AR0039713	Entergy AR, Inc-Blytheville	Ditch #36	8020204	16
AR0041441	Bush Brothers & Co-Blytheville	Ditch, Ditch #37, Pemiscott Bayou	8020204	17
AR0044181	Wheel Acres	Ditch 36,Pemiscot Bayou	8020204	9
AR0045977	Nucor Steel-Arkansas	Ditch38,Crooked Lake Bayou, Pemiscot Bayou	8020204	10
AR0046094	Fox Meadows MHP	Krutz Ditch Trib	8020204	18
AR0046523	Maverick Tube Corp	Ditch #38,Crooked Bayou, Pemiscot Bayou	8020204	11
AR0046663	MG Industries	Ditch, Ditch 14a, Ditch 13, Tyronza R	8020204	12
AR0048178	Huntco Steel, Inc	Ditch, Ditch #38 (1,2)-5c & MS R (3)-6c	8020204	19
AR0049166	Ipsco Tubulars, Inc Blytheville	Ditch, Ditch #42,Crooked Lake Bayou	8020204	13
AR0049425	Associated Electric Cooperative	Ditch #3, R Chute/Little R	8020204	14
AR0049468	R & S Materials	Rooker CR, Lighthouse Ditch, Big Bay Ditch	8020204	

Table A-211: FRA0008 St. Francis River at Lake City, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	61	6.46	2.71	12.20	2.12
BOD_5 (mg/L)	57	2.17	0.60	5.50	1.00
pH (standard units)	61	7.50	6.17	8.90	0.58
Total Organic Carbon (mg/L)	56	5.58	3.90	11.64	1.55
Ammonia as N (mg/L)	60	0.07	0.01	0.43	0.08
$NO_2 + NO_3$ as N (mg/L)	59	0.21	0.01	2.43	0.32
Orthophosphate as P (mg/L)	60	0.08	0.02	0.36	0.05
Total Phosphorus as P (mg/L)	60	0.18	0.02	0.58	0.10
Total Hardness (mg/L)	24	95.34	44.00	161.00	28.89
Chloride (mg/L)	60	8.11	2.17	20.40	4.04
Sulfate (mg/L)	60	9.48	3.00	43.30	4.85
Total Dissolved Solids (mg/L)	59	154.56	112.00	239.00	28.11
Total Suspended Solids (mg/L)	59	42.13	1.00	343.00	46.08
Turbidity (NTU)	60	57.38	6.56	330.00	61.12

Table A-212: FRA0013 St. Francis River at Hwy 50

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.06	4.30	12.50	1.71
BOD_5 (mg/L)	54	1.85	0.28	4.06	0.73
pH (standard units)	57	7.54	6.21	8.60	0.52
Total Organic Carbon (mg/L)	53	5.53	1.76	9.55	1.61
Ammonia as N (mg/L)	58	0.03	0.01	0.13	0.03
$NO_2 + NO_3$ as N (mg/L)	58	0.16	0.01	0.86	0.19
Orthophosphate as P (mg/L)	57	0.09	0.03	0.18	0.03
Total Phosphorus as P (mg/L)	56	0.22	0.09	0.52	0.09
Total Hardness (mg/L)	22	114.77	47.00	193.00	45.97
Chloride (mg/L)	59	9.10	2.99	25.80	4.88
Sulfate (mg/L)	59	13.36	4.16	25.00	4.99
Total Dissolved Solids (mg/L)	58	177.78	101.00	264.00	45.70
Total Suspended Solids (mg/L)	58	47.47	8.50	225.00	40.12
Turbidity (NTU)	59	60.05	7.40	293.00	54.60

Table A-213: FRA0010 L'Anguille River Near Marianna, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.54	3.27	12.90	2.12
BOD_5 (mg/L)	52	2.04	0.34	5.87	1.16
pH (standard units)	56	7.51	6.13	8.90	0.55
Total Organic Carbon (mg/L)	52	7.22	3.04	16.09	2.36
Ammonia as N (mg/L)	56	0.05	0.01	0.22	0.05
$NO_2 + NO_3$ as N (mg/L)	56	0.21	0.01	0.89	0.19
Orthophosphate as P (mg/L)	55	0.11	0.01	0.25	0.05
Total Phosphorus as P (mg/L)	54	0.25	0.09	0.66	0.11
Total Hardness (mg/L)	21	125.76	25.00	256.00	74.88
Chloride (mg/L)	57	14.18	2.15	46.90	10.87
Sulfate (mg/L)	57	11.04	2.64	25.50	5.80
Total Dissolved Solids (mg/L)	56	187.63	94.50	388.00	73.51
Total Suspended Solids (mg/L)	56	43.62	9.00	163.50	34.40
Turbidity (NTU)	57	60.95	10.00	200.00	45.68

Table A-214: FRA0012 Second Creek N. of Palestine, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	5.77	1.75	12.50	2.36
BOD_5 (mg/L)	52	1.44	0.32	7.88	1.36
pH (standard units)	56	7.23	4.22	8.20	0.67
Total Organic Carbon (mg/L)	52	8.32	4.78	13.54	1.77
Ammonia as N (mg/L)	57	0.03	0.01	0.29	0.05
$NO_2 + NO_3$ as N (mg/L)	57	0.04	0.01	0.24	0.05
Orthophosphate as P (mg/L)	56	0.10	0.02	0.32	0.05
Total Phosphorus as P (mg/L)	55	0.16	0.04	0.45	0.08
Total Hardness (mg/L)	22	124.59	25.00	271.00	79.01
Chloride (mg/L)	58	28.47	2.92	91.34	24.10
Sulfate (mg/L)	58	6.63	1.18	36.52	6.42
Total Dissolved Solids (mg/L)	57	198.93	78.50	427.00	92.80
Total Suspended Solids (mg/L)	57	6.45	1.00	19.00	4.26
Turbidity (NTU)	58	20.83	1.60	92.90	24.36

Table A-215: UWLGR01 L'Anguille River at Hwy 306 3 Mi. W. of Colt, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	6.03	0.90	11.80	2.26
BOD_5 (mg/L)	46	1.91	0.60	6.26	1.12
pH (standard units)	51	7.11	3.99	8.12	0.77
Total Organic Carbon (mg/L)	46	8.42	4.99	18.98	2.50
Ammonia as N (mg/L)	52	0.10	0.01	0.83	0.12
NO_2 + NO_3 as N (mg/L)	52	0.29	0.02	1.32	0.26
Orthophosphate as P (mg/L)	52	0.11	0.04	0.20	0.03
Total Phosphorus as P (mg/L)	51	0.23	0.11	0.92	0.11
Total Hardness (mg/L)	22	130.36	25.00	277.00	80.12
Chloride (mg/L)	53	17.76	2.37	65.28	13.35
Sulfate (mg/L)	53	13.64	3.63	38.31	9.00
Total Dissolved Solids (mg/L)	52	212.03	114.00	440.00	83.82
Total Suspended Solids (mg/L)	52	25.97	3.50	114.00	19.67
Turbidity (NTU)	53	50.77	4.54	162.00	37.85

Table A-216: UWLGR02 L'Anguille River at Hwy 214, 3 Mi. W. of Whitehall, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	47	5.36	1.65	11.5	2.29
BOD_5 (mg/L)	45	4.01	1.54	16.9	2.54
pH (standard units)	46	7.43	5.24	8.53	0.57
Total Organic Carbon (mg/L)	43	10.04	5.76	23.74	3.67
Ammonia as N (mg/L)	48	0.22	0.01	3.53	0.51
NO_2 + NO_3 as N (mg/L)	48	0.18	0.01	1.01	0.20
Orthophosphate as P (mg/L)	48	0.14	0.02	1.27	0.19
Total Phosphorus as P (mg/L)	48	0.32	0.10	1.39	0.22
Total Hardness (mg/L)	22	117.91	49.00	313.00	67.30
Chloride (mg/L)	48	18.44	4.72	45.90	12.03
Sulfate (mg/L)	48	26.71	3.82	134.00	25.53
Total Dissolved Solids (mg/L)	47	218.89	106.00	429.50	77.85
Total Suspended Solids (mg/L)	47	55.51	5.00	419.00	66.19
Turbidity (NTU)	48	84.00	2.80	660.00	99.97

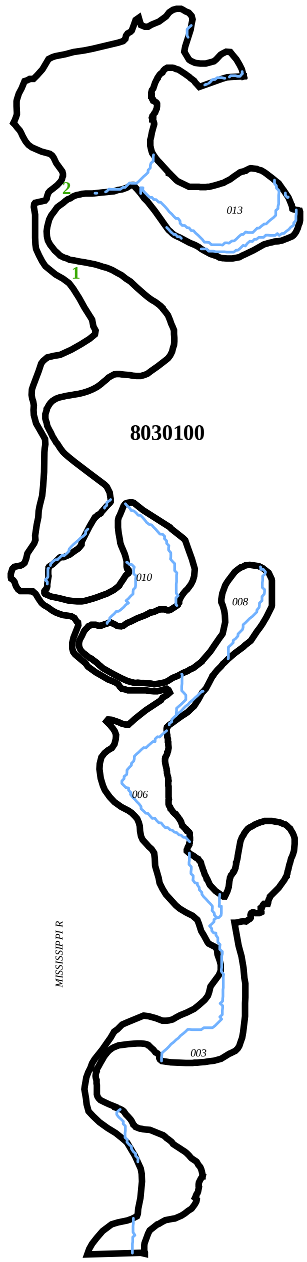
SEGMENTS 6A, 6B, 6C MISSISSIPPI RIVER BASIN

These three segments comprise the Mississippi River Basin, which consists of a 437 mile reach of the Mississippi River. It is levied throughout its total length within the State. Segment 6A contains a 129.9-mile reach of the Mississippi from its confluence with the Arkansas River to the Arkansas-Louisiana state line. No surface drainage enters this reach below the Arkansas River except from the Lake Chicot pumping plant on Macon Bayou. Segment 6B consists of a 137.2-mile reach of the Mississippi from its confluence with the St. Francis River to the confluence with the Arkansas River. All drainage from the Arkansas and the White River Basins reaches the Mississippi River at the lower end of this reach. Segment 6C is a 174.4-mile reach of the Mississippi from the Arkansas-Missouri state line to its confluence with the St. Francis River. All surface drainage from the St. Francis River Basin within Arkansas enters the Mississippi River via the St. Francis River at the end of this reach.

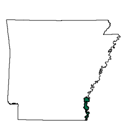
Summary of Water Quality Conditions

The waters within these segments have been designated as suitable for the propagation of fish/wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. These three segments include 437 miles of the Mississippi River. No recent data was available to assess the Mississippi River; however, USGS Circular 1133 provides an extensive review of the Mississippi River water quality from 1987-92. For this report all waters of the Mississippi River adjacent to Arkansas are listed as unassessed. However, most of the water contributed to the Mississippi River from Arkansas is from the White and Arkansas River Basins, both of which are assessed as meeting all designated uses in their lower segments prior to flowing into the Mississippi River.

Figure A-40: Planning Segment 6A

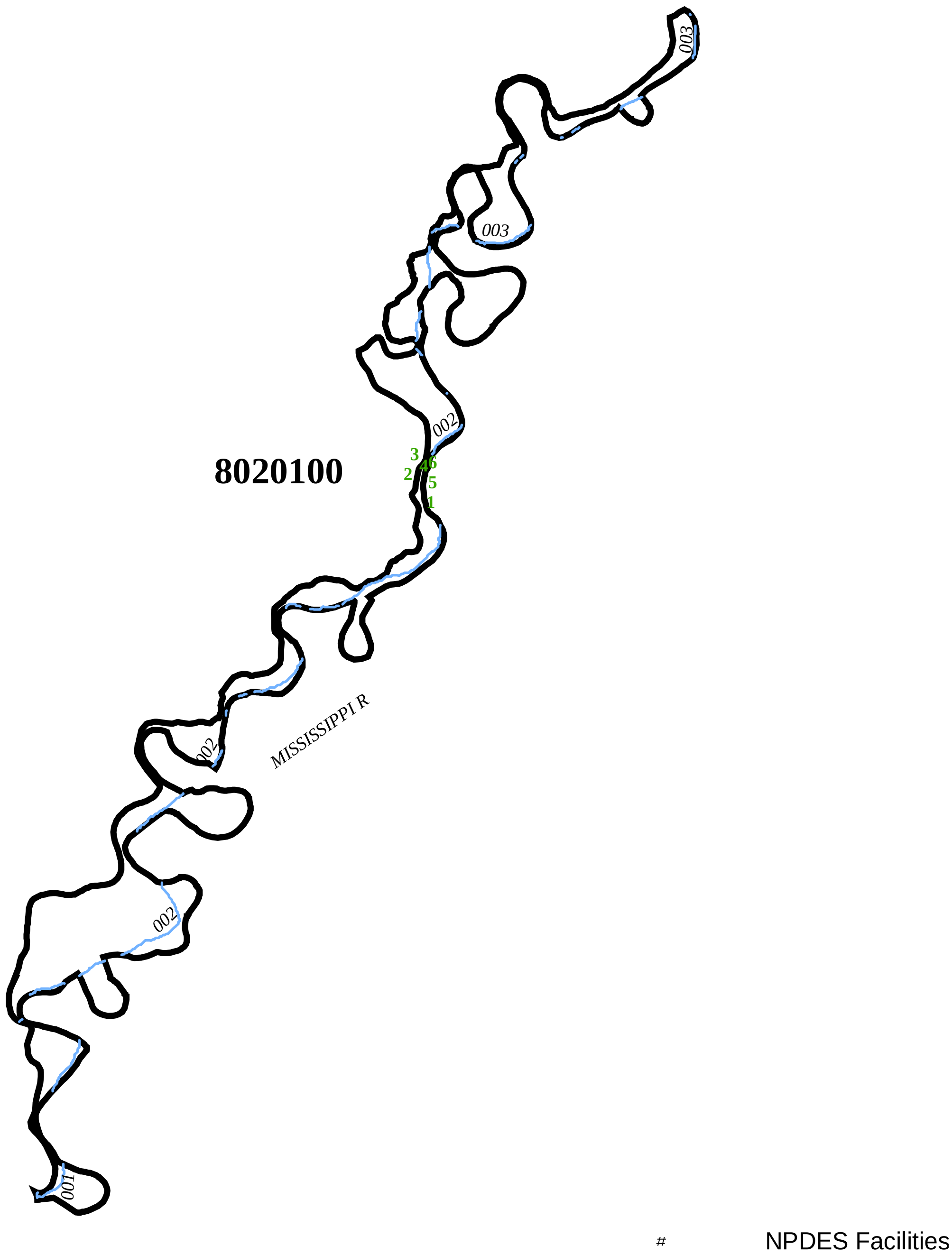


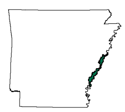
NPDES Facilities



(Segment 6A)

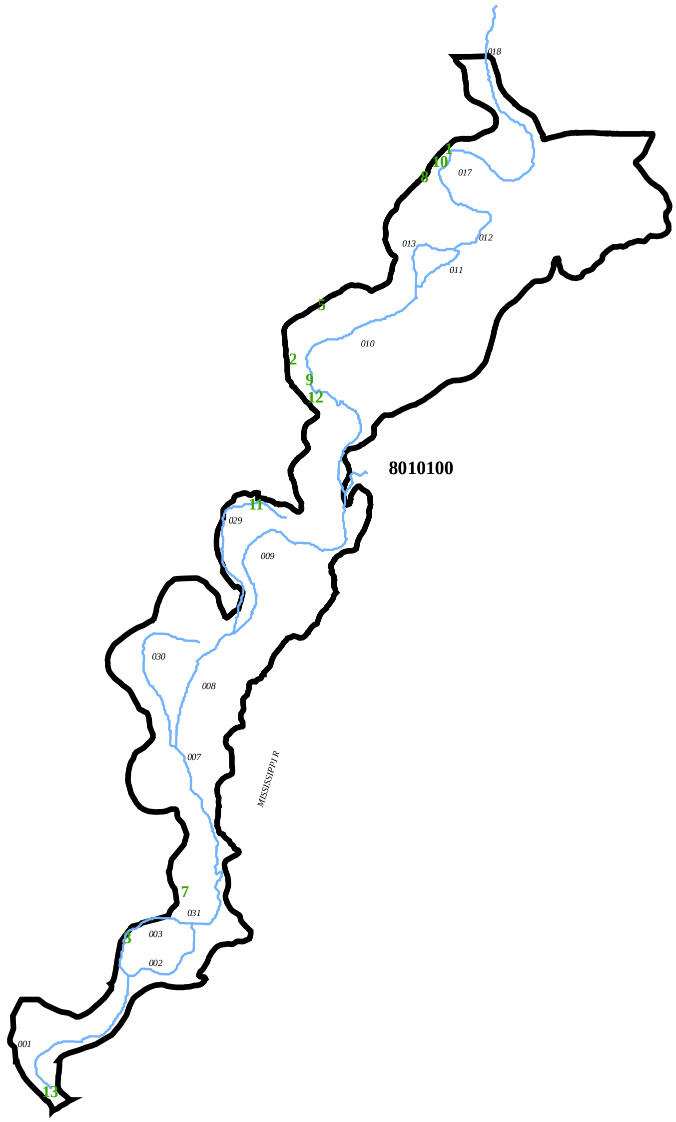
Figure A-41: Planning Segment 6B



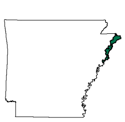


(Segment 6B)

Figure A-42: Planning Segment 6C



NPDES Facilities



(Segment 6C)

Table A-217: Planning Segment 6A, 6B, 6C—Designated Use Attainment Status

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-6																										
Mississippi R.	8010100	-001	6.2		U															3				FISH CONSUMPTION	0	0
Mississippi R.	8010100	-002	7.8		U															3				AQUATIC LIFE	0	0
Mississippi R.	8010100	-003	8.6		U															3				PRIMARY CONTACT	0	0
Mississippi R.	8010100	-004	4.8		U															3				SECONDARY CONTACT	0	0
Mississippi R.	8010100	-005	4.8		U															3				DRINKING SUPPLY	0	0
Mississippi R.	8010100	-007	2.3		U															3				AGRI & INDUSTRY	0	0
Mississippi R.	8010100	-008	10.1		U															3						
Mississippi R.	8010100	-009	19.4		U															3						
Mississippi R.	8010100	-010	24.3		U															3						
Mississippi R.	8010100	-011	4.8		U															3						
Mississippi R.	8010100	-012	4.0		U															3						
Mississippi R.	8010100	-013	5.8		U															3						
Mississippi R.	8010100	-017	16.8		U															3						
Mississippi R.	8010100	-018	43.6		U															3						
Mississippi R.	8010100	-034	6.6		U															3						
Mississippi R.	8020100	-001	18.0		U															3						
Mississippi R.	8020100	-002	76.1		U															3						
Mississippi R.	8020100	-003	43.1		U															3						
Mississippi R.	8030100	-003	56.6		U															3						
Mississippi R.	8030100	-005	4.7		U															3						
Mississippi R.	8030100	-006	8.9		U															3						
Mississippi R.	8030100	-007	3.8		U															3						
Mississippi R.	8030100	-009	2.6		U															3						
Mississippi R.	8030100	-011	19.2		U															3						
Mississippi R.	8030100	-012	34.1		U															3						
TOTAL MILES	437.0																									
MILES UNASSESSED	437.0																									
MILES EVALUATED	0.0																									
MILES MONITORED	0.0																									

Table A-218: Segment 6A, 6B, 6C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment	Map Number
AR0035751	Arkansas City, City of	Mississippi R	8030100	6A	1
AR0035823	Potlatch Corp-McGehee	Mississippi R	8030100	6A	2
AR0000019	ADM-Helena	Mississippi R	8020100	6B	6
AR0000035	G & B Terminal Inc	Mississippi R	8020100	6B	5
AR0000388	Entergy AR, Inc-Ritchie Plant	Mississippi R (1,2,3) & Long CR Bayou (4,5)	8020100	6B	1
AR0022021	West Helena Water Utilities	Mississippi R	8010100	6C	2
AR0036412	Cedar Chemical Corporation	Mississippi R	8020100	6B	3
AR0043389	Helena, City of	Mississippi R - Seg. 6B Of Mississippi R Basin	8020100	6B	4
AR0000361	Terra Nitrogen Ltd Partnership	Mississippi R (1) &Ditch #47 (2)	8010100	6C	1
AR0021580	Osceola, City of	Mississippi R	8010100	6C	2
AR0022039	West Memphis, City of-WWTP	Mississippi R	8010100	6C	3
AR0022314	Wilson, City of	Mississippi R	8010100	6C	
AR0033782	Luxora, City of	Mississippi R	8010100	6C	5
AR0036544	Viskase Corp-Osceola Plant	Mississippi R (1) &Big Sandy Slough-5A (2)	8010100	6C	
AR0037770	Ciba Speciality Chemicals WT	Mississippi R	8010100	6C	7
AR0041831	S-R of Arkansas	Mississippi R-6C (2) & Tyronza R-5D (1)	8010100	6C	11
AR0043117	Nucor-Yamato Steel Co-Armorel	Mississippi-6C (1) & Ditch #14A-5D (2)	8010100	6C	8
AR0045101	Fruit of The Loom, Inc	Mississippi R	8010100	6C	12
AR0048224	Canal Gardens POA	Rock Point Landing	8010100	6C	13
AR0049514	AES Cypress LLC	Ditch #26, Nat’l Ditch #6, Ditch #1	8010100	6C	
AR0049557	Plum Point Energy Associates,	Mississippi R	8010100	6C	9
AR0050083	Marine Terminals of Arkansas	Mississippi R	8010100	6C	10

APPENDIX B AMBIENT GROUND WATER MONITORING PROGRAM DATA

The following tables list data specific to each monitoring area sampled during the Federal Fiscal years 1997 through 2006. The tables identify sampling locations for each monitoring area and list descriptive statistics for each monitoring area. Volatile organic compounds and semi-volatile compounds (including pesticides) detected in a particular monitoring area during the referenced period are discussed in Part V of this report. Most of the tables contain spaces occupied by a single dash, which represent unavailable data for that monitoring area. For statistical analyses (mean calculation), a value of one half the detection limit was used in cases where the value is displayed as "less than" the detection limit.

The following abbreviations are used in the Sampling Locations tables:

NA	Not Applicable
S	Spring
W	Well
C/I	Commercial/Industrial
D	Domestic
I	Irrigation
M	Municipal
St	Stock
U	Unused
NT	Not Tested (not analyzed for specified parameter)

The following chemical abbreviations are used in the Selected Descriptive Statistics tables:

TDS	Total Dissolved Solids	Cl	Chloride
HCO3	Bicarbonate	Fe	Iron
NH3 -N	Ammonia-Nitrogen	F	Fluoride
NO3 -N	Nitrate-Nitrogen	K	Potassium
O-Phos	Ortho-Phosphate	Mg	Magnesium
T-Phos	Total Phosphorous	Mn	Manganese
SO4	Sulfate	Na	Sodium
Ba	Barium	SiO2	Silica
Ca	Calcium		

Table B-1: Brinkley Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
MON103	06/27/05	03N02W08ABB2	34.89651	-91.23214	60	Alluvial	D
MON116	06/28/05	03N02W10CCC3	34.88196	-91.20510	160	Alluvial	I
MON121	06/27/05	03N02W22ACC1	34.86196	-91.19552	65	Alluvial	I
MON122	06/27/05	03N02W23CDC2	34.85398	-91.18457	100	Alluvial	D
MON162	06/28/05	04N02W22DAD1	34.94374	-91.18855	-	Alluvial	I
MON304	06/28/05	04N02W14CDC3	34.95497	-91.18169	110	Alluvial	D
MON310	06/27/05	02N02W14ACB2	34.78990	-91.18096	140	Alluvial	I
MON315	06/28/05	04N02W28DDD1	34.92682	-91.20553	~120	Alluvial	I
MON318	06/28/05	04N02W28DAC	34.92989	-91.20776	121	Alluvial	I
MON324	06/27/05	02N02W34ACB2	34.74596	-91.20084	-	Alluvial	I
MON325	06/28/05	02N03W35ADD3	34.74643	-91.28356	-	Alluvial	I
MON326	06/27/05	02N03W26DDA2	34.75554	-91.28327	-	Alluvial	I
MON328A	06/27/05	-	34.80879	-91.18743	-	Alluvial	I
MON329	06/27/05	03N01W19BAB2	34.86666	-91.14872	80	Alluvial	D
MON330A	06/27/05	-	34.81795	-91.11884	-	Alluvial	I
MON331	06/27/05	03N01W33BCC2	34.83165	-91.11761	100	Alluvial	I
MON333	06/27/05	-	34.78815	-91.24224	-	Alluvial	I
MON335	06/27/05	02N02W06AAC1	34.82232	-91.24565	-	Alluvial	I
MON900	06/28/05	03N02W16AAC3	34.87860	-91.20970	-	Alluvial	I
MON902	06/28/05	02N02W07DDA4	34.79720	-91.24400	-	Alluvial	I
MON903	06/27/05	02N02W07DCD4	34.79540	-91.24830	-	Alluvial	I
MON904	06/27/05	02N02W17ACC4	34.78780	-91.23330	-	Alluvial	I
MON906	06/28/05	04N02W27ABC3	34.93680	-91.19560	-	Alluvial	I
MON907	06/28/05	-	34.92905	-91.19377	-	Alluvial	I
MON909	06/28/05	-	34.93818	-91.25406	-	Sparta	P
MON910	06/27/05	02N02W14AAB1	34.79390	-91.17610	-	Alluvial	I
MON911	06/28/05	02N02W15BAB2	34.79470	-91.20340	-	Alluvial	I
MON920	06/27/05	-	-	-	-	Alluvial	I

Table B-2: Brinkley Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
MON103	7.24	945	553	293	357.5	-	<0.075	0.015	-	15.3	190	66.3	125	3860	0.39	1.79	21.7	296	94.8	37.2
MON116	7.43	828	529	389	474.6	-	<0.075	0.012	-	36.3	260	106	35	2660	0.29	2.1	30.4	303	33.7	39.7
MON121	7.21	1030	639	394	480.7	-	<0.075	0.012	-	55.4	360	120	81	2800	0.32	2.26	33.1	308	53.5	33.7
MON122	7.22	1050	656	428	522.2	-	<0.075	0.014	-	52.2	361	141	69	3340	0.31	2.39	36.9	292	36.6	30.7
MON162	7.32	562	356	285	347.7	-	<0.075	0.019	-	3.67	163	76	22	1270	0.3	1.87	19	373	19.1	35.7
MON304	7.19	917	609	351	428.2	-	0.164	0.105	-	107	131	93.8	55	289	0.34	1.4	29.3	363	86.5	29.8
MON310	7.36	1220	722	409	499.0	-	<0.075	0.014	-	53.6	250	108	140	2780	0.31	2.61	35.3	361	94.5	30.3
MON315	7.43	1820	1030	385	469.7	-	<0.075	0.042	-	5.73	302	60.5	357	1650	0.38	5.95	15.5	222	279	27.8
MON318	7.6	1030	622	349	425.8	-	<0.075	0.506	-	14	175	35.3	123	853	1.71	3.71	8.96	108	202	23.6
MON324	7.34	769	506	335	408.7	-	<0.075	0.014	-	69.1	508	98.4	23	4130	0.29	3.02	27.6	810	21.4	46.5
MON325	7.37	732	482	232	283.0	-	<0.075	0.016	-	65.3	569	87.5	61	5860	0.25	2.48	19	1080	28	40.6
MON326	7.39	870	537	289	352.6	-	<0.075	0.013	-	70.7	657	114	73	4500	0.23	3.79	27.1	666	23.4	38.8
MON328A	7.3	1460	867	444	541.7	-	0.018	0.016	-	50.3	293	115	214	3520	0.31	3.5	34.5	444	155	29.7
MON329	7.14	759	475	358	436.8	-	<0.075	0.013	-	34.5	270	101	27	3170	0.26	0.976	28.6	356	23.5	36.2
MON330A	7.22	958	623	405	494.1	-	<0.075	0.012	-	104	421	122	30	4410	0.29	2.8	35.5	546	39.3	34.1
MON331	7.29	730	455	378	461.2	-	<0.075	0.014	-	28	227	99.3	14	1880	0.24	1.93	26.7	370	26.7	34.3
MON333	7.19	2550	1400	442	539.2	-	<0.075	0.012	-	18.5	1110	178	535	7970	0.24	6.93	49.4	331	261	34.5
MON335	7.43	678	417	279	340.4	-	<0.075	0.016	-	32.9	329	77.1	41	2980	0.3	1.99	23.1	219	31.6	32.2
MON900	7.6	948	609	414	505.1	-	<0.075	0.014	-	67.9	308	118	46	3070	0.29	2.29	34.3	367	41.4	37.2
MON902	7.43	1790	1040	427	520.9	-	<0.075	0.014	-	52.1	709	133	317	5480	0.3	4.3	41.2	367	186	33.3
MON903	7.26	2170	1220	438	534.4	-	<0.075	0.012	-	26.1	764	147	442	6460	0.28	5.4	40.7	338	250	34.6
MON904	7.22	2400	1330	438	534.4	-	<0.075	0.012	-	28.9	1150	200	506	8540	0.24	5.99	58.1	389	240	38.1
MON906	-	NA	417	338	412.4	-	<0.075	0.041	-	7.41	173	62.7	21	1260	0.27	2.56	16.7	312	64.6	32.3
MON907	7.44	1360	797	375	457.5	-	<0.075	0.054	-	14.2	236	73.1	187	996	0.32	3.19	19.4	338	212	33.9
MON909	8.1	790	461	219	267.2	-	<0.075	0.445	-	1.54	35.9	2.87	121	69.4	0.73	1.74	0.696	4.12	183	19.3
MON910	7.36	1940	1190	483	589.3	-	<0.075	0.015	-	146	249	155	286	3470	0.32	3.45	48.3	417	225	33.7
MON911	7.32	2350	1300	446	544.1	-	<0.075	0.012	-	43.9	519	190	493	6110	0.23	4.47	59.3	611	224	30.5
Min.	7.14	562	356	219	267.2	-	<0.075	0.012	-	1.47	32.4	2.87	14	10	0.23	0.976	0.696	1.11	19.1	16.3
Max.	8.10	2550	1400	483	589.3	-	0.164	0.506	-	146	1150	200	535	8540	1.71	6.93	59.3	1080	279	46.5
Mean	7.38	1244.0	727.6	366.4	447.0	-	0.011	0.062	-	43.07	384.0	103.1	164.98	3335.3	0.38	3.09	29.3	378.3	119.1	33.0

Table B-3: Chicot Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
CHI001	07/08/97	16S03W32BCB1	33 16' 44.6"	91 26' 31.6"	-	Alluvial	I
CHI002	07/08/97	16S03W34BBB1	33 16' 14.7"	91 24' 27.9"	-	Alluvial	D
CHI003	07/08/97	16S03W27ADD1	33 16' 46.3"	91 23' 30.5"	-	Alluvial	D
CHI004	07/07/97	17S03W33BBA1	33 11' 00.9"	91 25' 11.0"	-	Alluvial	I
CHI005	07/08/97	18S03W16CDD1	33 07' 37.0"	91 24' 54.8"	-	Alluvial	I
CHI008	07/08/97	17S03W15DAD1	33 13' 03.7"	91 23' 24.2"	-	Alluvial	I
CHI009	07/07/97	17S03W28ACD1	33 11' 26.6"	91 24' 41.3"	-	Alluvial	I
CHI010	07/07/97	16S02W08DDC1	33 18' 56.2"	91 19' 26.3"	-	Alluvial	I
CHI011	07/07/97	16S03W11ADC1	33 19' 19.3"	91 22' 33.4"	-	Alluvial	I
CHI012	07/07/97	16S03W15CDD1	33 18' 01.4"	91 23' 57.7"	-	Alluvial	I
CHI013	07/07/97	16S03W05BCA1	33 20' 22.9"	91 26' 15.9"	-	Alluvial	I
CHI014	07/07/97	17S03W16BBB1	33 13' 36.7"	91 25' 27.0"	-	Alluvial	I
CHI015	07/07/97	17S03W09AAA1	33 14' 30.1"	91 24' 29.6"	-	Alluvial	I
CHI016	07/07/97	16S03W25CAC1	33 16' 28.4"	91 22' 01.5"	-	Alluvial	I
CHI017	07/08/97	17S03W10AAD1	33 14' 20.4"	91 23' 23.7"	-	Alluvial	I
CHI018	07/08/97	16S03W35CAB1	33 15' 45.7"	91 23' 09.7"	-	Alluvial	I
CHI019	07/08/97	17S03W03AAB1	33 15' 19.8"	91 23' 31.0"	-	Alluvial	I
CHI020	07/08/97	16S03W20BCD1	33 17' 37.7"	91 26' 17.9"	-	Alluvial	I
CHI021	07/08/97	17S03W20AAD1	33 12' 32.9"	91 25' 27.1"	-	Alluvial	I
CHI022	07/08/97	17S03W32BBC1	33 10' 54.8"	91 26' 28.9"	-	Alluvial	I
CHI023	07/08/97	17S03W06DCC1	33 14' 34.2"	91 27' 00.3"	-	Alluvial	I
CHI024	07/08/97	18S03W14BBC1	33 08' 14.6"	91 23' 21.7"	-	Alluvial	I
CHI025	07/08/97	18S03W08DCC1	33 08' 26.6"	91 25' 56.3"	-	Alluvial	I
CHI026	07/08/97	18S03W08AAD1	33 09' 05.8"	91 25' 31.5"	-	Alluvial	I
CHI027	07/08/97	18S03W11CBD1	33 08' 39.8"	91 23' 12.6"	-	Alluvial	I
CHI028	07/08/97	17S03W35CCD1	33 10' 11.0"	91 23' 05.7"	-	Alluvial	I

Table B-4: Chicot Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
CHI001	7.17	1070	772	365	445.3	0.55	<0.02	<0.03	0.44	25	623.5	102	220	4620	0.41	3.9	30.8	284	136.4	-
CHI002	8.1	1480	1116	248	302.6	0.961	<0.02	0.247	0.29	8	180.4	17.2	385	146	0.39	4.5	3.9	22	480.6	-
CHI003	6.56	1450	922	258	314.8	1.005	<0.02	0.143	0.17	11	68.3	6	380	52	0.28	3.3	1.4	6	393.2	-
CHI004	7.17	2080	1334	368	449	0.701	<0.02	<0.03	0.56	45	416	212	460	13200	0.17	6.2	45.4	552	207.9	-
CHI005	6.95	898	2944	394	480.7	0.949	<0.02	<0.03	0.49	200	239.4	320	1230	12700	0.23	6.8	148	2130	473.4	-
CHI008	7.15	1688	1173	395	481.9	0.534	<0.02	<0.03	0.85	145	561	129	340	8000	0.34	2.9	54.5	1460	204.4	-
CHI009	7.08	2970	2064	422	514.8	0.751	<0.02	<0.03	0.59	161	495.3	237	890	8010	0.2	7.4	70.6	692	450.9	-
CHI010	7.16	1264	894	419	511.2	0.266	<0.02	<0.03	0.26	200	160.9	129	82.53	3450	0.21	2.3	49.5	532	100.9	-
CHI011	7.05	2730	2086	376	458.7	0.578	<0.02	<0.03	0.32	200	120	278	680	8010	0.19	6.1	99.6	875	238.2	-
CHI012	7.01	2910	2075	370	451.4	0.588	<0.02	<0.03	0.48	200	100	247	780	8470	0.19	5.1	88.2	1090	354.3	-
CHI013	6.91	1410	831	306	373.3	0.637	<0.02	0.032	0.75	84	781	149	260	14900	0.2	5.1	28.7	902	104.2	-
CHI014	7.24	1320	815	342	417.2	0.424	<0.02	<0.03	0.53	34	373.3	140	250	8130	0.24	3.3	27.4	530	127.2	-
CHI015	6.99	2920	2043	404	492.9	1.028	<0.02	<0.03	0.61	189	428	284	840	14200	0.18	3.6	74	1400	288	-
CHI016	7.01	2290	1597	334	407.5	0.728	<0.02	<0.03	0.4	200	320	276	570	6400	0.24	3.2	76	1070	183	-
CHI017	7.1	2360	1421	338	412.4	0.836	<0.02	0.045	0.76	70	668	154	630	9000	0.28	3.6	45	1260	244	-
CHI018	7.19	2510	1816	374	456.3	0.989	<0.02	<0.03	0.44	-	485.6	270	700	7740	0.2	5.6	77.9	999	286.5	-
CHI019	7.35	2770	1922	466	568.5	1.026	<0.02	<0.03	0.61	145	699.2	207	780	6460	0.28	5.6	62.7	1080	502.7	-
CHI020	6.97	947	690	336	409.9	0.573	<0.02	<0.03	0.65	46	724.2	111	180	6610	0.28	3.5	30.1	248	86.8	-
CHI021	7.13	1072	669	348	424.6	0.405	<0.02	<0.03	0.52	30	409.6	109	170	6560	0.23	3.2	25.6	383	89.9	-
CHI022	7.14	671	434	266	324.5	0.169	<0.02	<0.03	0.31	30	295.8	84.3	48.47	4710	0.2	2.7	18.6	880	29.4	-
CHI023	7.15	736	445	290	353.8	0.367	<0.02	<0.03	0.66	17	422.9	90.3	68.02	5160	0.31	2.4	20	532	37	-
CHI024	7.07	1406	1115	337	411.1	0.728	<0.02	<0.03	0.51	177	276.2	166	320	8020	0.26	3.4	47.2	1060	159.6	-
CHI025	7.13	1414	1193	350	427	0.431	0.054	<0.03	0.36	90	935.4	196	390	10500	0.16	5.3	44.3	776	127	-
CHI026	6.76	1884	1693	397	484.3	0.531	<0.02	0.031	0.26	154	522	239	640	11100	0.16	4.7	56.2	836	243.6	-
CHI027	7.04	1990	1773	388	473.4	0.752	<0.02	0.034	0.5	174	332.9	226	690	8590	0.25	6.1	81	688	277.5	-
CHI028	-	2770	3132	446	544.1	1.14	<0.02	0.034	0.78	145	1138	313	1460	12200	0.22	8.6	141	1420	620.9	-
Min.	6.56	671	434	248	302.6	0.169	<0.02	<0.03	0.17	8	68.3	6	48.47	52	0.16	2.3	1.4	6	29.4	-
Max.	8.1	2970	3132	466	568.5	1.14	0.054	0.247	0.85	200	1138	320	1460	14900	0.41	8.6	148	2130	620.9	-
Mean	7.10	1808.08	1421.88	359.12	438.12	0.68	0.01	0.03	0.50	111.20	452.96	180.45	517.08	7959.15	0.24	4.55	55.68	834.88	247.98	-

Table B-5: El Dorado Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
UNI008A	07/20/04	17S15W32BDD1	33.1950	-92.6797	712	El Dorado	C/I
UNI010	07/19/04	18S15W16ACB1	33.1603	-92.6563	295	Greensand	D
UNI011	07/19/04	17S16W24BBC1	33.2340	-92.7163	704	El Dorado	M
UNI015	07/20/04	18S16W01DBC1	33.1839	-92.7071	770	El Dorado	C/I
UNI021	07/19/04	17S15W16BBA1	33.2504	-92.6624	37	Cockfield	C/I
UNI023	07/19/04	16S16W34BDD1	33.2893	-92.7439	56	Cockfield	D
UNI024	07/20/04	17S15W09BBB1	33.2650	-92.6651	550	El Dorado	C/I
UNI025	07/19/04	18S15W35DAC1	33.1097	-92.6181	770	El Dorado	M
UNI026	07/19/04	17S14W14DBC1	33.2381	-92.5175	49	Cockfield	D
UNI027	07/20/04	18S14W07BBA1	33.1776	-92.5918	783	El Dorado	M
UNI028	07/19/04	17S14W32CBB1	33.1981	-92.5746	120	Cockfield	D
UNI029	07/19/04	16S16W34BDD2	33.2888	-92.7454	300	Greensand	D
UNI061	07/19/04	18S15W21DAC1	33.1397	-92.6522	40	Cockfield	D
UNI062R	07/19/04	-	33.1358	-92.6356	-	Cockfield	C/I
UNI063	07/19/04	18S15W20BDC1	33.1436	-92.6790	320	Greensand	D
UNI094	07/20/04	18S16W02AAA1	33.1932	-92.7179	43	Cockfield	D
UNI099	07/20/04	18S16W11CDD1	33.1649	-92.7269	70	Cockfield	D
UNI118A	07/19/04	-	33.2076	-92.6603	746	El Dorado	M
UNI119	07/20/04	17S15W22CCD1	33.2231	-92.6453	330	Greensand	D
UNI120	07/19/04	18S15W27AAB	33.1353	-92.6358	662	El Dorado	C/I
UNI121	07/19/04	18S15W21DAC2	33.1394	-92.6525	310	Greensand	D
UNI122A	07/20/04	-	-	-	566	El Dorado	C/I
UNI900	07/19/04	-	33.2574	-92.6635	528	El Dorado	M
UNI901	07/20/04	-	-	-	-	El Dorado	C

Table B-6: El Dorado Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
UNI008A	8.51	662	386	209	255	0.627	0.012	0.182	-	22.8	10.9	2.13	87.5	<15	0.28	2.13	0.3	5.76	146	11.9
UNI010	8.23	284	171	155	189.1	0.704	0.011	0.109	-	4.25	66.8	10.3	1.94	52.3	0.11	2.63	2.03	23.1	53.5	12.3
UNI011	8.66	423	256	199	242.8	0.461	<0.01	0.263	-	1.4	<8.8	0.87	23	<15	0.26	1.53	<0.013	7.04	99.5	12
UNI015	8.47	563	324	206	251.3	0.591	0.013	0.193	-	27.7	<8.8	1.9	41.4	16.4	0.27	2.31	0.23	5.35	125	11.4
UNI021	6.35	102	102	16.4	20.01	<0.03	0.155	0.013	-	25.4	84.2	5.04	4.43	55.4	0.1	3.94	2.68	33.9	8.61	28.1
UNI023	5.89	115	119	37.4	45.63	<0.03	0.032	0.015	-	4.5	33.4	7.44	11.4	533	0.23	3.39	3.04	91.4	9.36	51
UNI024	8.55	434	261	204	248.9	0.587	<0.01	0.22	-	1.38	16.3	2.68	24	30.8	0.22	2.15	0.49	7.79	99.6	11.6
UNI025	8.42	726	410	216	263.5	0.564	<0.01	0.253	-	5.66	<8.8	1.18	113	<15	0.3	1.96	<0.013	1.66	159	12.5
UNI026	6.57	50	71	14	17.08	<0.03	0.322	0.013	-	4.26	38.4	3.59	2.92	129	0.1	1.45	0.7	4.81	4.17	38.1
UNI027	7.95	729	422	222	270.8	<0.03	0.041	0.199	-	33.6	<8.8	1.17	114	<15	0.28	2.34	0.14	1.4	158	11.9
UNI028	5.5	123	138	29.5	35.99	0.036	0.014	0.034	-	3.89	57.5	4.61	16.7	808	0.19	2.48	1.66	28	15.9	63.7
UNI029	7.43	320	198	178	217.2	0.509	<0.01	0.048	-	2.04	106	16	1.9	104	0.13	3.07	3.17	25.6	55.3	16.1
UNI061	6.5	125	108	53.5	65.27	0.037	0.014	0.015	-	5.97	59.4	21.5	2.19	863	0.1	<0.46	0.45	104	2.42	18.4
UNI062R	6.62	325	172	135	164.7	0.604	<0.01	0.016	-	4.07	316	29.5	14.3	7190	0.13	12.6	11.7	3640	6.64	7.9
UNI063	8.22	292	184	159	194	0.992	<0.01	0.19	-	4.34	55.1	8.16	2.73	51.8	0.12	2.76	1.74	19.7	57	12.9
UNI094	5.94	160	188	33.8	41.24	<0.03	0.113	0.213	-	24	12	7.67	11.5	<15	0.15	1.61	1.18	5.31	22.5	81.8
UNI099	5.92	86	66	17.5	21.35	0.272	3.23	0.011	-	1.56	56.2	4.31	6.44	276	0.06	2.48	1.61	42.6	3.06	12.2
UNI118A	8.49	670	374	201	245.2	0.669	<0.01	0.204	-	1.56	17.2	3.03	115	<15	0.28	2.43	0.48	6.09	142	11.8
UNI119	8.13	299	181	160	195.2	0.8	0.013	0.214	-	4.42	46.9	6.67	2.32	54	0.15	3.38	1.43	16.8	61.4	12
UNI120	8.66	630	365	208	253.8	0.574	<0.01	0.216	-	29.4	<8.8	0.85	64.8	<15	0.26	1.75	<0.013	1.54	140	12.2
UNI121	7.88	308	193	167	203.7	0.754	0.018	0.313	-	2.9	89.8	12.6	4.58	37.3	0.08	3.03	2.65	21.6	54.2	15.9
UNI122A	8.25	505	294	207	252.5	0.467	0.062	0.214	-	6.65	<8.8	1.26	37	27	0.29	2.03	0.14	3.95	113	11.6
UNI900	8.61	550	325	197	240.3	0.554	<0.01	0.227	-	1.56	<8.8	1.11	41.6	<15	0.31	1.77	0.15	4.25	124	11.6
UNI901	8.6	433	259	205	250.1	0.559	0.014	0.222	-	1.5	15.4	2.71	23.8	<15	0.2	2.09	0.48	6.62	98.2	11.5
Min.	5.5	50	66	14	17.08	<0.03	<0.01	0.011	-	1.38	<8.8	0.85	1.9	<15	0.06	0.23	<0.013	1.4	2.42	7.9
Max.	8.66	729	422	222	270.8	0.992	3.23	0.313	-	33.6	316	29.5	115	7190	0.31	12.6	11.7	3640	159	81.8
Mean	7.60	371.42	231.96	142.92	174.36	0.43	0.17	0.15	-	9.37	46.35	6.51	32.02	428.98	0.19	2.73	1.53	171.18	73.27	20.85

Table B-7: Hardy Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
FUL001	04/12/05	19N06W30BBC1	36.2796	-91.6723	368	Cotter	D
FUL002	04/12/05	19N07W36AAB1	36.2677	-91.6777	1050	Roubidoux	M
FUL003	04/11/05	20N07W26DAA1	36.3624	-91.6918	200	Cotter-Jefferson City	D
FUL004	04/11/05	21N07W35DAA1	36.4347	-91.6919	-	-	D
FUL005	04/11/05	21N06W12ACD1	36.4918	-91.5694	220	Cotter-Jefferson City	D
FUL007	04/11/05	19N06W36CCD1	36.2513	-91.5807	160	Cotter-Jefferson City	D
FUL010	04/11/05	21N06W18CBD1	36.4763	-91.6687	760	Roubidoux	D
FUL011	04/11/05	20N06W33BBD1	36.3515	-91.6342	160	Cotter-Jefferson City	D
SHA001	04/11/05	17N06W23BCC1	36.1100	-91.6035	1045	Cotter-Jefferson City	D
SHA002	04/11/05	18N07W01DCD1	36.2398	-91.6798	-	-	D
SHA003	04/11/05	18N07W01CBB1	36.2443	-91.6912	263	Cotter	D
SHA004	04/11/05	18N06W05DCA1	36.2408	-91.6522	368	Cotter	D
SHA005	04/11/05	18N05W19BBA1	36.2059	-91.5623	563	Cotter-Jefferson City	D
SHA006	04/11/05	19N05W11BDB1	36.3164	-91.4859	1180	Roubidoux-Gunter	M
SHA008	04/11/05	19N05W22CBC1	36.2836	-91.5101	368	Cotter-Jefferson City	C
SHA009	04/12/05	20N04W05ABA1	36.4214	-91.4212	685	Roubidoux	D
SHA010	04/12/05	21N04W33ACC1	36.4309	-91.4064	158	Cotter	D
SHA011	04/12/05	20N04W23BAA1	36.3765	-91.3739	120	Cotter	D
SHA012	04/12/05	19N03W05DCC1	36.3190	-91.3199	830	Roubidoux	D
SHA013	04/12/05	20N03W29ADB1	36.3561	-91.3145	-	-	D
SHA014	04/12/05	19N04W26CCB1	36.2625	-91.3831	188	Cotter	D
SHA016	04/12/05	18N04W28BBB1	36.1876	-91.4229	208	Cotter	D
SHA056	04/11/05	-	36.3211	-91.4839	1590	Roubidoux-Gunter	M
SHA098	04/12/05	-	36.2627	-91.3959	S	Cotter	U
SHA099	04/12/05	-	-	-	S	Cotter	U
SHA150	04/11/05	-	-	-	295	-	D

Table B-8: Hardy Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
FUL001	7.73	444	-	250	305	<0.03	0.726	0.008	0.033	3.55	19.2	48.7	2.39	<100	0.1	0.596	28.4	<1.0	1.58	11
FUL002	7.32	446	-	255	311	<0.03	0.249	0.009	0.03	4.01	23.5	49.5	2.44	<100	0.08	0.915	28.1	<1.0	1.48	10.6
FUL003	7.25	706	-	355	433	<0.03	5.24	0.01	0.044	4	32.2	76	16.4	<100	0.09	0.744	43.6	<1.0	4.73	15.8
FUL004	7.26	797	-	378	461	<0.03	2.63	0.007	0.044	2.58	39	83.8	40.5	<100	0.08	0.702	49.3	<1.0	5.77	13.8
FUL005	7.26	650	-	349	426	<0.03	1.09	0.01	0.043	4.16	32.8	71.2	9.78	<100	0.08	1.05	40.9	<1.0	2.38	13.5
FUL007	7.52	432	-	234	285	<0.03	2.9	0.011	0.034	1.16	25.1	47.4	3.17	<100	0.06	0.509	26.7	<1.0	1.02	11.1
FUL010	6.93	796	-	455	555	<0.03	1.06	0.005	0.034	2.93	32.4	89.5	2.82	<100	0.07	0.728	51.3	5.53	1.02	14.6
FUL011	7.39	569	-	320	390	<0.03	1.49	0.01	0.036	1.85	17.1	28.7	2.18	<100	0.08	0.661	16.5	<1.0	0.932	11.9
SHA001	7.76	512	-	282	344	<0.03	0.455	0.014	0.05	3.74	24	58.1	5.57	<100	0.09	0.826	30.2	<1.0	1.97	13.1
SHA002	7.41	515	-	285	348	<0.03	1.08	0.005	0.026	5.99	15.4	57.4	3.01	<100	0.09	0.831	32.6	<1.0	1.19	10.7
SHA003	7.42	475	-	251	306	<0.03	1.26	0.01	0.03	4.96	29	50.5	8.57	<100	0.09	0.57	29.6	<1.0	2.34	11.7
SHA004	7.39	510	-	292	356	<0.03	0.622	0.008	0.032	2.62	21.4	57.2	2.26	<100	0.07	0.828	32	<1.0	1.16	11.2
SHA005	7.3	578	-	318	388	<0.03	1.87	0.008	0.033	3.56	23.5	65.5	6.42	<100	0.07	0.787	36.4	<1.0	1.73	11.4
SHA006	7.33	654	-	366	447	<0.03	0.041	<0.005	0.031	9.72	35.8	72.6	2.05	<100	0.07	1.14	43.7	<1.0	1.4	11.3
SHA008	7.44	605	-	277	338	<0.03	1.54	0.007	0.032	5.13	36.2	63	34.2	<100	0.05	0.839	35.3	1.46	7.2	11.4
SHA009	7.49	317	-	158	193	<0.03	0.16	0.007	0.021	5.29	21.9	34.5	6.83	<100	0.07	0.623	18.2	<1.0	1.83	12.9
SHA010	7.54	342	-	165	201	<0.03	0.631	0.01	0.02	2.21	20.4	33.6	13.4	<100	0.09	0.842	19.6	<1.0	3.46	10
SHA011	7.47	491	-	285	348	<0.03	0.233	0.007	0.03	3.56	22.9	64.7	2.32	<100	0.08	0.675	36.6	<1.0	0.775	13.8
SHA012	7.2	608	-	334	407	<0.03	0.989	0.005	0.033	10.6	24.4	68	3.82	<100	0.09	1.56	39.3	<1.0	1.73	11.8
SHA013	7.3	685	-	381	465	<0.03	0.586	0.005	0.028	6.04	26.1	79.5	3.02	<100	0.09	0.62	45	<1.0	0.792	9.82
SHA014	7.37	438	-	249	304	<0.03	0.186	0.009	0.031	3.54	18.2	48.1	2.27	<100	0.06	0.384	27.9	<1.0	1.54	13
SHA016	7.26	556	-	308	376	<0.03	0.403	0.007	0.023	6.62	23.6	62.3	2.58	<100	0.08	0.686	36.6	<1.0	1.2	9.45
SHA056	7.24	651	-	366	447	<0.03	0.162	<0.005	0.033	8.57	32	73.1	2.29	<100	0.07	1.19	43.5	<1.0	1.34	11.5
SHA098	7.2	270	-	134	163	<0.03	0.152	0.011	0.022	3.2	17.2	29	1.36	<100	0.06	0.659	16.7	<1.0	0.928	12
SHA099	7.5	131	-	60.9	74	<0.03	0.418	0.016	0.026	3.75	19.3	12.4	1.96	<100	0.04	0.735	7.72	<1.0	1.1	9.81
SHA150	7.47	519	-	267	326	<0.03	0.588	0.01	0.033	2.04	31.6	55.9	18.1	<100	0.06	0.719	31.9	<1.0	2.75	10.6
Min.	6.93	131	-	60.9	74.30	<0.03	0.041	<0.005	0.02	1.2	15.4	12.4	1.36	<100	0.04	0.384	7.72	<1.0	0.775	9.45
Max.	7.76	797	-	455	555.10	<0.03	5.24	0.016	0.05	10.6	39	89.5	40.5	<100	0.1	1.56	51.3	5.53	7.2	15.8
Mean	7.38	526.81	-	283.65	346.05	<0.03	1.03	0.01	0.03	4.44	25.55	56.93	7.68	<100	0.08	0.79	32.60	0.73	2.05	11.84

Table B-9: Jonesboro Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
CRA002	07/14/03	14N04E07ABA1	35 51 52.2	90 42 01.1	70	Alluvial	D
CRA005	07/14/03	14N04E07CDC2	35 51 08.4	90 42 29.7	180	Memphis	M
CRA009	07/15/03	13N04E03ABB1	35 47 30.1	90 39 06.0	90	Alluvial	I
CRA010	07/15/03	13N04E09DCD1	35 45 52.6	90 39 58.1	105	Alluvial	I
CRA014	07/14/03	14N04E22CBD1	35 49 28.9	90 39 20.9	350	Memphis	M
CRA015	07/14/03	14N04E32BCA1	35 48 10.4	90 41 30.8	342	Memphis	M
CRA017	07/14/03	14N04E28DAB1	35 48 49.4	90 39 49.5	362	Memphis	M
CRA038	07/14/03	14N02E23CDD1	35 49 23.3	90 51 00.4	97	Alluvial	I
CRA039	07/14/03	14N03E14CAA1	35 50 30.3	90 44 22.7	173	Alluvial	I
CRA044	07/15/03	13N05E21BAA1	35 44 57.5	90 33 42.5	871	Wilcox	M
CRA045	07/14/03	15N03E29BBB1	35 54 28.5	90 48 01.3	160	Alluvial	M
CRA046	07/15/03	15N05E29DBB1	35 53 59.9	90 34 33.1	170	-	M
CRA048	07/14/03	14N02E14BDA1	35 50 51.6	90 50 49.5	140	Alluvial	I
CRA049	07/14/03	14N02E08DAB1	35 51 32.8	90 53 39.4	142	Alluvial	I
CRA900	07/14/03	-	-	-	130	Alluvial	I
CRA901	07/15/03	-	-	-	-	-	I
CRA902	07/15/03	-	-	-	-	-	I
PON019	07/15/03	12N03E12BBC1	35 41 24.9	90 43 47.3	160	Alluvial	I

Table B-10: Jonesboro Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
CRA002	6.01	239	152	-	75.8	<0.030	1.64	0.037	-	6.39	46.3	18.8	31.6	25.1	0.09	1.03	7.54	<0.50	16.3	-
CRA005	6.31	256	162	-	101.9	<0.030	2.08	0.019	-	30.6	28.5	21.4	10.6	128	0.12	0.95	9.6	6.63	17.4	-
CRA009	6.91	398	245	-	223.7	<0.030	0.029	0.065	-	18.9	40.9	49.1	11.6	59.8	0.15	1.1	14	257	17.4	-
CRA010	6.99	428	262	-	211.0	<0.030	0.023	0.06	-	41	67.9	37.5	12	256	0.19	1.34	14.8	48.5	35.1	-
CRA014	6.18	143	98	-	61.3	<0.030	0.605	0.014	-	4.59	36.2	10.6	11	203	0.11	1.12	4.45	13.4	11.4	-
CRA015	6.36	163	114	-	70.4	<0.030	0.642	0.027	-	5.01	27.4	12.3	13	104	0.12	1.05	5.32	2.47	12.8	-
CRA017	6.22	177	116	-	82.8	<0.030	0.204	0.037	-	7.76	30.7	14.2	10.4	24.9	0.13	1.01	6.05	5.08	13.4	-
CRA038	7.19	1094	703	-	251.9	0.104	<0.010	0.02	-	147	225	159	185	4580	0.2	2.2	33.7	1130	37.8	-
CRA039	7.03	333	160	-	142.7	<0.030	0.455	0.063	-	6.89	34.7	26.8	14.4	39.6	0.19	0.79	11.3	1.99	14	-
CRA044	8.06	351	215	-	231.8	0.348	<0.010	0.22	-	1.27	14.5	1.16	2.89	95.3	0.19	2.38	0.37	13.4	86.4	-
CRA045	6.17	141	104	-	55.2	<0.030	1.27	0.074	-	5.14	28.2	10.9	12.4	<15.0	0.13	1.29	3.08	3.49	12.7	-
CRA046	6.16	96	71.5	-	36.9	<0.030	0.349	0.017	-	3.84	34.7	6.81	9.38	<15.0	0.16	1.02	2.86	0.68	8.14	-
CRA048	6.85	539	329	-	288.0	0.036	<0.010	0.019	-	39.5	90.8	71.7	17.4	4300	0.18	1.47	17.5	936	22.5	-
CRA049	7.01	736	478	-	343.9	0.341	<0.010	0.018	-	108	466	109	17.4	8790	0.15	2.49	24.5	2180	19.7	-
CRA900	6.35	375	240	-	139.7	<0.030	2.19	0.046	-	46	77.1	31.4	18.2	36.9	0.26	1.42	11.9	<0.50	27.9	-
CRA901	6.89	727	444	-	405.4	0.032	<0.010	0.007	-	59.2	196	99.8	17.5	3500	0.14	1.77	25.9	801	27.9	-
CRA902	7.15	948	581	-	549.0	0.171	<0.010	0.016	-	84.8	393	123	14.4	3540	0.17	2.16	33.9	185	50.3	-
PON019	6.59	788	483	-	393.9	0.049	<0.010	0.021	-	60.8	258	115	43.2	3010	0.16	1.27	30.7	309	14.8	-
Min.	6.01	96	71.5	-	36.92	<0.030	<0.010	0.007	-	1.27	14.5	1.16	2.89	<15.0	0.09	0.79	0.37	<0.50	8.14	-
Max.	8.06	1094	703	-	549.04	0.348	2.19	0.22	-	147	466	159	185	8790	0.26	2.49	33.9	2180	86.4	-
Mean	6.69	440.7	275.4	-	203.63	0.069	0.529	0.043	-	37.59	116.4	51.03	25.13	1594.9	0.16	1.44	14.3	327.5	24.8	-

Table B-11: Lonoke Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
LON003A	08/02/04	03N08W30DDD1	34.8497	-91.8945	160	Alluvial	C
LON009A	08/02/04	-	34.8319	-91.9447	~150	Alluvial	I
LON010	08/02/04	02N08W06ADA1	34.8295	-91.8946	128	Alluvial	D
LON014	08/02/04	02N08W20BCD1	34.7861	-91.8916	164	Alluvial	M
LON016	08/02/04	02N09W28CCC1	34.7636	-91.9860	136	Alluvial	I
LON017	08/02/04	02N08W32BCC1	34.7590	-91.8788	195	Alluvial	I
LON017A	08/02/04	02N08W32	34.7551	-91.8962	~250	Alluvial	I
LON021A	08/02/04	-	34.7054	-91.9846		-	-
LON022	08/02/04	02N09W34AAA1	34.7623	-91.9521	354	Sparta	C/I
LON024	08/02/04	01N08W16BAC1	34.7157	-91.8757	~150	Alluvial	I
LON040	08/02/04	-	34.6871	-91.9769	-	Alluvial?	C
LON900	08/02/04	-	34.8495	-91.8821	-	-	-
LON901	08/02/04	-	-	-	462	Sparta	M
LON902	08/02/04	-	34.6908	-91.9851	-	Alluvial	-
LON903	08/02/04	-	34.6973	-91.9354	-	Alluvial	-

Table B-12: Lonoke Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
LON003A	6.36	186	138	62.5	76.25	0.244	0.023	0.0156	-	7.39	121	14.7	9.9	4990	0.22	<.046	4.62	1720	11.5	13.3
LON009A	6.74	253	193	91.8	112	0.044	0.015	0.0125	-	13.7	209	25.7	24.4	2310	0.18	<.046	8.07	536	16.8	33
LON010	6.55	309	216	111	135.4	0.094	0.012	0.0109	-	11.5	197	29.4	23.6	526	0.24	1.18	8.77	1220	17.4	34.6
LON014	6.61	367	230	149	181.8	0.145	0.012	0.0133	-	8.8	210	38.7	18.7	3990	0.29	<.046	11.3	533	18.9	34
LON016	6.86	838	523	270	329.4	0.53	0.016	0.0124	-	105	492	144	16.8	14500	0.19	<.046	22.9	394	14	22.8
LON017	6.93	555	341	237	289.1	0.117	<.001	0.0135	-	40.6	348	76	10.7	2900	0.21	<.046	18.3	244	15.2	26.3
LON017A	6.65	644	417	233	284.3	0.215	<.001	0.013	-	53.3	376	99.1	23	3950	0.2	<.046	19.2	744	16.2	29.3
LON021A	6.93	765	462	279	340.4	0.441	0.013	0.0131	-	41	437	111	33.7	9160	0.2	<.046	18.7	589	26.4	22.7
LON022	6.67	388	222	188	229.4	0.176	0.015	0.0124	-	2.53	334	44.8	7.37	3980	0.19	5.4	10.9	243	21.1	14.4
LON024	6.81	674	424	255	311.1	0.559	0.017	0.0117	-	29.7	512	102	23.4	2420	0.21	<.046	17.9	375	26.6	25.5
LON040	6.7	847	487	248	302.6	0.94	<.001	0.012	-	59.8	555	96	59.7	22900	0.25	4.42	21.8	659	42.7	21.6
LON900	6.4	234	179	56.2	68.56	0.112	0.012	0.021	-	23.1	120	17.3	14	6010	0.15	<.046	5.68	2460	14.7	41.8
LON901	6.81	512	292	218	266	0.285	0.016	0.0117	-	9.19	360	46.6	20.6	5440	0.16	1.08	11.9	421	42.8	13.3
LON902	6.88	605	344	232	283	0.903	0.016	0.0116	-	10.7	542	75.8	37.8	11000	0.27	<.046	15.8	528	21.3	18
LON903	6.81	658	425	216	263.5	0.435	0.015	0.0133	-	80	235	102	10.5	15800	0.22	<.046	16.6	522	12.8	27.4
Min.	6.36	186	138	56.2	68.56	0.044	<.001	0.0109	-	2.53	120	14.7	7.37	526	0.15	<.046	4.62	243	11.5	13.3
Max.	6.93	847.00	523.00	279.00	340.38	0.94	0.02	0.02	-	105.00	555.00	144.00	59.70	22900.00	0.29	5.40	22.90	2460.00	42.80	41.80
Mean	6.71	522.33	326.20	189.77	231.52	0.35	0.01	0.01	-	33.09	336.53	68.21	22.28	7325.07	0.21	0.97	14.16	745.87	21.23	25.20

Table B-13: Omaha Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
BNE002	04/04/05	19N21W14CDA1	36.2981	-93.1850	spring	Springfield Plateau	U
BNE003	04/04/05	19N22W12CAB1	36.3168	-93.2735	spring	Springfield Plateau	D
BNE007	04/05/05	19N21W31ACB1	36.3839	-93.2081	spring	Springfield Plateau	D
BNE008A	04/05/05	20N20W02DBB2	36.4170	-93.1770	spring	Springfield Plateau	D
BNE012	04/05/05	21N20W29ACD1	36.4464	-93.1253	spring	Springfield Plateau	D
BNE015	04/04/05	21N21W17CCB1	36.4719	-93.2400	spring	Springfield Plateau	U
BNE017	04/04/05	21N21W09BAD1	36.4958	-93.2128	spring	Springfield Plateau	D
BNE023	04/04/05	20N21W33ACA1	36.3753	-93.2415	565	Ozark	D
BNE024	04/04/05	20N22W13CBD1	36.3891	-93.2734	460	Ozark	D
BNE025	04/05/05	20N21W15CAD1	36.3883	-93.1978	455	Ozark	D
BNE027	04/05/05	-	-	-	-	Ozark	D
BNE028	04/04/05	20N22W03DDA1	36.4169	-93.2975	400	Ozark	D
BNE029	04/05/05	21N21W26ADA1	36.4483	-93.1694	675	Ozark	D
BNE030A	04/05/05	21N20W23CDD1	36.4514	-93.0767	225	Ozark	D
BNE032	04/05/05	21N21W15BDA1	36.4787	-93.1970	705	Ozark	D
BNE033	04/04/05	21N22W12DCC1	36.4861	-93.2667	550	Ozark	D
BNE036	04/05/05	21N21W22DDA1	36.4567	-93.1887	1340	Ozark	M
BNE037	04/04/05	19N21W20BDC1	36.2895	-93.2374	450	Ozark	D
BNE041	04/04/05	-	-	-	-	Springfield Plateau	D
BNE042	04/05/05	20N20W09AAA1	36.4061	-93.1050	spring	Ozark	U
BNE044	04/04/05	21N21W09ABB1	36.4975	-93.2118	spring	Springfield Plateau	D
BNE045	04/04/05	21N21W18DAD1	36.4917	-93.2398	~550	Ozark	D
BNE046	04/05/05	20N19W23CDC3	36.4519	-93.0788	248	Ozark	D
BNE047	04/05/05	20N20W02DBA3	36.4167	-93.1759	375	Ozark	D
BNE048	04/05/05	20N19W10BCA2	36.4026	-93.0988	~465	Ozark	D
BNE050	04/05/05	19N20W20BCC2	36.3741	-93.1352	550	Ozark	D

Table B-14: Omaha Monitoring Area Selected Descriptive Statistics: Springfield Plateau Aquifer

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
BNE002	7.35	418	-	196	239	<0.030	1.32	0.018	0.037	6.87	25.2	80.4	8.7	<5	0.06	1.35	1.7	<0.20	4.05	9.97
BNE003	7.45	501	-	234	285	<0.030	2.13	0.019	0.039	9.96	52.9	102	10.9	<5	0.07	1.77	1.74	<0.20	4.69	10.5
BNE007	7.26	417	-	183	223	<0.030	3.74	0.021	0.039	6.16	41.7	83.5	8.82	<5	0.05	1.31	1.49	<0.20	3.83	11.4
BNE008A	7.73	339	-	115	140	<0.030	3.2	0.022	0.05	6.73	49.5	57	23.5	<5	0.05	1.81	2.71	2.37	6.06	11.3
BNE012	7.66	308	-	105	128	<0.030	8.42	0.018	0.036	8.34	37.3	51.8	5.06	<5	0.06	2.34	2.52	<0.20	2.74	12
BNE015	7.9	423	-	132	161	<0.030	4.84	0.018	0.042	7.33	40.1	56.2	7.94	<5	0.08	1.66	4.22	<0.20	3.81	10.7
BNE017	7.92	232	-	83.4	102	<0.030	2.64	0.02	0.033	3.54	45.7	36	12.1	<5	0.06	1.53	2.13	<0.20	6.13	10.2
BNE041	7.22	402	-	183	223	<0.030	3.75	0.019	0.033	4.09	38.8	80.8	8.05	<5	0.05	1.28	1.36	<0.20	2.72	10.7
BNE044	8.29	192	-	59.1	72	<0.030	1.62	0.019	0.033	5.64	43.8	25.6	13.9	<5	0.06	1.49	2.46	<0.20	6.94	9.61
Min.	7.22	192	-	59.1	72.10	<0.030	1.32	0.018	0.033	3.54	25.2	25.6	5.06	<5	0.05	1.28	1.36	<0.20	2.72	9.61
Max.	8.29	501	-	234	285.48	<0.030	8.42	0.022	0.05	9.96	52.9	102	23.5	<5	0.08	2.34	4.22	2.37	6.94	12
Mean	7.64	359.11	-	143.39	174.93	<0.030	3.52	0.02	0.04	6.52	41.67	63.70	11.00	<5	0.06	1.62	2.26	0.35	4.55	10.71

Table B-14 continued: Omaha Monitoring Area Selected Descriptive Statistics: Ozark Aquifer

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
BNE023	7.49	347	-	158	193	<0.03	0.027	0.009	0.016	17.1	10.8	43.9	3.3	<5	0.22	1.66	16.4	1.15	2.16	9.66
BNE024	7.48	489	-	241	294	<0.03	0.108	0.009	0.017	18.9	11.1	56.4	3.91	<5	0.58	3.67	26.9	0.69	5.6	8.85
BNE025	7.23	636	-	171	209	<0.03	7.98	0.011	0.027	34.9	32.8	89.9	58.9	<5	0.12	1.69	14.3	0.5	13.3	11.5
BNE027	7.07	650	-	323	394	<0.03	2.08	0.012	0.04	6.02	36.3	68.2	13.3	<5	0.11	1.06	40.1	<0.2	6.71	13.5
BNE028	7.26	515	-	221	270	<0.03	5.52	0.01	0.028	11.1	18.4	77.8	13.7	<5	0.66	2.86	14.1	0.69	6.47	10.4
BNE029	7.29	568	-	258	315	<0.03	2.06	0.009	0.021	38.1	28.3	83.3	8.02	<5	0.16	2.7	22.1	2.4	2.48	9.28
BNE030A	7.5	550	-	280	342	<0.03	0.16	0.008	0.025	25.7	11	63.7	2.32	35.8	0.19	3.02	33.1	9.28	1.56	9.45
BNE032	7.75	342	-	143	174	<0.03	0.045	0.009	0.017	38.7	14.2	39.8	1.2	<5	0.4	2.47	19.1	1.01	1.16	9.1
BNE033	7.58	345	-	170	207	<0.03	0.315	0.009	0.02	13	11.1	39.4	2.38	<5	0.09	1.13	19.7	<0.2	1.48	10.2
BNE036	7.72	346	-	180	220	<0.03	0.014	0.01	0.022	13.8	3.06	42.5	1.63	<5	0.16	1.46	18.2	1.26	1.36	9.84
BNE037	7.47	565	-	242	295	0.12	0.66	0.016	0.032	35.1	28.8	84.1	16.2	1700	0.52	1.32	16.7	1130	11.1	9.14
BNE042	7.02	675	-	356	434	<0.03	3.57	0.01	0.042	4.95	37.6	77.8	9.03	<5	0.09	1.21	43.3	<0.2	2.2	13
BNE045	7.74	330	--	158	193	<0.03	1.02	0.009	0.02	14	10.8	41.8	1.93	<5	0.1	1.23	16.6	0.76	1.33	9.93
BNE046	7.44	558	-	292	356	<0.03	0.132	0.009	0.026	18.3	7.04	67.5	1.91	<5	0.41	3.95	32.9	1.74	1.57	9.66
BNE047	7.28	784	-	300	366	<0.03	0.127	0.009	0.024	139	22.2	99.2	2.31	<5	0.46	5.86	45.3	1	2.7	9.23
BNE048	7.08	592	-	325	397	<0.03	0.175	0.009	0.024	9.82	24.5	69.9	2.69	<5	0.09	1.48	37.8	<0.2	1.51	9.05
BNE050	7.33	549	-	276	337	<0.03	0.11	0.009	0.025	29.8	18.1	73.8	1.71	<5	0.09	1.4	29.7	<0.2	1.52	11.4
Min.	7.02	330	-	143.00	174.46	<0.03	0.01	0.01	0.02	4.95	3.06	39.40	1.20	<5	0.09	1.06	14.10	<0.2	1.16	8.85
Max.	7.75	784	-	356.00	434.32	0.12	7.980	0.0160	0.04	139.00	37.60	99.20	58.90	1700.00	0.66	5.86	45.30	1130.00	13.30	13.50
Mean	7.40	520.06	-	240.82	293.80	0.02	1.418	0.0098	0.03	27.55	19.18	65.82	8.50	110.93	0.26	2.25	26.25	67.70	3.78	10.19

Table B-15: Ouachita County Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
OUA005	03/09/04	12S19W13BCB1	33 41 42.4	93 01 06.4	60	Cane River/Sparta	M
OUA008	03/09/04	13S17W28DDC1	33.5641	92.8554	40	Alluvial	S
OUA017	03/08/04	13S19W28BCD1	33 34 32.8	93 04 16.9	52	Sparta	D
OUA024	03/08/04	14S18W27BDC1	33 29 16.3	92 57 06.6	55	Sparta	M
OUA028	03/08/04	14S19W20BAD1	33 30 26.0	93 05 13.4	61	Sparta	M
OUA030	03/08/04	15S19W10DCC1	33 26 18.0	93 03 18.4	370	Cane River	M
OUA031	03/08/04	15S19W22CCC1	33 24 37.0	93 03 50.3	375	Cane River	M
OUA033	03/08/04	15S19W30DBD1	33 23 56.7	93 06 18.3	59	Sparta	D
OUA034	03/08/04	15S19W33BDB1	33.3904	93.0787	295	Sparta	D
OUA036	03/09/04	14S17W30ACD1	33 29 10.2	92 29 10.2	52	Sparta	D
OUA037	03/08/04	14S17W08CDA1	33.5244	92.8786	-	-	D
OUA041	03/08/04	14S18W28CAB1	33 29 16.3	92 58 06.2	spring	Sparta	U
OUA048	03/09/04	-	33.5350	92.9247	60	Sparta	D
OUA900	03/08/04	-	33.4709	92.8816	42	Sparta	D
OUA901	03/09/04	-	33.5430	92.9664	130	Sparta	S

Table B-16: Ouachita County Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
OUA005	4.95	33	19.5	2.2	2.68	<0.030	0.146	0.006	-	4.68	24.6	0.75	2.62	25.5	0.07	0.75	0.63	8.05	2.58	8.5
OUA008	4.91	55	50.5	7.5	9.15	<0.030	0.699	0.012	-	2.84	28.3	1.99	7.05	<15.0	0.06	<0.46	0.3	11.4	6.53	26.7
OUA017	5.45	36	26.5	5.2	6.34	<0.030	0.155	0.006	-	6.31	32.7	1.26	2.89	<15.0	0.11	1.13	0.74	6.66	2.46	12.5
OUA024	6.61	131	77	152	185.44	<0.030	0.208	0.735	-	28.8	<8.80	13.5	12.7	24.8	0.11	1.24	1.58	0.77	5.06	5.1
OUA028	6.01	58	54	13.7	16.71	<0.030	0.04	0.01	-	6.72	35.8	6.16	1.9	2090	0.09	1.05	<0.13	16.2	1.77	35.8
OUA030	6.51	192	127	66.1	80.64	0.189	0.032	0.011	-	15.5	112	14.3	5.4	3250	0.15	3.59	2.99	63.8	17.2	29.5
OUA031	7.17	249	138	105	128.10	0.337	0.041	0.015	-	10.1	127	12.3	7.81	1700	0.11	3.39	2.86	22.2	35.4	14.7
OUA033	7.15	337	207	86.3	105.29	<0.030	0.029	0.031	-	47.6	36.7	46.8	21.1	21.4	0.15	5.14	2.63	3.46	14.1	26.1
OUA034	7.80	254	140	122	148.84	0.393	0.027	0.034	-	7.62	118	13.6	3.58	1110	0.11	2.89	3.06	29.8	34.9	13.3
OUA036	5.16	98	69	7.7	9.39	<0.030	3.62	0.008	-	7.32	143	3.44	9.68	24	0.12	1.25	1.9	14	9.41	14.1
OUA037	5.44	60	40	14.1	17.20	<0.030	0.776	0.008	-	4.87	42.8	4.81	3.26	<15.0	0.07	1.06	0.72	3	4.31	12.4
OUA041	4.82	25	29	3.3	4.03	<0.030	0.303	0.01	-	2.29	9.1	0.36	2.28	30.7	0.06	0.65	0.28	5.92	1.7	15.6
OUA048	6.36	170	105	32.4	39.53	<0.030	3.45	0.009	-	18.6	74.8	19.4	8.58	56.3	0.12	2.47	2.65	13	4.01	18.4
OUA900	5.54	131	99	5.1	6.22	<0.030	4.87	0.007	-	3.3	241	8.66	16.7	526	0.13	3.6	4.39	9.97	3.3	17.5
OUA901	6.48	207	110	73	89.06	0.198	0.015	0.012	-	3.75	131	13.2	13.8	2770	0.1	3.67	2.83	37.2	20.8	12.5
Min.	4.82	25.00	19.50	2.20	2.68	<0.030	0.02	0.01	-	2.29	<8.80	0.36	1.90	<15.0	0.06	0.65	<0.13	0.77	1.70	5.10
Max.	7.80	337.00	207.00	152.00	185.44	0.39	4.87	0.74	-	47.60	241.00	46.80	21.10	3250.00	0.15	5.14	4.39	63.80	35.40	35.80
Mean	6.02	135.73	86.10	46.37	56.58	0.09	0.96	0.06	-	11.35	77.41	10.70	7.96	776.75	0.10	2.28	1.84	16.36	10.90	17.51

Table B-17: Pine Bluff Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
JEF003	08/23/04	05S09W19BAA1	34.2689	-92.0247	1275	Sparta	C/I
JEF004	08/23/04	05S09W30DBA1	34.2517	-92.0247	792	Sparta	C
JEF005	08/23/04	-	34.2285	-92.0206	-	Sparta	M
JEF008	08/24/04	05S10W11ACA1	34.2944	-92.0567	992	Sparta	C
JEF010	08/23/04	06S09W04BAB1	34.2251	-92.0183	865	Sparta	M
JEF012	08/23/04	06S09W17CCC1	34.1969	-92.0414	848	Sparta	M
JEF016	08/23/04	05S09W07CCC1	34.2847	-92.0328	265	Cockfield	D
JEF024	08/23/04	05S08W30AAB1	34.2521	-91.9128	~900	Sparta	C/I
JEF028	08/23/04	-	34.2983	-91.9730	-	Alluvial	I
JEF034	08/23/04	05S09W34CAB1	34.2317	-91.9736	102	Alluvial	C/I
JEF038A	08/23/04		34.2201	-91.9187	108	Alluvial	C/I
JEF039	08/23/04	06S08W10CAA1	34.2164	-91.8956	1020	Sparta	C/I
JEF041	08/23/04	-	34.2577	-92.0716	-	Sparta	M
JEF042	08/23/04	-	34.1763	-92.0464	-	Cockfield	D
JEF044	08/23/04	-	34.2556	-92.0263	~76	Alluvial	C
JEF045	08/23/04	-	34.2575	-92.0240	772	Sparta	C
JEF900	08/23/04	-	34.3651	-92.0356	~400	-	C

Table B-18: Pine Bluff Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
JEF003	6.68	126	86	51.4	62.71	0.164	0.012	0.01	-	5.36	137	5.35	2.8	2530	0.2	4.94	1.45	52.9	14.4	15.4
JEF004	6.33	139	85	55.7	67.95	0.177	0.014	0.009	-	2.65	131	4.24	2.76	7750	0.15	5.35	1.34	101	16.4	17.2
JEF005	6.6	125	80	53.3	65.03	0.159	0.015	0.009	-	4.04	127	6.78	2.35	2540	0.22	6.48	1.71	70.2	11.4	16.2
JEF008	6.46	126	88	51.4	62.71	0.159	0.013	0.011	-	4.45	123	6.54	2.4	2740	0.16	5	1.65	62.6	12.5	13.8
JEF010	6.64	161	88	61.7	75.27	0.172	0.012	0.01	-	1.41	137	7.19	2.04	10000	0.21	7.1	1.84	143	13.5	17.1
JEF012	7.2	155	99	70.8	86.38	0.228	0.012	0.014	-	4.24	99.9	8.46	1.8	2050	0.17	6.88	1.75	80	17.2	18.5
JEF016	6.61	470	322	192	234.24	0.387	0.02	0.018	-	16.7	65.7	20.5	19.9	5250	0.18	4.63	5.79	356	74.2	42.8
JEF024	7.14	167	117	68.1	83.08	0.209	0.012	0.011	-	9.63	117	7	2.01	2270	0.22	6.18	1.62	57.6	20.7	16.5
JEF028	6.87	856	481	360	439.20	1.02	0.014	0.011	-	30.5	324	102	35.8	9720	0.33	2.17	26.6	322	47.9	28.5
JEF034	6.74	632	362	279	340.38	0.567	0.016	0.01	-	16.1	410	81.7	18	12800	0.25	1.55	21.6	288	16.8	32
JEF038A	6.63	1230	691	410	500.20	0.664	0.012	0.011	-	6.53	494	137	139	15200	0.23	2.36	24.1	930	91.4	29.1
JEF039	7.32	167	102	74.9	91.38	0.213	0.013	0.019	-	6.37	92	7.19	1.69	1670	0.23	5.92	1.53	51.4	21.5	16.1
JEF041	6.36	101	73	42.3	51.61	0.101	0.011	0.009	-	3.77	135	5.31	2.55	2460	0.14	5.01	1.54	53.1	8.62	15.4
JEF042	7.94	504	337	169	206.18	0.321	0.018	0.324	-	68.9	<8.8	3.25	8.25	369	0.14	4.34	0.76	31.8	109	35
JEF044	6.2	575	277	169	206.18	0.431	0.023	0.028	-	14	299	33.1	32	44500	0.13	2.25	13.8	2850	40.9	33.6
JEF045	6.86	112	79	48.8	59.54	<.03	0.232	0.012	-	4.4	118	4.61	2.72	111	0.19	5.91	1.41	<0.5	14.2	15.9
JEF900	7.8	662	400	218	265.96	1.18	0.026	0.054	-	65.9	60	16.2	36.3	22	0.54	4.51	2.48	27	124	10.6
Min.	6.2	101	73	42.3	51.61	<.03	0.011	0.009	-	1.41	4.4	3.25	1.69	22	0.13	1.55	0.76	<0.5	8.62	10.6
Max.	7.94	1230	691	410	500.20	1.18	0.232	0.324	-	68.9	494	137	139	44500	0.54	7.1	26.6	2850	124	42.8
Mean	6.85	371.06	221.59	139.73	170.47	0.36	0.03	0.03	-	15.59	169.06	26.85	18.37	7175.41	0.22	4.74	6.53	322.17	38.51	21.98

Table B-19: Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
ATH001	04/05/04	-	34.32529	93.50876	90	Stanley Shale	D
ATH002	04/05/04	-	34.31377	93.70008	105	Stanley Shale	D
ATH003	04/05/04	-	34.29457	93.94424	85	Stanley Shale	D
ATH004	04/05/04	-	34.31185	94.01291	100?	Stanley Shale	D
ATH005	04/05/04	-	34.31185	94.01291	180?	Stanley Shale	D
ATH006	04/05/04	-	34.26494	94.06884	120	Stanley Shale	D
ATH007	04/05/04	-	34.26494	94.06884	65	Stanley Shale	D
ATH008	04/05/04	-	34.29188	94.18110	207	Stanley Shale	D
ATH009	04/05/04	-	34.34656	94.26499	na	Arkansas Novaculite	not used
ATH010	04/05/04	-	34.21957	93.92500	190?	Stanley Shale	D
ATH011	04/05/04	-	34.19201	93.90828	140	Stanley Shale	D
ATH012	04/05/04	-	34.06807	93.70250	150	Alluvial Aquifer	D
ATH013	04/05/04	-	34.06545	93.71374	60	Alluvial Aquifer	D
ATH014	04/05/04	-	34.06995	93.70943	?	Alluvial Aquifer	D
ATH015	04/06/04	-	33.88086	93.91615	480	Terrace deposits	M
ATH016	04/06/04	-	33.87494	93.92178	525	Terrace deposits	M
ATH017	04/06/04	-	33.80346	93.96156	505	Tokio Formation	M
ATH018	04/06/04	-	33.87584	93.91357	?	Terrace deposits	M
ATH019	04/06/04	-	33.92923	93.88537	85	Tokio Formation	D
ATH020	04/06/04	-	33.95035	93.95948	188	Tokio Formation	D
ATH021	04/06/04	-	33.95772	93.95915	230	Tokio Formation	D
ATH022	04/06/04	-	34.00844	93.56659	125	Alluvial Aquifer	D
ATH023	04/06/04	-	34.04051	93.67160	?	Alluvial Aquifer	D
ATH024	04/06/04	-	34.15699	93.73057	420	Jackfork Sandstone	D
ATH025	04/06/04	-	34.23979	93.64162	185?	Stanley Shale	D
ATH026	04/06/04	-	34.35751	93.50001	110	Stanley Shale	D

Table B-20: Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
ATH001	7.07	259	188.0	126.0	153.7	<0.030	0.030	0.027	-	8.26	45.70	31.20	3.18	209.0	0.31	0.94	5.89	666	15.10	35.80
ATH002	7.06	266	197.0	120.0	146.4	<0.030	0.094	0.077	-	10.70	64.80	29.30	7.05	<15.0	0.25	1.02	5.55	20	15.80	40.20
ATH003	6.85	119	127.0	54.4	66.4	<0.030	0.023	0.016	-	2.83	13.10	7.14	3.73	1410.0	0.32	0.64	2.87	442	13.50	46.80
ATH004	5.22	188	172.0	12.6	15.4	<0.030	14.000	0.028	-	2.90	83.90	9.51	10.20	<15.0	0.16	2.53	4.42	128	14.50	36.90
ATH005	6.00	140	141.0	54.9	67.0	<0.030	0.732	0.068	-	8.84	14.50	10.50	4.90	15.7	0.43	1.06	3.69	214	11.80	45.60
ATH006	7.10	278	193.0	143.0	174.5	0.085	0.042	0.062	-	4.50	48.80	36.90	3.13	52.6	0.23	<0.46	4.51	330	14.40	34.90
ATH007	6.45	163	131.0	78.0	95.2	<0.030	0.136	0.015	-	4.86	20.40	16.70	3.70	30.8	0.17	0.84	4.40	109	9.79	26.10
ATH008	6.88	432	301.0	174.0	212.3	<0.030	0.020	0.072	-	55.90	78.80	61.70	1.99	127.0	0.31	0.47	10.10	1590	17.30	33.40
ATH009	7.07	200	137.0	98.5	120.2	<0.030	0.044	0.043	-	3.83	<8.80	34.40	2.70	<15.0	0.11	<0.46	1.59	<0.50	2.83	13.20
ATH010	7.19	158	114.0	51.5	62.8	<0.030	0.243	0.009	-	42.30	11.20	21.30	5.34	<15.0	0.08	0.78	1.55	<0.50	2.09	4.30
ATH011	8.04	365	228.0	189.0	230.6	0.156	0.063	0.027	-	6.97	722.00	15.30	3.93	<15.0	0.30	0.72	3.61	24.1	63.30	15.30
ATH012	7.78	816	440.0	206.0	251.3	0.512	0.020	0.006	-	21.90	90.70	26.80	115.00	121.0	0.33	3.44	8.24	6.55	124.00	8.60
ATH013	7.84	899	524.0	212.0	258.6	0.454	0.067	0.011	-	49.60	54.90	25.40	124.00	16.5	0.87	3.36	8.12	6.31	146.00	8.50
ATH014	7.04	1700	821.0	166.0	202.5	0.151	0.099	0.010	-	15.00	418.00	67.00	385.00	110.0	0.28	3.42	10.80	641	213.00	10.50
ATH015	9.20	720	438.0	367.0	447.7	0.337	0.021	0.101	-	18.80	<8.80	1.03	3.07	<15.0	2.07	0.91	<0.13	5.2	168.00	10.20
ATH016	9.09	577	365.0	244.0	297.7	0.259	0.018	0.070	-	49.30	<8.80	1.31	5.61	<15.0	0.85	0.71	<0.13	9.8	128.00	10.80
ATH017	9.11	682	406.0	343.0	418.5	0.359	0.020	0.097	-	20.00	<8.80	0.88	2.77	28.1	1.66	0.86	<0.13	10.9	158.00	10.10
ATH018	8.80	533	332.0	245.0	298.9	0.232	0.018	0.252	-	28.90	<8.80	0.48	8.61	<15.0	0.61	1.05	<0.13	2.14	129.00	10.50
ATH019	5.73	64	83.0	17.7	21.6	<0.030	0.011	0.010	-	7.96	32.80	2.26	2.04	4040.0	0.19	3.35	1.18	253	3.46	29.30
ATH020	6.38	188	127.0	89.0	108.6	<0.030	0.035	0.128	-	5.12	22.60	23.00	3.43	<15.0	0.26	2.54	4.12	4.54	6.91	16.40
ATH021	6.23	136	111.0	62.1	75.8	<0.030	0.049	0.090	-	4.60	13.00	15.60	3.65	70.4	0.30	2.45	3.25	19.2	5.64	16.90
ATH022	4.58	22	46.5	5.3	6.5	<0.030	0.231	0.010	-	1.95	9.66	0.14	2.49	<15.0	0.13	<0.46	0.27	6.78	1.67	11.40
ATH023	8.04	561	343.0	200.0	244.0	0.532	0.017	0.022	-	42.20	38.10	7.08	30.90	48.8	0.40	2.56	2.02	14.5	114.00	8.50
ATH024	7.14	421	250.0	176.0	214.7	0.125	0.019	0.011	-	4.61	89.90	2.86	25.30	2030.0	0.32	0.88	2.06	76.3	88.60	13.40
ATH025	7.46	145	99.0	54.1	66.0	<0.030	0.133	0.010	-	29.20	12.70	20.20	4.72	<15.0	0.10	0.84	1.87	<0.50	2.63	4.10
ATH026	7.11	405	255.0	171.0	208.6	<0.030	0.335	0.034	-	20.40	89.70	43.20	15.40	16.8	0.26	1.16	10.50	74.7	23.50	27.00
Min.	4.58	22	46.5	5.3	6.5	<0.030	0.011	0.006	-	1.95	<8.80	0.14	1.99	<15.0	0.08	0.23	<0.13	<0.50	1.67	4.10
Max.	9.20	1700	821.0	367.0	447.7	0.532	14.000	0.252	-	55.90	722.00	67.00	385.00	4040.0	2.07	3.44	10.80	1590	213.00	46.80
Mean	7.17	401	252.7	140.8	171.7	0.132	0.635	0.050	-	18.13	76.82	19.66	30.07	323.4	0.43	1.43	3.88	179.03	57.42	20.33

Table B-21: Northeastern Ouachitas Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Surface Geology	Use
FRO001	09/13/04	-	34.6825	-92.4234	175	Womble Shale	D
FRO002	09/13/04	-	34.7437	-92.5005	~120	Stanley Shale	D
FRO003	09/13/04	-	34.7372	-92.5499	unk	Womble Shale	D
FRO005	09/13/04	-	34.7450	-92.5418	unk	Womble Shale	D
FRO006	09/13/04	-	34.7017	-92.5744	87	Bigfork Chert	D
FRO007	09/13/04	-	34.7984	-92.5690	~70	Womble Shale	D
FRO008	09/13/04	-	34.7227	-92.5384	67	Womble Shale	D
FRO009	09/13/04	-	34.6863	-92.5177	65	Bigfork Chert	D
FRO010	09/13/04	-	34.6618	-92.5462	~160	Womble Shale	D
FRO011	09/20/04	-	34.8033	-92.5611	105	Bigfork Chert - Arkansas Novaculite	D
FRO012	10/11/04	-	34.7467	-92.5444	~75	Womble Shale	D
FRO013	10/11/04	-	34.7452	-92.5442	<75	Womble Shale	D
FRO014	10/11/04	-	34.6830	-92.4235	~160	Womble Shale	D
FRO015	10/11/04	-	34.6819	-92.4234	~500	Womble Shale	D
FRO016	10/19/04	-	34.6822	-92.4224	unk	Womble Shale	D
FRO017	10/19/04	-	34.6811	-92.4222	200	Womble Shale	D
FRO018	10/19/04	-	34.6800	-92.4231	<180	Womble Shale	D
FRO019	10/19/04	-	34.6803	-92.4231	~180	Womble Shale	D
FRO020	10/19/04	-	34.6858	-92.4232	~35	Womble Shale	D
FRO021	10/26/04	-	34.6854	-92.4235	unk	Womble Shale	D
FRO022	10/26/04	-	34.6853	-92.4450	140	Womble Shale	D
FRO023	11/15/04	-	34.7808	-92.7089	unk	Stanley Shale	D
FRO024	11/15/04	-	34.7938	-92.6916	spring	Bigfork Chert/Polk Creek Sh. Contact	U
FRO025	11/15/04	-	34.7876	-92.6202	~120	Womble Shale	D
FRO026	11/15/04	-	34.7717	-92.5664	spring	Arkansas Novaculite	U
FRO027	11/15/04	-	34.7924	-92.6991	60	Arkansas Novaculite	D
FRO028	11/16/04	-	34.9103	-92.4922	90	Terrace	M
FRO029	11/16/04	-	34.9035	-92.4974	90	Terrace	M
FRO030	11/16/04	-	34.9027	-92.5036	90	Terrace	M

Table B-22: Northeastern Ouachitas Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO3-N	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
FRO001	7.59	479	321	199	242.8	<0.03	6.34	0.013	-	14.9	22.4	82.8	13.8	16.7	0.46	1.33	10.9	2.05	6.06	13.4
FRO002	6.18	54	69	14.5	17.7	<0.03	1.02	0.036	-	2.52	49.2	3.41	4.29	<15	0.16	0.47	1.95	45	3.58	12.3
FRO003	7.1	518	333	261	318.4	<0.03	0.146	0.01	-	14.9	35.5	74.8	7.22	34.5	0.42	1	18.4	2.89	12.2	14.1
FRO005	6.72	608	386	270	329.4	<0.03	0.014	0.009	-	30.7	30.3	89.8	13.3	707	0.26	0.48	16.8	22.2	15.5	14.4
FRO006	4.7	21	29.5	7.4	9.0	<0.03	0.012	0.016	-	3.25	13	0.17	1.43	108	0.11	<0.46	0.19	1.18	1.15	8.4
FRO007	5.76	98	83	43.6	53.2	<0.03	<0.01	0.348	-	11.5	<8.8	5.24	2.55	299	0.38	<0.46	7.35	49.6	1.82	12.1
FRO008	6.6	388	254	203	247.7	0.042	<0.01	0.029	-	6.28	80	71.1	2.52	80.3	0.25	0.8	6.6	100	5.86	19.4
FRO009	6.99	372	248	193	235.5	<0.03	<0.01	0.022	-	8.55	20	73.9	3.05	19.2	0.15	<0.46	4.88	75	2.72	13.2
FRO010	7.14	437	283	235	286.7	<0.03	0.057	0.026	-	3.24	65.9	52.5	4.99	36.8	0.29	0.84	24.4	<0.5	3.16	25.3
FRO011	4.49	26	51	3.9	4.8	<0.03	0.071	0.015	-	4	30.6	0.51	2.2	<15	0.13	0.8	0.59	57.2	1.6	11.8
FRO012	7.08	441	288	220	268.4	<0.03	0.312	0.015	0.012	14.9	20.4	64.4	6.83	2.24	0.35	0.99	13.9	10.3	8.19	17.9
FRO013	7.33	649	389	262	319.6	<0.03	0.508	0.011	<0.01	33.2	47.9	90.1	16.2	5.84	0.28	0.58	20.6	8.7	16.4	16.1
FRO014	8.14	378	252	156	190.3	<0.03	5.58	0.02	0.018	15.1	24.1	48.3	11.5	0.63	0.53	0.7	12.1	0.94	10.4	17.4
FRO015	7.66	442	286	150	183.0	<0.03	12.8	0.037	0.038	21.2	39.5	61.2	12.4	0.81	0.31	1.18	14.9	1.54	3.58	19.1
FRO016	7.18	512	295	239	291.6	<0.03	0.241	0.011	<0.01	33.7	75.4	58.5	4.9	0.26	1.58	5.38	28.3	0.63	5.03	9.73
FRO017	7.42	432	269	189	230.6	<0.03	1.07	0.016	0.014	32.2	30.2	68.2	6.63	1.3	0.44	1.21	10.8	0.24	5.24	13
FRO018	7.53	478	272	238	290.4	<0.03	0.08	0.011	0.01	15	35.1	53.2	9.73	13.3	0.49	1.54	28.3	16.9	5.33	10.4
FRO019	7.45	392	219	196	239.1	<0.03	0.021	0.011	0.011	13.6	37.3	46.9	4.23	97.8	0.47	1.85	21.1	26.7	1.85	11.3
FRO020	5.84	192	134	28.4	34.6	<0.03	4.73	0.01	0.102	27.9	27.8	14.1	12.5	55.1	0.41	0.77	8.17	96.1	6.72	18.4
FRO021	6.88	404	254	163	198.9	<0.03	4.36	0.123	0.131	19.2	18.6	52.4	15.1	1.37	0.43	1.71	12.8	18.8	9.49	17.6
FRO022	7.49	239	153	106	129.3	<0.03	1.26	0.029	0.03	9.65	5.69	23.8	5.64	1.47	0.48	0.87	14.1	2.42	2.04	16.6
FRO023	7.05	104	68	35.9	43.8	0.055	0.097	0.03	0.03	13.8	33.2	13.8	1.78	<20	0.19	2.17	3.99	76.7	2.13	10.7
FRO024	7.03	34	42	4.8	5.9	<0.03	<0.01	0.01	0.033	10.5	8.85	2.04	2.09	49.8	0.16	0.57	1.47	31.2	1.42	13.3
FRO025	6.71	381	240	175	213.5	0.033	<0.01	0.015	0.014	27.3	25.1	77.3	3.74	<20	0.15	0.84	9.79	113	7.95	19.6
FRO026	4.93	19	18.5	5.6	6.8	<0.03	<0.01	0.009	0.01	3.53	4.81	0.61	1.55	<20	0.11	0.49	0.32	22.3	1.26	11.4
FRO027	5.65	79	61.5	<1	0.6	0.047	0.014	0.023	0.557	16.7	2.14	4.15	2.35	5910	0.26	1.23	2.68	735	1.62	13.4
FRO028	6.54	163	125	52.3	63.8	<0.03	1.31	0.024	0.024	4.98	110	13.2	14.9	<20	0.09	1.48	3.3	<0.2	18.5	46.3
FRO029	6.27	265	169	62.3	76.0	<0.03	1.59	0.015	0.016	17.9	129	23.1	24.2	2810	0.12	2.78	8.3	137	20.7	39.5
FRO030	6.32	89	88.5	25.1	30.6	<0.03	2.74	0.028	0.027	2.19	37.5	4.8	5.83	26.1	0.13	1.21	1.69	1.08	8.65	38.3
Min.	4.49	19	18.5	0.5	0.6	<0.03	<0.01	0.009	<0.01	2.19	2.14	0.17	1.43	0.26	0.09	<0.46	0.19	<0.2	1.15	8.4
Max.	8.14	649	389	270	329.4	0.055	12.8	0.348	0.557	33.7	129	90.1	24.2	5910	1.58	5.38	28.3	735	20.7	46.3
Mean	6.68	299.79	195.90	128.94	157.31	0.02	1.53	0.03	0.06	14.91	36.69	40.49	7.50	356.29	0.33	1.17	10.64	57.07	6.56	17.39

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ADEQ State of Arkansas
Department of Environmental Quality

"To protect, enhance and restore the natural environment for the well-being of all Arkansans."